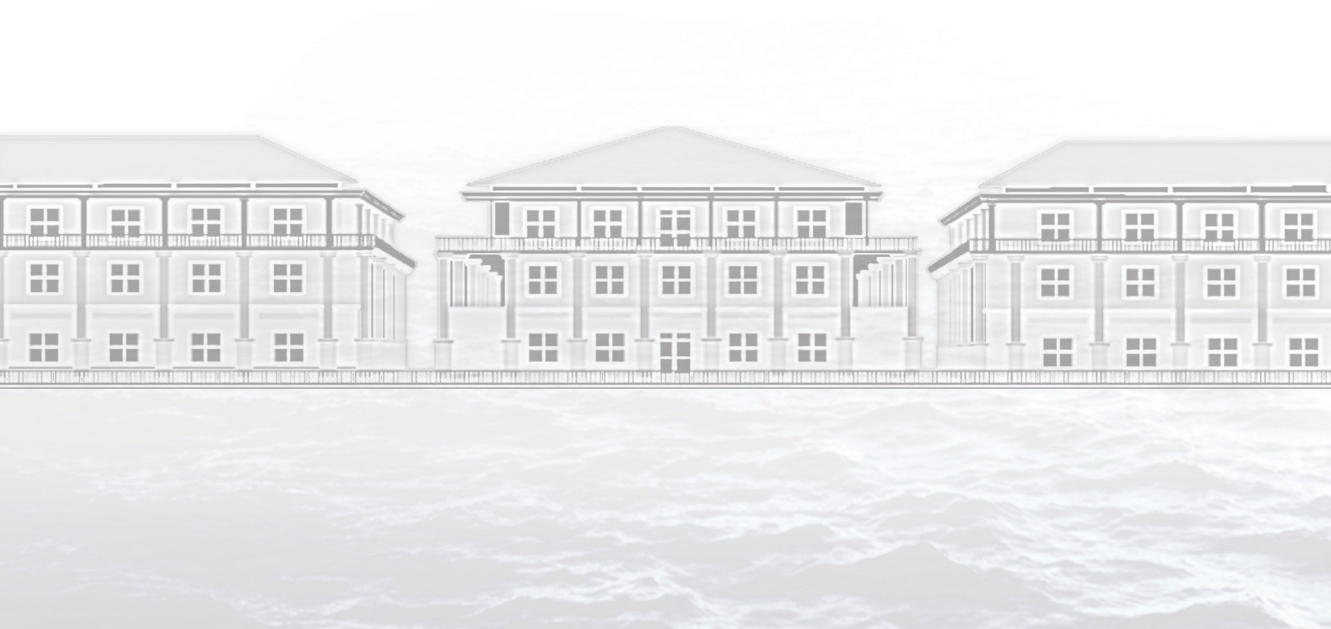




NAVAL & MARITIME ACADEMY

THE PORTHOLE

**December 2023
Second Edition**





THE PORTHOLE

December 2023
Second Edition

Naval & Maritime Academy

'ECONOMIC SECURITY AND RESILIENCE THROUGH THE MARITIME REALM'

THE PORTHOLE

The Porthole is an annual testament to the academic prowess and maritime expertise fostered by the Naval & Maritime Academy, unveiled each year in conjunction with the celebrated Navy Day. Its inaugural edition, launched in 2022, marked a milestone achievement in fulfilling the long-standing aspiration of the NMA, which serves as an arena for individuals immersed in the academic realm to showcase their research, thoughts, and arguments across specific subject fields.

With the advent of its second edition, Porthole ascends to new heights by providing a centralised platform for individuals deeply engaged in academia. This edition beckons contributors to share their expertise by publishing research papers and scholarly articles across diverse subject disciplines. The primary objective of this edition is to fortify academic writing abilities and cultivate a voracious reading habit among naval personnel. The journal strives to maintain the community abreast of developments in diverse subject areas in the dynamic landscape of constantly evolving knowledge.

Inside the pages of Porthole, a diverse blend of scholarly articles unfolds as a collective effort contributed by a spectrum of individuals. The authors include members of the faculty, student officers, officer undertrainees, sailor instructors, and sailor undertrainees, each providing insights within specific disciplines or fields of study.

The views expressed by the authors are personal and do not necessarily align with the official stance of the NMA editorial policy. However, the copyright for all published articles rests firmly with the editorial board. Reproduction in whole or part is permissible only with the written concurrence of the Chief Editor.

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Contacts

Naval & Maritime Academy, Trincomalee

Training Captain
Tel: 0267761212

Email: nma-tc@navy.lk

website : nma.navy.lk

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FOREWORD



Sail into literary wonder with the Second Edition of the Porthole

William Zinsser once wisely remarked, "Hard writing makes easy reading: Easy writing makes hard reading", encapsulating the essence of the profound connection between the effort invested in writing and its impact on the reader. As the Commandant of the Naval & Maritime Academy, it is my great pleasure to present the foreword for the second edition of our annual journal.

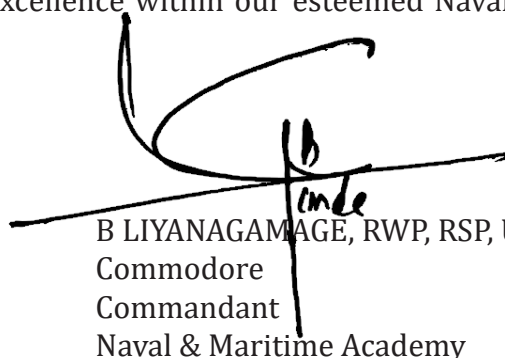
Porthole serves as a showcase of the hidden talents within the academic realm, specifically highlighting the efficiency of academic writing. I am deeply impressed by the researches conducted across various subject disciplines, paving the way for insightful solutions in pursuit of our common goals.

The concept of establishing a professional publication for the Naval & Maritime Academy was originated with the previous Commandant, who envisioned enhancing the writing abilities of our academics. Through immense commitment, the goal was materialised with the inauguration and publication of the Porthole in 2022. Continuing this noble effort with the second edition is not an easy task, considering the myriad responsibilities shouldered by members of the faculty and trainees.

Porthole aligns with the Sri Lanka Navy's goal of instilling writing and reading habits among naval personnel, offering a valuable forum for intellectual exchange. This trend is not only fascinating but also greatly appreciated.

I must commend the editorial board for their untiring efforts in selecting, proofreading, and compiling the articles. The IT school deserves recognition for their dedication in designing and editing work, while the Language School staff's meticulous proofreading adds vibrancy to the journal producing an excellent outcome.

I congratulate all the authors for their utmost contribution in this scholarly work. Your professionalism and dedication shine brightly throughout the pages. Your expertise is evident, and readers will undoubtedly benefit from your knowledge. May this platform continue to foster a culture of knowledge-sharing and academic excellence within our esteemed Naval & Maritime Academy!



B LIYANAGAMAGE, RWP, RSP, USP, ndc, psc
Commodore
Commandant
Naval & Maritime Academy

MESSAGE FROM THE EDITORIAL BOARD

The editorial board considers it a privilege to helm the second edition of the Porthole published by the Naval & Maritime Academy. This responsibility coincides with the ongoing efforts of the Sri Lanka Navy to instil the habits of reading and writing among its officers and sailors. Undoubtedly, the NMA journal, the Porthole offers a substantial platform for officers and sailors at the NMA to inculcate these habits in a fair and enriching manner. Additionally, it opens avenues for them to emerge as professional authors, contributing to higher levels of professional writing.

The myriad views and insightful recommendations presented by the authors within the journal are poised to be enlightening for decision-makers at all levels. The NMA journal encapsulates writings from various echelons, spanning the members of the faculty, instructors, student officers, officer undertrainees, sailor instructors, and sailor undertrainees, ensuring a comprehensive and inclusive perspective that can significantly contribute in effective decision-making processes.

In realising the vision of the second edition of the Porthole, the personal concerns, active involvements, and strategic directives of the Commandant have played a pivotal role in shaping the quality of the final product. We sincerely appreciate the commitments made by the Commandant of the Naval & Maritime Academy, whose vision has been instrumental in turning this endeavour into a reality.

Finally, the editorial board extends its heartfelt compliments to all stakeholders who contributed in various capacities to publish the journal to the highest standard. Through the collaborative efforts of all involved parties, the Porthole has been brought to fruition, marking a significant milestone in pursuing academic excellence.

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UNITED STATES INDO-PACIFIC STRATEGY: BENEFITS TO SOUTH ASIAN COUNTRIES WITH EMPHASIS ON SRI LANKA

Commander (ND) JHCH Ranaweera, RSP, USP, psc

Officer Training Officer



Abstract

This paper explores the multifaceted impact of the Indo-Pacific strategy on South Asian countries, focusing on the geopolitical, economic, and security dimensions of the evolving regional landscape. As the Indo-Pacific gains prominence in international relations, South Asian nations find themselves strategically positioned in a region of growing importance. The study investigates the potential benefits accruing to these countries in the wake of the Indo-Pacific strategy, examining economic opportunities, enhanced security measures, infrastructure development, and the fostering of strategic partnerships. Further, the author aims to discuss the US Indo-Pacific strategy in Sri Lanka’s lens in order to explore the avenues to harness advantages of it to Sri Lanka.

Keywords: Indo-Pacific Strategy, Geopolitical, Economic, Security, Benefits

Introduction

A universal definition for Indo-pacific could not be found in the global literature whereas the boundaries for this region defers from nation to nation according to their geopolitical and strategic perspectives. Nevertheless, in general the Indo-Pacific region extends from the east coast of Africa to the west coast of the United States of America (USA), and from the Arctic Ocean to the Antarctic Ocean. CEOWORLD magazine (2019) illustrates that ‘Indo-Pacific’ term is being very widely used in geopolitical and geostrategic contexts since 2011. According to Charlton, G.C. and Gao, X. (2023) more than half of the world’s population live in this region with approximately two-thirds of the world’s economy is based in it. It is the home for seven largest militaries in the world as well which depicts the great importance of the region to any state in the world.

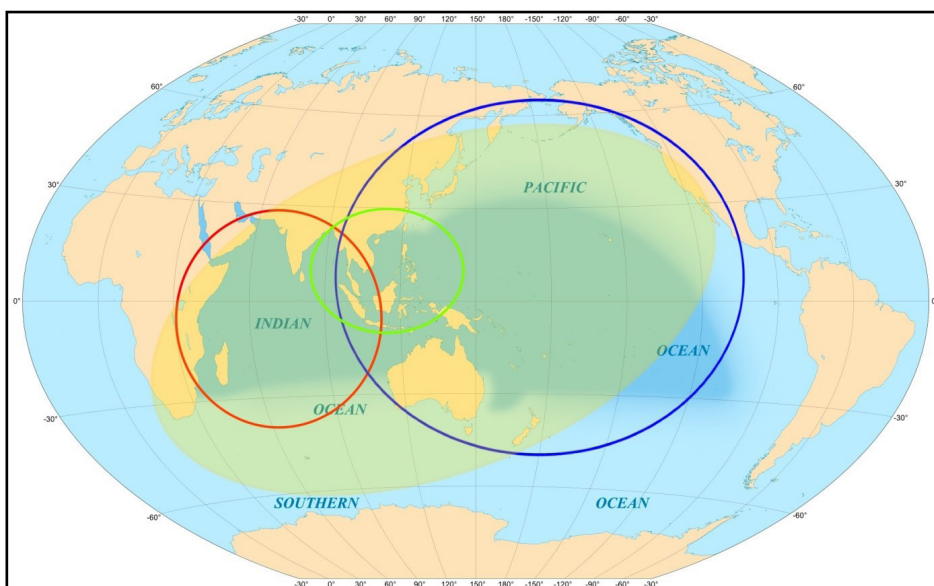


Figure 1: Indo-Pacific Region
Source: <https://gasam.org.tr/india-and-the-eu-strategy-for-indo-pacific-region/>

What is US Indo-Pacific Strategy?

The United States (US) defines their Indo-Pacific strategy as “an ironclad and enduring commitment to a region that spans from the Pacific Ocean to the Indian subcontinent” (ShareAmerica, 2019). It was the President Obama’s administration who initiated the US Indo-Pacific strategy which was then termed as the ‘pivot’ or ‘rebalance’ to the region in 2011 with the goals of enhancing the economic prosperity, diplomacy, and military engagement with Indo-Pacific region. It was also focused in countering the increased influence of China in the region and promoting regional stability and prosperity. However, west of Indian Ocean, South Asia and Bay of Bengal had not been given significance in then strategy until the President Trump administration recharted the pivot to the Indo-Pacific, expanding its focus to include the Indian Ocean region (IOR). The strategy has been remapped by the present President of the USA Joe Biden and aims to enhance US partnerships and security alliances to ensure a free, open, connected, prosperous, resilient, secure and rules-based international order in the Indo-Pacific region in which all Indo-Pacific countries are empowered to adopt to the 21st century’s challenges whilst countering rising China’s influence (Indo-Pacific strategy - the White House, 2023).

Charlton, G.C. and Gao, X. (2023) emphasize this region has provided job opportunities for more than three million Americans and facilitates approximately \$900 billion as foreign direct investment (FDI) in the United States. It is predicted that the region would reach to two-thirds of global economic growth in a year ahead. Further, this region is of immense importance to USA as far as the security is concerned because of the significant number of their military personnel deployed in this region.

It is not solely the US who has embraced the Indo-Pacific strategy in the world. Several other countries have also expressed support for the strategy or have adopted their own versions of it. These countries include;

- a. **Japan.** Japan has been a strong supporter of the US Indo-Pacific strategy and has partnered with the US to promote a free and open Indo-Pacific through various initiatives, including infrastructure development and maritime security.
- b. **Australia.** Australia has also been a strong supporter of the Indo-Pacific strategy and has partnered with the US to promote regional stability and economic growth specially through multilateral alliances such as ‘Quadilateral Security Dialogue (Quad)’ and ‘Security Pact between Australia, the UK and the USA (AUKUS)’ etc.
- c. **India.** India has its own version of the Indo-Pacific strategy called the Indo-Pacific Ocean’s Initiative, which aims to promote peace, stability, and prosperity in the region through economic and security cooperation.
- d. **Singapore.** Singapore has embraced the Indo-Pacific concept and has promoted the idea of a ‘networked region’ that is connected through trade and infrastructure, and blessed by the USA immensely.
- e. **France.** The interest of France in the Indo-Pacific region is mainly focused on maritime security, economic partnerships, and promoting human rights.
- f. **European Union (EU).** EU launched its Indo-Pacific strategy in 2021 whose approach is designed to foster a rules-based international order, an open and fair environment for trade and investment, tackling climate change and supporting connectivity with the EU.

Significance of IOR

IOR is the third largest ocean in the world and has seen the oldest sea trade routes in the world. One third of the world's bulk cargo and two-thirds of the world's oil shipments are transited through this region. It is the home to nearly 35 percent of the world population and the Indian Ocean economy accounted for 10.7 percent of the global GDP in 2017 and predicted to be expanding vastly in the years ahead. IOR is the home for many of the most critical choke points in the world such as Strait of Hormuz, Gulf of Aiden, Strait of Malacca and Straight of Sunda etc. The region is a proved energy hub which is rich with many explored and yet to be explored hydrocarbon reserves particularly, offshore Saudi Arabia, Iran, Persian Gulf, India, Gulf of Mannar and Western Australia etc. The region is the base for 60 percent of Uranium, 40 percent of gold and 98 percent of diamond. (Stimson Center, 2023). IORA (2023) explains that the IOR is nourished with fishery resources and 14 percent of the world's caught fish is found in the IOR which provides the protein requirement for several hundreds of millions of people in the world.

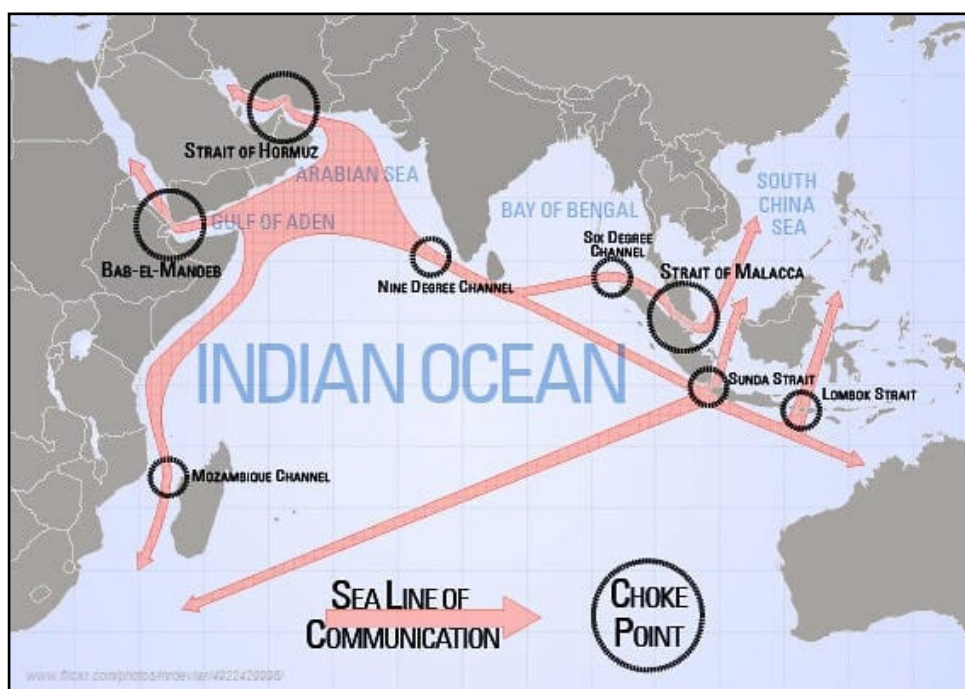


Figure 2: Strategic Choke Points in the IOR
Source: <https://journalsofindia.com/maritime-choke-points-of-indian-ocean/>

US Strategy Narrowing Down from Indo-Pacific to Asia-Pacific

US Indo-Pacific strategy was initially focused on East Asia and the Pacific until President Trump expanded the strategy sphere across IOR as well, considering the strategic and economic importance of the region as mentioned above as well as China's growing influence in the IOR.

However, considering the aforementioned very reasons, the US has further narrowed down its foreign policy focus from the "Asia-Pacific" to the "Indo-Pacific" region in recent past years. China's rising economic and military powers, as well as its increasing assertiveness in the South China Sea have also caused this shift. The US has also expressed its determination to maintain a strong presence in the IOR which is strategically important for global trade routes and energy security. However, it is also important to note that the Indo-Pacific strategy is not solely focused on containing China, but also includes promoting regional stability and cooperation as well (Darmawan, 2022).

US Indo-Pacific Strategy through South Asia's Lens: Benefits for South Asian Countries

The US has emphasized the importance of the IOR in its national security strategy. Thus, the strategy is expected to lead to increased US engagement with countries such as India, Sri Lanka, Bangladesh, and Maldives situated in the south Asian region. Therefore, the implications of this strategy in South Asia being a vital region in the whole IOR are significant. US Indo-Pacific strategy has several potential benefits for South Asian countries which could be highlighted as follows:

- a. **Enhanced Economic Ties.** The strategy aims to promote increased trade, investment, and economic integration in the Indo-Pacific region. Therefore, South Asian countries such as India, Sri Lanka, Bangladesh, and Maldives could be benefitted immensely by opening up new markets for their goods and services and increasing tourism and investment opportunities.
- b. **Infrastructure Development.** The promotion and development of high-quality infrastructure projects by the USA in the region, could contribute immensely to the South Asian countries to fulfill their much needed infrastructure facilities by which they could succeed economic growth.
- c. **Improved Security Cooperation.** The US has been increasing its military and security cooperation with South Asian countries, in the forms of strengthening military capabilities by providing grants, military hardware and training etc. This could contribute to improve their military capacities, maritime domain awareness (MDA) etc. to address increased non-traditional threats such as terrorism, maritime piracy, smuggling, illegal, unreported, unregulated (IUU) fishing etc. in the South Asian region. Ultimately, this leads to the growth of the maritime economy in South Asia.
- d. **Technology Transfer and Innovation.** The US is very rich with knowledge on technology, science, research and development and innovation and has been promoting collaboration on those fields. Obtaining the knowledge on the above fields through the US strategy would immensely contribute for implementation and development of new industries and businesses in South Asia.
- e. **Development of the Health Sector.** Prioritize the health sector is a crucial area for the South Asian countries to be benefitted through the US Indo-Pacific strategy. These countries could explore the assistance of the US to ensure the receipt of quality pharmaceutical products for enabling their people to have access for better healthcare. Access to modern medical treatments would improve the life span of their people.
- f. **Promoting Information Technology (IT) Sector and Digital Governance.**
The US will engage with like-minded partners in the IOR to promote digital governance through more ambitious and standardized approaches. South Asian countries, specially countries like Sri Lanka, Bangladesh etc. who need a significant IT knowledge with a huge capital could be immensely benefitted with these kind of initiatives which support to improve artificial intelligence, data protection and security, measures to address cyber-crimes, systemizing government offices such as immigration, consular work, registration of various essential documents etc. Further, promoting IT and digital sectors could lead to new business opportunities and job creation in South Asia.
- e. **Mitigating the Climatic Change.** The US strategy continues its disaster risk mitigation activities in the Indo-Pacific to reduce hazard risks aggravated by climate change

and build resilience amongst vulnerable communities who are highly exposed to natural and man-made disasters. Cooperation on research and innovation as well as satellite services facilitate these specific objectives. This is very helpful to countries such as India, Pakistan, Bangladesh and Sri Lanka etc. in the South Asia who frequently hit by natural calamities.

f. **Promoting Renewable Energy.** The US has been promoting greater energy cooperation in the Indo-Pacific region as far as renewable energy sector is concerned. In a context where a lot of developing South Asian countries such as Sri Lanka facing energy crises, the US contribution through their strategy would provide increased access to new sources of energy for countries in South Asia.

Recommendations

Even though the implementation of the Indo-Pacific strategy would bring many opportunities for South Asia, it may lead to increased geopolitical tensions and competition in the region as well. There could be often overlaps between the strategic interests of major powers and the interests of regional states which could create complex dynamics that require careful management, particularly in a region such as South Asia where there are multiple great powers with significant interests. In the above perspective, following recommendations could be derived in order to explore the best opportunities for the South Asian countries to achieve great prosperity;

a. **Form Closer Regional Alliances.** By working together, regional states can increase their collective bargaining power and reduce their dependence on external actors. Strengthening regional alliances and partnerships can help to promote cooperation and reduce regional tensions too. Further, they provide a platform for South Asian countries to engage with major powers on their own terms. This can help to ensure that the region benefits from major power competition, rather than being dominated or bandwagon to them.

(1) **The South Asian Association for Regional Cooperation (SAARC).**

SAARC is an intergovernmental organization that aims to promote economic and political cooperation among South Asian countries. However, it has faced challenges in recent years due to the rivalry between India and Pakistan, and as a result, the organization has not been very effective in the recent years. Strengthening SAARC could help to promote greater regional cooperation and reduce tensions in the South Asia.

(2) **The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC).**

The name BIMSTEC itself suggests the purpose of its existence i.e. to bring the countries from the Bay of Bengal region together to promote technical, economic and social development, as well as regional cooperation. Though the organization has made some progress in recent years, still a greater potential exists to further strengthen cooperation, particularly in areas such as energy and trade.

(3) **The Indian Ocean Rim Association (IORA).**

IORA is a regional forum that brings together countries from the IOR to promote cooperation and economic development. The organization has focused on a broad range of issues, including trade, tourism, and maritime security. A greater regional integration and cooperation could be enhanced by further strengthening of this organization.

(4) **Indian Naval Symposium (IONS).**

IONS is a forum for the littoral states of the IOR to work collaboratively to enhance the maritime security cooperation and discuss regional maritime issues, and promote friendly relationships among the member states.

(5) **Economic cooperation.** Strengthening economic cooperation through initiatives such as the South Asian Free Trade Area (SAFTA) agreement and the Asia-Pacific Trade Agreement (APTA) could help to promote greater regional integration and reduce economic dependencies on external actors.

b. **Engage in Diplomatic Outreach.** South Asian countries should endeavor to engage in diplomatic negotiations with multiple major powers simultaneously, in order to balance competing interests and prevent any one power dominating the region. Further, the regional countries should determine to support each other for justice in international arenas such as United Nations General Assembly and Human Rights Council etc. Getting themselves divided in the house due to the influence of any other powerful nation should not be occurred. Further, all states in the region should endeavour to adopt to the non-aligned foreign policy.

c. **Prioritizing Regional Economic Integration and Development.** This could be identified as a very important approach. This could enhance mutually beneficial economic ties between South Asian countries and that would lead to a concrete foundation for stronger political and strategic cooperation. Finally, promoting a culture of dialogue, cooperation, and respect for international law among major powers and regional states could be a significant step towards fostering greater stability in the region. Following aspects could be used to prioritize South Asian regional economic integration and development in the IOR which would attract the US investments;

(1) **Connectivity of Infrastructure.** Regional connectivity infrastructure such as roads, railways, ports, and airports can facilitate cross-border trade and investment by reducing transportation costs, improving logistics, and enhancing market access. South Asian countries can work together to identify and invest in key connectivity projects that can unlock the region's economic potential.

(2) **Trade Agreements.** South Asian countries can negotiate trade agreements to reduce trade barriers and promote regional economic integration.

(3) **Investment in Human Capital.** Education and training programmes can help to develop a skilled workforce in the region, which can attract US foreign investment.

(4) **Energy Cooperation.** South Asian countries could prioritize energy cooperation, including the development of energy infrastructure and investment in renewable energy sources like solar and wind power which could attract US FDIs in the energy field.

(5) **Regional Financial Cooperation.** South Asian countries can strengthen regional financial cooperation mechanisms such as regional payment systems, currency swaps, and investment platforms. For an example, Indian Rupee is gaining a significant position in global market. Promoting such mechanisms in the region could address the economic dependence on external actors and promote regional economic connectivity.

US Indo-Pacific Strategy in Sri Lanka's Lens

Sri Lanka has been enjoying very cordial relations with the USA for several decades and therefore, harnessing the benefits of the US Indo-Pacific strategy is significant in a time in extremely need to the country. Further, being a country which is situated in a significant strategic location in the IOR, Sri Lanka could also gain aforementioned benefits. Adopting to the strategies derived under recommendations would inevitably useful for harnessing those benefits and specially, not being bias to any powerful state as well as not being forced to play a proxy role in the region are paramount important.

Active participation in the dialogues to strengthen regional cooperation, enhancing bilateral and multilateral cooperation with the states in the region, implementing trade agreements with the regional countries, enhancing the connectivity of country's maritime infrastructure such as ports and adopting to non-aligned foreign policy are very much vital in that context.

Conclusion

'Indo-Pacific', which was at its beginning a geographic concept that described two regions of the Indian and the Pacific Oceans, has become a strategy for many super powers in the contemporary world and it is the USA which has embraced the strategy to a greater extent. The main pillars of this initiative are economics, governance and security and it is not a secret that hedging against rising China as a giant in the region is also a significant focus on the strategy. The huge investments outlined by the USA for fuelling the economic growth as well as enhancing the security in the region amply depict the importance of the region.

Due to the significance of the IOR and the dominance of China in the region through its Belt and Road initiative, the United States has narrowed down the Indo-Pacific Strategy which reflects the attention of the United States to the Indian Ocean region.

South Asian countries in the IOR such as Sri Lanka, Bangladesh, Pakistan and Maldives etc. could be immensely benefitted through the US Indo-Pacific strategy specially by taking their geographical location to the advantage. Nevertheless, following meticulously planned strategies to avoid these poor South Asian states getting caught between China and the USA rivalry is very much vital in that endeavour without losing their share of the dividends brought about by the economic development of both countries.

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IMPLEMENTATION OF ARTIFICIAL DIVING SITES TO ENHANCE DIVING TOURISM

Lieutenant Commander (CDO) DJKS Siriwardana

Student Officer - 33rd Junior Naval Staff Course



Abstract

Sri Lanka’s tourism sector is vital to the country’s economic growth and is a key component that brings in a lot of money from outside the nation. When thinking about the benefits of tourism, it is crucial to ensure that the Sri Lankan tourist business keeps growing by incorporating new ideas in tourism and technology. One appealing new facet that emerged from the travel industry is scuba diving tourism and artificial diving sites, which might be a part of this effort. Any man-made structure submerged in water that attracts fish and other marine life is called an artificial diving site. Most artificial reefs, except for ‘accidental’ reefs, are in sandy, flat areas with little to no natural reef structure. Five artificial diving sites in Sri Lanka are operating, including Trincomalee Underwater Museums and Sagain Shipwreck, Galle and Tangalle Underwater Museums, and Galle. Since there is a pressing need to expand scuba tourism in Sri Lanka, this study aims to examine the feasibility of establishing additional sites in the country’s Southern and Eastern regions. The author has assessed the current demand to promote diving tourism in Sri Lanka and the construction of new locations in Sri Lanka. The findings of factors to be considered for the implementation process were identified, and recommendations have been derived accordingly.

Keywords: Diving, Artificial Diving Sites, Tourism Industry, Scuba Diving

Introduction

The direct and indirect impacts of the tourist sector on national economies are substantial and far-reaching. Tourist spending is crucial to the economy of Sri Lanka and the globe at large. According to the WTTC (2023), the travel and tourism business is a major contributor to the worldwide gross domestic product. Sri Lanka’s tourism industry saw a significant increase in revenue in December 2022, surpassing \$1 billion, as reported in the 2022 Annual Statistical Report of the Sri Lanka Tourism Development Authority (SLTDA). This was compared to the revenue of \$507 million in December 2021 (SLTDA, 2023).

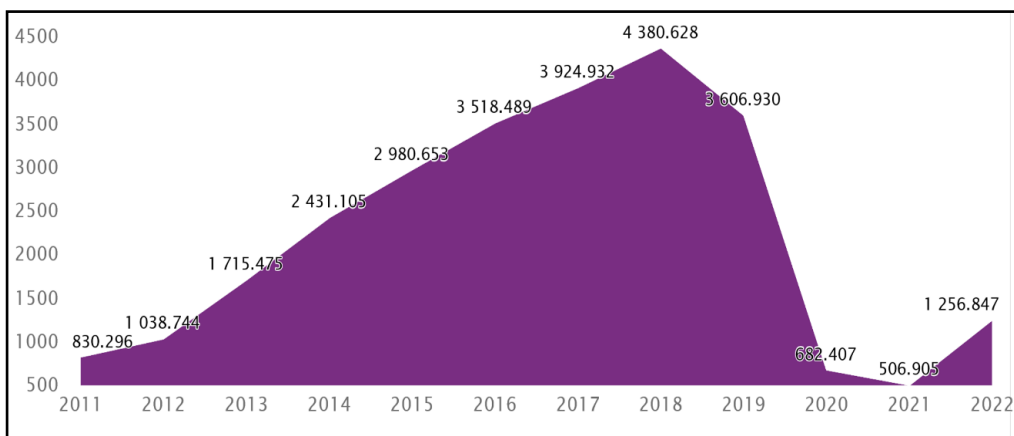


Figure 1: Tourism Revenue
Source: Ceicdata (n.d.)

Foreign tourists visited the country in 2022 at a 270.2% increase from 194,495 in 2021 to 719,978. Europe was the most popular destination for Sri Lankan tourists in 2022, with arrivals up 42.5% from pre-pandemic levels (-57.5 vs 2018).

Table1: Reasons for Tourists to Visit Sri Lanka

SOURCE MARKET	PLEASURE/ VACATION	VISITING FRIENDS AND RELATIVES	BUSINESS	OTHER OR NOT RESPONDED	NUMBER OF TOURISTS
India	68,926	21,620	19,997	12,461	123,004
Russia	63,272	4,935	131	22,934	91,272
United Kindom	42,142	37,280	1,048	4,717	85,187
Germany	38,218	9,305	433	7,586	55,542
France	24,573	8,499	320	2,075	35,467
Australia	8,176	19,297	452	2,999	30,924
Canada	5,214	20,126	167	1,338	26,845
United State	9,910	8,556	611	3,153	22,230
Maldives	4,796	4,063	20	10,001	18,880
Poland	13,997	277	107	814	15,195

Source: SLTDA (2023)

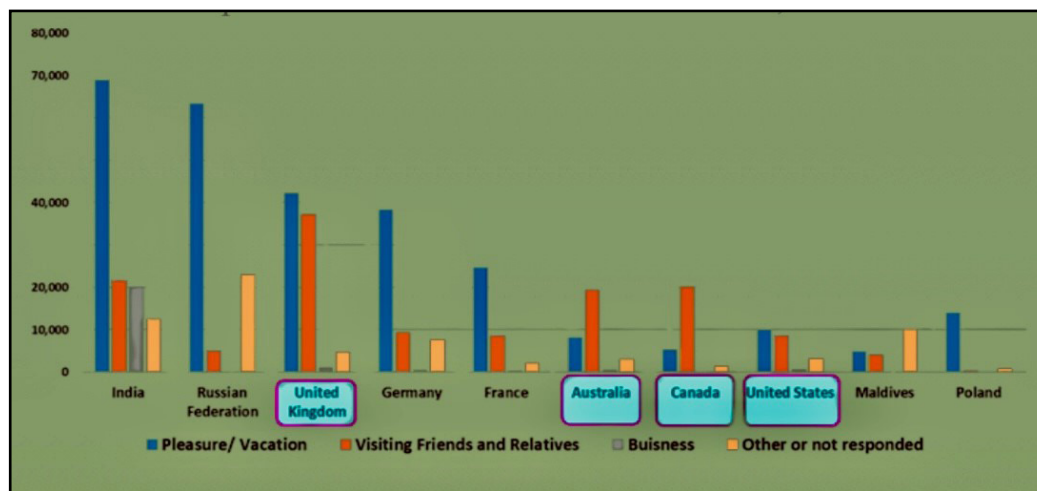


Figure 2: Reasons for Visiting Sri Lanka

Source: <https://dayouting.lk/places-to-visit/107/underwater-museum-galle-by-navy>

As per the above data, it can be concluded that most visitors visit Sri Lanka for pleasure and vacation, so in case of the development of tourist revenue, Sri Lanka has to enhance opportunities for fun and relaxation using technology and new trends in tourism.

Research Problem and Background

This study examines the feasibility and variables of building artificial diving sites in Southern and Eastern Sri Lanka to boost tourism. Scuba-diving and artificial diving sites have become popular in tourism suddenly. It has drawn the attention of many individuals worldwide who enjoy sea, river, and lake recreation due to the restricted time humans may spend underwater. Artificial diving sites are fascinating, exciting, and unique due to new technologies (Musa and Dimmock, 2013). Coral reefs and manmade diving sites helping to develop Scuba diving tourism. Scuba diving on calm, attractive coral reefed beaches attracts tourists. Even though diving-related mechanical damage may degrade tiny reefs. The damage is acceptable for short- and long-term benefits. Human-made diving attractions can attract tourists without coral reefs. Artificial underwater attractions like reef

substitutes can reduce tensions between nature conservation and economic benefits (Van Treeck and Schuhmacher, 1999).

World famous Artificial Diving Sites

- Museo subacuatico de arte, Mexico.
- Parco archeologico sommerso di baia, Italy.
- Dive Bahrain, Bahrain.
- Christ of the Abyss, Italy.
- Molinere Underwater Sculpture Park, Grenada.
- Ancient cities of Alexandria, Heraklion, and Canopus, Egypt.
- Yonaguni monument, Japan.
- Underwater post office, Yanuatu.
- Sunken pirate city of Port Royal, Jamaica.
- Neptune Memorial Reef, USA.
- Lion city of Qingdao lake, China.
- Ancient town of Dwarka, India.

Sri Lankan Context

Sri Lanka has 1,790 kilometers of coastline, per the Department of Census and Statistics (n.d.). Thus, Sri Lanka offers great beach surfing, snorkeling, swimming, and diving. Most of Sri Lanka's best beaches are in the South and East, including Midigama, Mirissa, Aluthgama, Bentota, Tangalla, Unawatuna, Induruwa, Arugam Bay, Nilaveli, Hikkaduwa, Kalkudah Bay, and Uppuveli. Local and foreign tourists can visit Galle's Unawatuna beach. Sir Arthur C. Clarke ranked it the 12th most beautiful natural beach. Compared to Australia and the Maldives, 'The Discovery Channel' considers it the most beautiful beach (Rathnayake, 2015).

Galle is a renowned Sri Lankan tourist destination. Ceylon Expeditions (n.d.) reports that the government opened its first underwater museum in Galle on June 17, 2020. The Sri Lanka Navy handles this effort under government oversight. This campaign aims to draw tourists. Sri Lanka is ranked highly according to international travel publications. Sri Lanka can grow maritime-based tourism in established areas with technical progress because it is an island. Artificial coral reefs are possible as underwater museums. Another ambition is a 15-meter-deep Galle underwater museum (Watching Lanka, 2020).



Figure 3: The Underwater Museum is Located Near the Galle Harbor
Source: <https://dayouting.lk/places-to-visit/107/underwater-museum-galle-by-navy>

Artificial diving sites are a part of Diving tourism, which reveals that diving tourism is a very popular emerging sector in Sri Lankan tourism (Ceylon Expeditions, n.d). Further, the Sri Lanka Navy Divers constructed three underwater museums and galleries in Trincomalee, Galle and Nilwella beach Tangalle (Amalean, 2021).

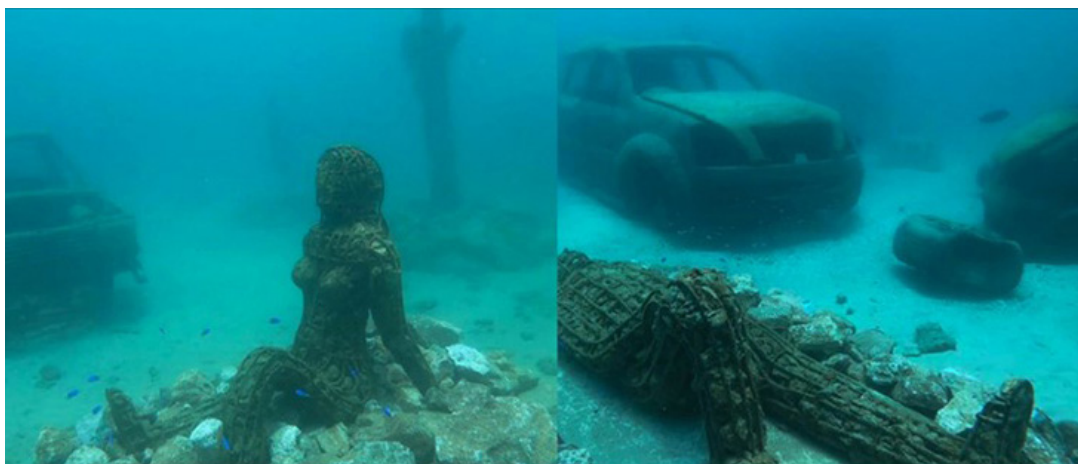


Figure 4: Galleries in Nilwella Beach Tangalle
Source: <https://archives1.dailynews.lk/sites/default/files/news>

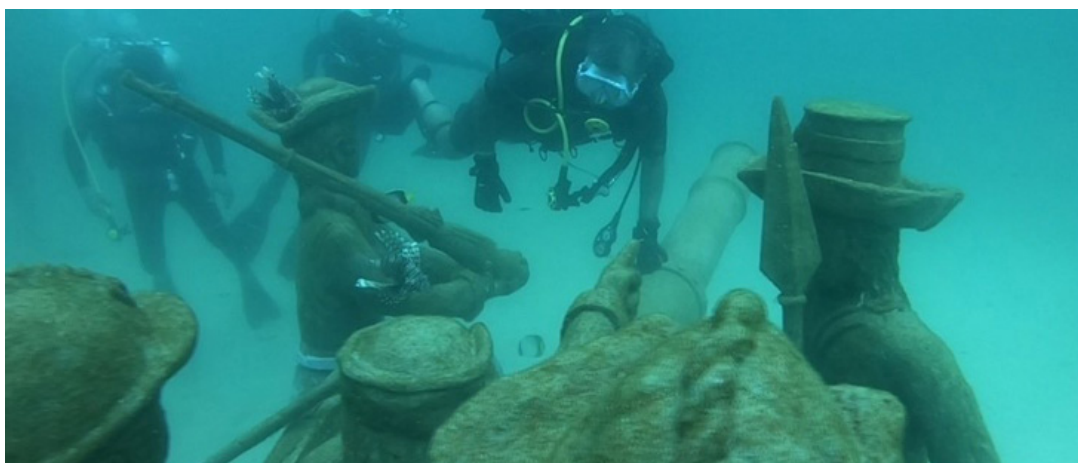


Figure 5: The Underwater Museum, Trincomalee
Source: <https://pulse.lk/everythingelse/sri-lankas-underwater-museums>

The literature provides sufficient information emphasizing that diving tourism in Galle can be widely developed and actively enhance the economy of Sri Lanka, greatly impacting the country's tourism industry (Ramanayaka, n.d.).

Discussion

- a. **Demand.** In coastal areas, especially those near coral reefs, scuba diving is a major economic driver. Unfortunately, the coral reef will inevitably be destroyed if visitor activities are not meticulously organized. This is why several different management strategies were developed to lessen the negative effects of scuba diving. Hsua and Wang (2013) list the construction of artificial reefs and other similar structures as an effective method. Tourists, recreational fishermen, environmentalists, and scientists are today's four main beneficiaries of artificial reefs and structures;

- Scuba diving, recreational fishing, and surfing are all forms of tourism.
- Recreational fishing encompasses a wide range of activities all over the globe, and to prevent overfishing, it is necessary to assess the levels of attraction exploitation.
- Environmental protection has three tiers: first, protecting pristine ecosystems; second, reducing harm already in place; and third, reusing and recycling degraded areas to build new ones.
- Research technology for efficient artificial reefs and other creation construction, and monitoring of epifauna are all part of science.

There was a time when scuba diving, when done properly, was thought to be harmless to coral reefs (Barker and Roberts, 2004). As scuba diving became more accessible and popular, new problems like the careless use of natural resources and the harm done by divers surfaced. Constructing artificial locations is one option. According to Uy et al. (2008), Fadli et al. (2012), and Nichols (2013), these locations not only offer new habitats for marine life to colonize, but also for shield juvenile fish from predators and give divers an alternative to natural reefs. Sites like these can have metal buildings, sunken ships or automobiles, or even sculptures and statues resting on top of them (Nichols, 2013). Almost 28 million people regularly participate in scuba diving, as reported by two sources (Edney, 2006; Garrod, Gossling, 2008). Wreck diving presents an exciting new challenge for divers who crave variety.

b. Services and Equipment Required. The scuba diving tourist sector offers physical and immaterial products and services. Education and skill development, dive charter services, and guide services on dives are examples of intangible components. In contrast, providing rental and sale equipment is an example of physical features (Musa and Dimmock, 2013);

- Experience Dive shops that cater to the general public offer various services to divers, including dive charters, dive guides, transportation to and from dive locations, and even lodging and other hospitality options.
- Safety of Scuba diving has become less risky due to technological gear, training, and service advances. Due to more medical support services, decompression chambers, and onboard medical oxygen for first aid, diving accidents are managed better, reducing the risk of permanent injury (Scuba Diving Tourism, 2013).
- Equipment sales and service are important, but divers on the road can rent equipment from the diving tourism industry. Due to their importance, scuba cylinders and diving gears are expensive to ship by air (Scuba Diving Tourism, 2013). Personal equipment, including regulators, wetsuits, masks, and fins, must be highly supplied to serve all consumers. Divers can rent or bring their own. Divers usually buy cameras and dive computers, while some shops rent entry-level models. Some equipment makers and distributors give financial incentives, limiting their product range. This is because equipment stock determines replacement parts and service tools availability.
- Vacation diving classes are popular because most regions lack good recreational dive sites, many scuba divers combine training with a vacation to a popular dive site. Scenic and biodiversity-rich dive locations are harder and deeper than entry-level training sites (Scuba Diving Tourism, 2013). To protect ecosystems, untrained divers should not dive. Divers can take wreck, cave, and low-impact courses in places where diving sites require certification.

c. **Benefits.** Scuba diving and visiting artificial diving sites may contain many benefits (St Leger Dowse et al., 2019);

- Relieving load on popular diving areas. If divers have more options when arranging dive trips, they will use less popular natural dive locations.
- There is now a greater variety of places where novice divers can learn the basics of scuba diving.
- Facilitate the housing and care of numerous aquatic species by providing habitats for their young. Marine organisms and artificial reefs have hard surfaces perfect for coral growth, algae adhesion, and barnacle attachment. On top of that, they provide structural support by way of cracks and crevices that marine life may utilize as hiding places.
- Coral propagation programs have boosted the coral reef population. The corals of opportunity break off during storms or when ships ground or anchors are collected with other onshore coral. We next link them to coral fragment-regrowing artificial frameworks. Once large enough, coral fragments are taken from the artificial structure and returned to the reef. They help the reef grow and regenerate. Most man-made structures should be erected on flat, sandy seafloors without reefs.

d. **Strategies for Sustainable Use Management.** Several approaches have been devised to lessen the environmental toll (Dimmock and Musa, 2015; Wongthong and Harvey, 2014);

- The method of carrying capacity. In areas where there is a cap on divers. As a result, the region's revenue from tourism is also reduced. Factors affecting sustainable diver carrying capacity differ among locations.
- The boundaries of what is considered necessary change. This paradigm employs quantitative constraints on change outlined in site-specific management objectives, building on an existing baseline (Wongthong and Harvey, 2014).
- The percentile method, which evaluates the capacity for damage at non-dived control sites.
- Scuba divers' gear regulations, including gloves and cameras-items believed to enhance contact with reefs and creations. Photographers are understandably opposed to these rules, which could affect divers who successfully avoid touch and those who do not (Giglio, Luiz, and Ferreira, 2020).
- Changing service delivery methods (Wongthong & Harvey, 2014). When divers can change their behaviours underwater, instructors can watch and intervene to reduce contact. Pre-dive briefings about ethics, rules, and the environment can help divers avoid contact and minimize diver effects. Reduced dives per guide improve treatments (Giglio, Luiz, and Ferreira, 2020).
- Set up locations in low-impact zones and prepare for diving in fragile regions. An efficient method of decreasing diver interaction has been found in this (Dimmock and Musa, 2015).

e. **Capital Funding.** For scuba diving and operating artificial diving sites, much equipment is needed. Retail locations require a lot of equipment and filling facilities, so starting one is expensive. Due to crew expenses, running costs, and initial investment, dive boats can be costly. Operator and customer safety must be considered while using high-pressure filling equipment to give breathing air in risky conditions. Quality control is essential to product safety. Besides the annual registration expenses, becoming a diving instructor takes time and money (Brathwaite et al., 2022). Median project expenses for the coral gardening nursery phase were \$400,000/ha (2010 US), and the artificial reef substrate was \$4,000,000/ha. Restoration operations usually lasted a few years and covered less than a hectare (108 square meters) (Bayraktarov et al., 2019).

f. **Economic Risks.** The economy is always move along with risks and following economic risks are very common to the tourism industry;

- Terrorism, economic downturns, and global disease outbreaks threaten scuba diving tourism. Rising crime and unstable administrations may threaten a country's borders with these sites (Jaksic, Stamenkovic, and Djordjevic, 2013; Stolk, Markwell and Jenkins, 2007).
- Global warming and natural calamities like coral bleaching threaten the recreational diving sector and the environment. Divers are less inclined to visit polluted or damaged areas. Overfishing and unlawful extraction have led to site closures and authorization systems that limit the number of divers authorized in a given time (Stolk, Markwell, and Jenkins, 2007).
- Political volatility deters travelers, while the global economic downturn has curtailed expenditure on expensive leisure activities, hurting scuba diving charters and schools (Jaksic, Stamenkovic, and Djordjevic, 2013).
- Public liability insurance, waivers, and industry best practices can help in managing liability (Stolk, Markwell, and Jenkins, 2007).
- Most divers visiting tropical coral reefs are foreign nationals. Therefore, any reason limiting their travel could hurt a diving business. An East African diving tourism study found overfishing and marine pollution to be the worst environmental issues. Global disease outbreaks, international crime, price inflation, and recessions are the biggest economic risks. Political instability and strict visa regulations are major dangers (Jaksic, Stamenkovic, and Djordjevic, 2013).

g. **Legal Risk and Liability.** You risk your life by recreational scuba diving. Certification indicates the certification organization accepts the instructor's evaluation that the diver is proficient in these abilities and aware of the risks. Divers find ways to lower these dangers throughout training. The training standard for a diver's certification specifies what diving tasks they can perform. Depth, environment, and diver-trained equipment affect these constraints (Seymour, 1975).

- (1) **Release and Waiver.** The operator incorporated this waiver in the contract to avoid carelessness claims. The diver has read and accepted scuba diving's risks. Under the release, the diver may be required to follow diving safety measures. By signing the release, the diver waives his right to sue the operator for ordinary carelessness while

diving. Extreme neglect or situations outside of ordinary scuba diving may make it unenforceable (Brown, 2000).

(2) **Health Record.** Medical statements warn divers that many medical conditions can increase their risk of damage on a dive. Divers who fail to disclose a medical condition that caused their mishap will usually lose legal compensation or have their insurance claim dismissed. The diver must assess their diving fitness, not the operator (Brown, 2000).

h. **Marketing Strategies.** Advertising in print and online travel periodicals, trade fairs, websites, and word-of-mouth from satisfied customers to others who share their interests are traditional ways to promote scuba diving and artificial diving centre vacations (Saragih, 2016). According to polls, the most effective advertising is one-on-one talks focusing on consumer satisfaction. Despite being transient, diving fatalities can hurt a resort or service provider's appeal, even if no fault is identified (Oh, Ditton, and Stoll, 2008; Shani, Polak, and Shashar, 2012).

Conclusion

Concerns about habitat degradation and species extinction are rising due to the increasing global population. Scuba diving is one of the fastest-growing ecotourism subsets to capture the spirit of extinction tourism. Despite widespread assumptions to the contrary, sustainable development, improved fisheries, and the relocation of diving tourists from natural locales are driving the proliferation of artificial reefs and sites in the ocean. Now that people see the importance of sustainable structures in boosting ecotourism, their views on artificial reefs and similar places must shift. Legislation mandating the deployment of artificial reefs by dive shops would be a great step towards helping scuba divers with less than ten or twenty dives.

Participation in local conservation or offsetting efforts is strongly encouraged, and dive operators are encouraged to use artificial reefs instead of natural reefs wherever possible. By applying eco-engineering principles, Sri Lanka can build man-made reefs that are more aesthetically pleasing, more conducive to marine life support, and more fun for everyone. By informing divers about how artificial reefs support natural reefs and the unique characteristics of each one-its history, inhabitants, or photo opportunities-dive shops may encourage using artificial reefs.

Dive shops, newspapers, and websites could benefit from standardized visual content (like films and posters) that international projects like UNEP Green Fins can create. The biodiversity catastrophe and the United Nations Decade of Action for Sustainable Development and Restoration should make divers reevaluate their previous decisions and actions. Divers throughout the globe may play a role in protecting endangered ecosystems by cutting back fossil fuels, just like many others are doing.

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NAVIGATING SRI LANKA'S MARITIME RENAISSANCE: UNVEILING THE BLUE ECONOMY POTENTIAL

Lieutenant Commander (N) DKNS Wickramasinghe

Student Officer - 33rd Junior Naval Staff Course



Abstract

Sri Lanka, despite its vast maritime potential, has been hesitant to fully embrace the Blue Economy, primarily due to a land-centric mindset, a lack of public engagement with the sea, and concerns about the scarcity of capable maritime professionals. This paper explores the unique position of the Sri Lanka Navy as a key player poised to drive the country's maritime transformation. While recognizing the Navy's primary role in national defence, the paper suggests a strategic initiative to create a 'Blue Economy Force' comprised of ex-naval personnel. To address the skills gap and high turnover rates among naval personnel, the paper proposes a second career path aligned with the country's economic needs. It outlines various Blue Economy initiatives, focusing on modern water sports, island hopping, sunset scenic visits, cultural tours, ecotourism, festivals, culinary experiences, and relaxation and wellness. Leveraging the skills, discipline, and experience of ex-servicemen, these initiatives aim to attract tourists, generate revenue, and inspire the next generation, fostering a positive and motivated naval force. The paper emphasizes the importance of balancing economic pursuits with the Navy's primary role to ensure sustained effectiveness. Through these initiatives, Sri Lanka has the potential to not only tap into its maritime wealth but also position itself as a premier destination for diverse and sustainable economic growth.

Keywords: Blue Economy, Maritime Transformation, Ex-naval Personnel, Blue Economy Force, Tourism Initiatives

The Untapped Treasure

Despite the frequent discussions around the Blue Economy, Sri Lanka has yet to fully realize its maritime potential. The lack of significant initiatives suggests a hesitancy among politicians and investors. This reluctance can be attributed to factors such as the public's limited engagement with the sea, a perceived lack of capable professionals in the maritime sector, and a prevailing land-centric mindset that favours land-based ventures.

Reluctance of Politicians and Investors: A Deep-Rooted Issue

Sri Lanka's hesitation to embrace the Blue Economy has many reasons. The lack of public engagement beyond traditional fishing activities contributes to a disconnect with the ocean (De Silva and Weeraratne, 2023). Doubts about the country's ability to generate capable maritime professionals further hinder progress (Perera and Cooke, 2022). The historical significance of Sri Lanka's maritime heritage, coupled with its vast waters, should naturally foster a deeper connection with the ocean, but this potential remains largely untapped. The perception that land-based ventures are more profitable and less risky exacerbates the issue, leading to a neglect of the ocean's economic potential (Amarasinghe, 2021).

The Land-Centric Mindset: A Barrier to Maritime Development

The government and potential investors often perceive investments in land-based ventures as more profitable and less risky compared to those in the maritime sector (Wijesinghe and Hewage, 2020). This perception stems from a land-centric mindset that prioritizes land use over ocean utilization (Jayasinghe, 2019).

This land-centric mindset has led to an overemphasis on land-based opportunities, resulting in a neglect of the ocean's economic potential. The focus on land has diverted resources and attention away from developing the maritime sector, hindering Sri Lanka's ability to fully harness its maritime wealth (Gunasekara and Rajapaksa, 2018).

Addressing the Skills Gap: A Critical Need for Maritime Expertise

The development of the Blue Economy in Sri Lanka is constrained by a shortage of skilled labour (Wickramaratne and Kodikara, 2017). The country's education and training systems have not kept pace with the evolving demands of the maritime sector, resulting in a scarcity of qualified professionals. (Silva and Gunasekara, 2016). To address this skills gap, Sri Lanka needs to invest in education and training programs that develop the expertise required for the maritime sector. This includes creating specialized educational courses, establishing training centres, and providing opportunities for professional development.

The Unique Position of the Sri Lanka Navy

a. **Why Navy Emerges as a Key Player?** In contrast to the overall reluctance, the Sri Lanka Navy emerges as a key player uniquely positioned to drive the country's maritime transformation. With a deep-rooted connection to the sea and expertise in maritime operations, the Navy possesses the resources and capabilities crucial for advancing the Blue Economy. The high discipline, knowledge, experience, and potential of naval personnel position them as valuable assets in unlocking Sri Lanka's maritime treasure.

Sri Lanka Navy has its bases all over the coastline. The naval culture and most of the recreational activities have a strong bond with the ocean. The naval personnel who undergo training and serve a significantly longer phase of their lives along the coastline have a huge bond with the sea.

b. **Professionalism, Expertise & Versatility.** Sri Lanka Navy is undoubtedly the main maritime force in Sri Lanka where the country invests a huge amount of funds to uplift the professionalism of its personnel. The knowledge, experience, expertise and professionalism that the naval personnel possess is an invaluable asset for a developing nation like Sri Lanka and the capability of transforming into any profession would be much more flexible with the training undergone by ex-service personnel.

However, the expectation of the general public investing such a huge amount in the Navy is safeguarding the nation being the first line of defence.

c. **The Uncompromisable Naval Role.** Unquestionably, the enormous naval role comes first despite all other potentials of profit-generating. Sri Lanka Navy cannot compromise its naval role and focus on profit generation even though the country undergoes even more challenging situations than the ongoing economic crisis.

On the other hand, even though the Navy’s involvement in profit-generating ventures holds economic promise, it poses challenges. Any generated profits must be added to the consolidated fund, limiting direct contributions to naval development. There’s a risk of deviation from the Navy’s primary role if personnel become excessively focused on profit generation. Striking a balance is crucial to ensure the Navy’s effectiveness and avoid potential disadvantages.

Therefore, if the Sri Lanka Navy plans to support the nation in reaching its maritime potential, the most ideal approach is to create a separate force using ex-naval personnel without hindering the prime role of the Navy which will also provide solutions for some critical problems that the Navy is facing.

d. **Analysing the Ongoing Trends to Find the Most Suited Approach.** When analysing the annual evaporation rate of Sri Lanka Navy personnel, it is quite evident that the turnover rate of the naval personnel has increased significantly in the recent past. If naval personnel are attempting to find new professions despite their invaluable knowledge and expertise in the maritime field, it is a huge disadvantage for the nation as well as for the individuals.

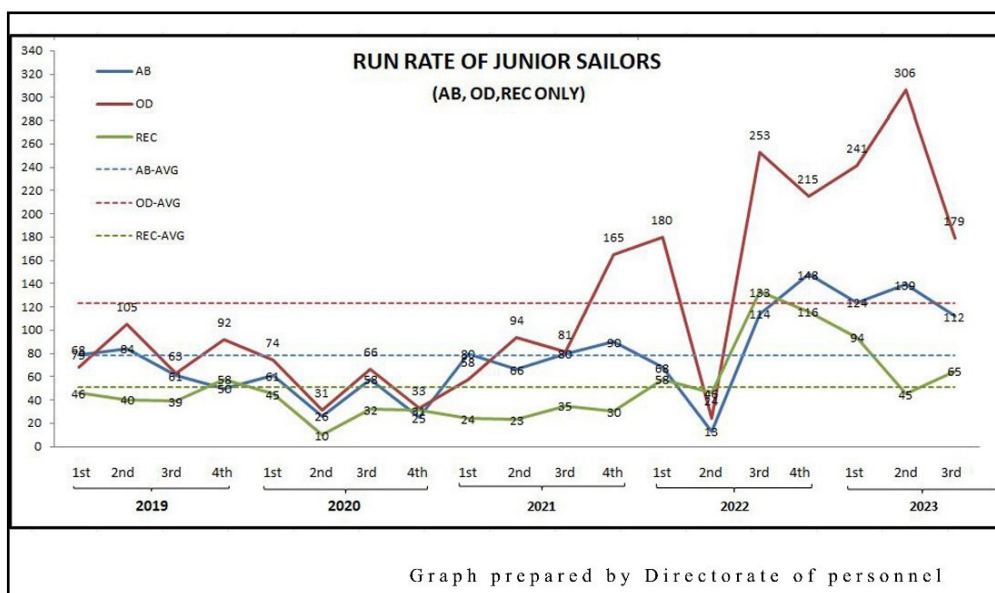


Figure 1: Run Rate of Junior Sailors
 Source: <https://intweb.navy.lk>

e. **Creating a Second Career for SLN Personnel: Supporting the Economy.** To mitigate turnover challenges, a strategic approach involves creating a second career path for SLN personnel aligned with the country’s economic needs. Leveraging the skills, discipline, and experience of ex-servicemen in a ‘Blue Economy Force’ can unlock new opportunities. Recognizing achievements during naval careers boosts morale and contributes to personnel satisfaction.

Blue Economy Initiatives for SLN Personnel: A Holistic Approach

a. **A Blue Economy Force.** Sri Lanka Navy can take initiatives to make a ‘Blue Economy Force’ that generates profits for the government by utilizing ex-service personnel who possess knowledge and expertise. Opportunities can be given to service personnel who show excellence throughout their naval careers. Further, this initiative may reduce the early

retention rates of service personnel and may provide them with more courage and motivation to build up their knowledge, skills, and expertise as an investment for the future.

b. **Ex-Servicemen Navigating for Profit Generating.** Following are some suggestions where ex-naval personnel can contribute to the economic development of the nation by retaining the pride and dignity of the profession. However, it is required to be cautious not to direct ex-servicemen to professions like fishing which have ethical issues and affect the dignity and pride of the Navy. Further, some of these professions may help the Navy to increase maritime domain awareness expanding reconnaissance capabilities in various capacities with increased sea-going activities.

Modern Water Sports

a. **An Opportunity for Physically Fit Ex-Servicemen.** Sri Lanka has not yet taken any significant approach to promote most of the modern water sports which are highly attracted by tourists in other countries. With very low investments these sports can be promoted in Sri Lanka with its breathtaking natural beauty.

Ex-service personnel can be utilized to promote modern-day water sports to uplift tourism to a higher level. The reluctance of most investors to invest in such sports may be the unavailability of human resources to promote such events. However, with high physical standards ex-service personnel can be directed to promote such sports while providing a great recreational opportunity for naval personnel and their families. The physical standards and commitment of naval personnel who show excellence through their naval careers can be rewarded by providing them great opportunities to promote those sports through a proper mechanism.

b. **Modernized Surfing and Other Sports.** Waterskiing and wakeboarding, adrenaline-pumping activities, cater to those seeking a thrilling challenge. Wind Surfing is a combination of surfing and sailing, and offers an exhilarating experience riding the wind and waves. Tube riding, a fun-filled activity, offers an exhilarating ride as participants are towed behind a boat on an inflatable tube.



Figure 2: Waterskiing, Wind Surfing, Tube Riding
Source: www.windfoilzone.com

c. **Parasailing & Kite Surfing.** Parasailing, a serene and scenic activity, provides a bird's-eye view of the island's coastline and its surrounding beauty. Kitesurfing is an adrenaline-pumping sport that utilizes a kite to harness the wind and propel a board across the water. Kitesurfers use their kites to perform a variety of tricks, such as high jumps, spins, and even powered loops.



Figure 3: Parasailing, Kite Surfing
Source: www.funpcb.com, www.findit.lk

d. **The Emerging Hydro Flight.** Hydro flight has swiftly risen to prominence, emerging as one of the most sought-after water sports worldwide. With its unique blend of adrenaline-pumping aerial manoeuvres above water, hydro flight has captivated thrill-seekers and water sports enthusiasts, solidifying its status as a rapidly growing and immensely popular activity.

Stand-up paddleboarding, a popular water sport involving riding a surfboard while standing and using a paddle, offers an enjoyable way to explore the serene waters of Sri Lanka's coastline.

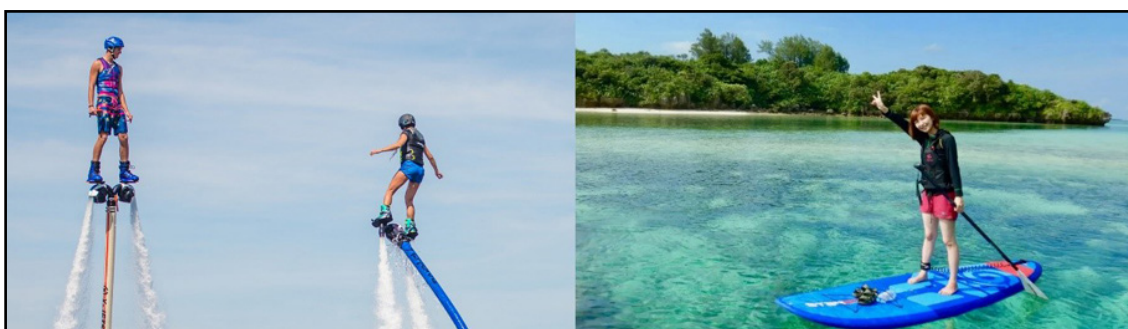


Figure 4: Hydro Flight, Stand-Up Paddle Boarding
Source: www.aquafly.com , www.en.activityjapan.com

By promoting these diverse water sports activities, Sri Lanka can attract a wider range of tourists, generate significant revenue, and establish itself as a premier destination for water sports enthusiasts. With relatively low investment compared to other tourism infrastructure projects, these activities offer a promising opportunity for sustainable economic growth and development.

Initiatives Other Than Water Sports

a. **Island Hopping: Embracing the Coastal Charm.** Sri Lanka's coastline is dotted with picturesque islands, each offering its own unique blend of natural beauty, cultural heritage, and recreational opportunities. By promoting island hopping excursions, Sri Lanka can showcase its diverse coastal landscapes, attract nature enthusiasts, and generate revenue through tourism packages and local businesses.

b. **Sunset Scenic Visits: Capturing the Ephemeral Beauty.** Sri Lanka's sunsets are renowned for their breathtaking hues and tranquil atmosphere. By promoting sunset scenic visits to strategically chosen locations, such as beaches, hilltops, or coastal towns, Sri Lanka can attract romantic couples, photography enthusiasts, and nature lovers, providing

them with unforgettable experiences and generating revenue through guided tours and local hospitality services. Boats can be designed especially for this purpose in Sri Lanka and ex-service personnel can be trained with their rich experience in navigating waters.



Figure 5: Island Hopping, Sunset Scenic Visits
Source: www.doorcountyboats.com

d. **Cultural Tours: Immersing in the Rich Tapestry of Traditions.** Sri Lanka's rich cultural heritage is a treasure trove waiting to be explored. By promoting cultural tours, Sri Lanka can showcase its ancient temples, historical sites, traditional arts and crafts, and vibrant festivals. These tours can provide tourists with a deeper understanding of the country's unique customs and traditions, fostering cultural appreciation and encouraging repeat visits. Vessels can specially be built for the purpose and local and foreign tourists can be attracted through a proper media campaign. Many countries especially European countries use these cultural cruises to attract local foreign tourists.

e. **Ecotourism: Preserving Nature's Bounty.** Sri Lanka's extensive coastal areas, including pristine beaches and marine reserves, present a plethora of opportunities for marine ecotourism activities. By promoting sustainable tours focused on activities like snorkelling, dolphin watching, and coral reef exploration, Sri Lanka can captivate marine enthusiasts who are dedicated to the preservation of underwater ecosystems. These initiatives not only contribute to the conservation of the country's marine biodiversity but also generate revenue through responsible and eco-friendly tourism practices.

f. **Festivals and Events: Celebrating the Spirit of Sri Lanka.** Sri Lanka's vibrant cultural calendar is filled with colourful festivals and events that showcase the country's traditions, music, and dance. By promoting these events, Sri Lanka can attract tourists seeking authentic cultural experiences and generate revenue through ticket sales, accommodation, and local businesses catering to the influx of visitors. Throughout their careers naval personnel improve their professionalism and build up their organizing capabilities. If the service can be obtained from ex-servicemen to plan and execute mega-scale beach activities simultaneously with colourful festivals, that would attract most of the local/foreign tourists.

g. **Culinary Experiences: Savouring the Flavors of Sri Lanka.** Sri Lanka's cuisine is a fusion of culinary influences, offering a tantalizing array of flavours and aromas. By promoting culinary experiences, such as cooking classes, food tours, and street food sampling, Sri Lanka can attract gastronomes and food enthusiasts, providing them with a taste of the country's unique culinary heritage and generating revenue through local restaurants and food stalls.



Figure 6: Cultural Water Tours in Europe, The Hawaiian Food & Wine Festival
Source: www.traveltriangle.com

h. **Relaxation and Wellness: Embracing Serenity and Tranquillity.** Sri Lanka's tranquil beaches, lush landscapes, and abundance of wellness centres offer a perfect setting for relaxation and rejuvenation. By promoting spa retreats, yoga sessions, and meditation retreats, Sri Lanka can attract tourists seeking stress relief and inner peace, generating revenue through wellness centres, accommodations, and local businesses catering to the well-being of visitors.



Figure 7: Beach Yoga Activities for Tourists/Civilians
Source: www.elementsofbyron.com.au

j. **Other Advantages: Inspiring the Next Generation.** The holistic approach benefits not only the Navy but also the country as a whole. The adventures and initiatives undertaken by SLN personnel can inspire the younger generation to join the Navy, addressing recruitment challenges. Increased job satisfaction among naval personnel, fuelled by hopes of a well-profited second career, contributes to a positive and motivated force.

Conclusion

In conclusion, Sri Lanka stands at the threshold of unlocking its untapped maritime potential through the strategic utilization of its naval assets. The paper highlights the nation's hesitancy to fully embrace the Blue Economy, attributing it to a land-centric mindset, limited public engagement with the sea, and concerns about a shortage of capable maritime professionals. However, amidst these challenges, the Sri Lanka Navy emerges as a pivotal player uniquely positioned to lead the country's maritime transformation.

Recognizing the Navy's primary role in national defence, the paper proposes the establishment of a 'Blue Economy Force' comprised of ex-naval personnel. This innovative initiative aims to address the skills gap and high turnover rates among naval personnel by providing a second career path aligned with the country's economic needs. By leveraging the skills, discipline, and experience of ex-servicemen, this force is envisioned to drive various Blue Economy initiatives, ranging from modern water sports to cultural tours and relaxation experiences.

The emphasis on modern water sports, island hopping, sunset scenic visits, cultural tours, ecotourism, festivals, culinary experiences, and wellness activities demonstrates a holistic approach to tapping into Sri Lanka's maritime wealth. The inclusion of ex-naval personnel in these initiatives not only contributes to economic growth and tourism but also fosters a positive and motivated naval force.

The paper underscores the importance of balancing economic pursuits with the Navy's primary role to ensure sustained effectiveness. While promoting diverse economic initiatives, it remains imperative to safeguard the uncompromisable naval role, considering the ongoing challenges faced by the nation. The proposed 'Blue Economy Force' offers a strategic solution to reconcile these objectives, providing a separate avenue for ex-naval personnel to contribute to economic development without hindering the Navy's core responsibilities.

By analysing the ongoing trends, especially the increasing turnover rates among naval personnel, the paper advocates for a well-defined second career path to retain valuable expertise within the maritime sector. The creation of this path, coupled with the proposed Blue Economy initiatives, has the potential to inspire the next generation, address recruitment challenges, and enhance overall job satisfaction among naval personnel.

In essence, the comprehensive approach outlined in this paper positions Sri Lanka to not only tap into its maritime wealth but also emerge as a premier destination for diverse and sustainable economic growth. The synergy between the naval force, ex-servicemen, and various Blue Economy initiatives presents a transformative model that can propel the nation towards a maritime future, ensuring a harmonious balance between economic prosperity and national defence.

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COLLABORATIVE APPROACHES TO MITIGATE NATIONAL ENVIRONMENTAL THREATS: SAFEGUARDING THE WELL-BEING OF ALL CITIZENS

Lieutenant Commander (S) DMNS Dissanayake

Student Officer - Long Logistics Management Course No 8



Abstract

The relationship between nature and humans is emphasized in this paper, along with the importance of protecting and honoring the natural world. It investigates the idea that the environment plays a crucial role in our existence, acting as a life support system, supplying necessary supplies, and fostering economic activity. The essay focuses on the potential repercussions of disregarding nature's welfare as well as the pressing necessity to combat environmental contamination. It also recognizes the difficulties in fostering and comprehending our relationship with the natural world. The introduction also covers the negative effects that population expansion and technological development have on the environment, such as pollution, deforestation, and climate change. Environmental issues and geographical differences in resource utilization are also mentioned. The need for international environmental protection efforts and the shifting tendencies in climate change are emphasized. The paper also emphasizes how crucial it is to recognize natural warning signs and how urgent it is to protect and restore nature to support all life on Earth. A brief discussion is given on the causes of environmental problems and possible fixes, such as public health, sustainable food practices, deforestation, biodiversity loss, water pollution, climate change mitigation, and the depletion of natural resources. In summary, the introduction calls for people and countries to assume accountability and change to a more sustainable and thoughtful way of relating to nature.

Keywords: Nature, Life Support System, Economic Activity, Pollution, Climate Change, Global Warming, COVID-19 Epidemic, Developing Countries

Introduction

Everything around us is made of nature. It adds elegance to our surroundings and a strong sense of strength. The tiger, an incredible animal possessing boundless energy, is nature. Religion and belief are products of intellect; nature is not. It covers everything found in the natural world. We are a part of nature, and nature is a part of our lives. You are harming yourself if you harm the natural world. How do we relate to the natural world? Rivers, trees, fish, swift-flying birds, minerals beneath the surface of the earth, waterfalls, and shallow ponds are all parts of nature. And how do you feel about them? The majority of us are ignorant of that connection. It can be just as challenging to comprehend one's relationship with nature as it might be to comprehend one's relationship with a neighbour, wife, husband, or kids.

Our life support system is nature. In addition to offering clean water to drink and fresh air to breathe, nature also naturally supplies the necessities for everyone's existence and well-being. Aside from that, nature will give our prosperity, which supports millions of livelihoods and the majority of our economic activity uncountable assistance. All of these things will be extremely beneficial to humanity, but as nature is deteriorating faster than it can recover, it is evident that we are not acting quickly enough to stop environmental pollution, which could seriously hurt our economies and leave us without enough food and water to feed the world expanding population. No one can overpower nature on this planet, not even technological advancements.

People everywhere need to realize that without it, we will never be able to deal with the bad things that nature brings forth. Examples of nature's opposition to people include the occurrence of tsunamis, flooding, droughts, and the COVID-19 epidemic are some evidence. Even though global technology has advanced significantly, no nation has been able to escape the pandemic in the last two years. Thus, the lesson is that it is time for people to adjust to their surroundings.

Since the industrial revolution, there has been a fragile interaction between the environment and humans. As the global population continues to rise, the environment is being severely impacted. The negative repercussions of population growth and technological advancements include deforestation, pollution, and changes in the global climate. The industrial revolution dealt a severe blow to the way the environment changed as a result of increased human activities. Because of the growing population, the environment also changed as a result of increased requirements.

According to Melissa Mayer (2018), there are regional differences in the way that environmental issues are addressed and how resources are used. Compared to those in underdeveloped countries, people in rich countries need a lot more resources to preserve their way of life. For instance, the United States today generates 25% of global CO₂ emissions despite having only 5% of the world population.

The trends of the climate have altered as of late. Everyone on the planet throughout the middle ages can recall more about their upbringing and the surroundings at that time than they do at present. Because it is, in my opinion, the finest signal for determining the shift in environmental pattern rather than having someone else do it. Is the environment facing problems now? Yes, the task at hand is difficult, and we are all far behind in overcoming it. Thus, all that is left for the future is for every nation on Earth to make every effort to enact laws protecting the environment, and for every individual on Earth to alter their perspective toward the natural world.

Natural warning indicators are still growing in the interim. Over the past 40 years, the average reduction in mammal, bird, reptile, amphibian, and fish populations has been 60%, and human activity has drastically affected 5% of the land. As a result, people are looking for a new agreement to preserve and repair nature for the good of all living things on Earth, one that does not involve any single loss of natural areas due to the detrimental ecological effects of production and consumption. This will make it possible for us to feed and water the world population, which is expected to reach nine billion in the next few decades.

Sources of Environmental Issues

There is no denying that the ecosystem has been exposed to several risks during the past fifty years. Every nation in the globe is worried about the environment due to rising pollution levels and ozone layer depletion. The world around us is ever-changing. People are negligent about their environment as a result. However, some of them have become more circumspect in light of current awareness. There are a lot of things going on in the globe that harm the environment which could be described as follows;

- a. **Global Warming and Climate Change.** The two biggest environmental problems we face now are climate change and global warming. Human activity, principally the combustion of fossil fuels, is what causes the Earth's surface, oceans, and atmosphere to gradually warm. These gases include Carbon Dioxide (CO₂) and Methane etc. Global warming has several direct and evident effects, one of which is the increase in global temperature. Over the past century, the average global temperature has risen by roughly 1.4 degrees Fahrenheit (0.8 degrees Celsius), according to the National Oceanic and Atmospheric Administration.

In line with the UN (2015) Sustainable Development Agenda for 2030, the UN reports that CO₂ emissions have increased by nearly 50% since 1990, contributing to global warming. This is speeding up climate change, endangering the lives of millions of people, plants, and animals through more frequent and extreme weather events like droughts, fires and floods.

The rate of sea level rise due to global warming is accelerating. It was predicted, even as recently as two years ago, that sea levels would rise by about one meter by the year 2100. By the end of the century, doubling that estimate seems more and more likely based on the current prognosis. Additionally, a 1.5 degree increase in global warming points to a six to seven metre rise by the year 2500. Low-lying coastal cities are already experiencing the effects and as a result of misuse of the coastal freshwater aquifers and seawater intrusion, the water level is becoming saline.

Global warming and its effects on the planet's weather patterns are two long-term trends that are together referred to as climate change. Although they have different meanings, climate change and global warming are frequently used synonymously. Similar to how the terms 'climate' and 'weather' can be used interchangeably, weather refers to brief periods (Examples – Rain, Snow, Clouds, Winds, Floods, Thunderstone, etc.). However, climate change is a long-term phenomenon.

Human activities have been the primary cause of climate change that has been documented since the early 20th century. Burning fossil fuels, in particular, raises the levels of heat-trapping greenhouse gases in the atmosphere, which in turn raises the average surface temperature of the planet. The most significant development in this field in recent years has been the rise in confidence and precision of scientific projections regarding the rate and nature of human influence on the climate.

b. Overpopulation and Environmental Issues. Another major environmental issue of the day is overpopulation. The world population is growing to unsupportable proportions due to a lack of resources like food, fuel, and water. Growing populations in developing and less developed nations were placing further burden on already limited resources. Intensive agriculture harms the environment by using chemical pesticides, fertilizers, and insecticides to produce food.

The world population has increased from one billion in 1800 to seven billion today, according to Max Roser (2019). The United Nations' article on global issues related to population states that the world population is expected to rise by two billion people over the next thirty years, from 7.7 billion in 2019 to 9.7 billion in 2050, with a potential peak of nearly 11 billion around 2100.

As a result, the world population is growing at a faster rate than ever before, which might lead to environmental damage, less access to clean water, greater risk of air pollution and sickness, and a rise in greenhouse gasses, primarily from CO₂ emissions. As a result, it might be caused by a decline in biodiversity and manifest itself more quickly as a result of the depletion of local resources like plants and animals.

While the interconnected problems of population growth and environmental issues seem overwhelming, it is important to remember that humans can make changes that positively impact the planet. One good starting point is understanding and applying the concept of sustainability, which is the opposite of resource depletion. Sustainability describes a model of resource usage in which the current generation uses only the resources the Earth provides

indefinitely (like solar or wind power instead of burning fossil fuels) to ensure that future generations inherit resources.

In addition to that, growing resource depletion causes certain environmental issues like global warming, deforestation, and declining biodiversity since the demand for natural resources exceeds the supply, which results in a reduction in the amount of available resources. While residents in developing countries experience the effects of environmental issues sooner, those in developed countries tend to use far more resources, which eventually leads to the long-term pattern known as climate change.

c. **Pollution Issues.** There are seven main categories of pollution, air, light, thermal, water, soil, noise, and radioactive. These are the main factors that have an impact on our environment in many ways. Each of these pollution kinds affects and is influenced by the others. As such, we must address each one of them collectively.

(1) **Air Pollution.** Air pollution ranks among the world most pressing issues. The burning of fossil fuels and the many gases and toxins released by factories and other establishments can contaminate the air. Due to severe air pollution, residents of New Delhi, India, must always have an oxygen supply on hand to breathe clean air. Thus, it takes a very long time for soil, water, and air pollution to subside. The most visible pollutants are those from engines and industries. Poisons that because pollution include plastic, nitrates, and heavy metals. The story of India's first shutdown during the COVID-19 pandemic is the clearest example of that; for the first time in a long time, the Himalayan mountain range was visible from New Delhi because of the environmental calm.

(2) **Water pollution.** Urban development, acid rain, and oil slicks all contribute to water contamination, which is one of the world's biggest environmental problems. Just over 3% of the world freshwater is accessible worldwide; of that, half can only be accessed through rivers, lakes, or the earth; the remaining 3% is trapped in inaccessible locations like glaciers. By 2025, almost every nation South of 35 degrees North latitude is expected to face physical or economic water scarcity, according to predictions from the International Water Management Institute. Currently, crops are grown on around 11% of the world land surface. In many nations, the cost of clean drinking water is often more than that of fuel, and as more people fight for access to this essential resource, the issue of water is becoming more and more political. Water utilized by people, animals, and plants is contaminated by wastes from industrial and agricultural processes.

(3) **Soil and Land Pollution.** The need for land has grown as the world population has expanded. As a result, pollution may arise as a competition among the peoples for land areas needed to suit their demands. Degradation of the earth's surface brought about by mining, trash, deforestation, industry, construction, and agriculture is known as land pollution. Air pollution, soil pollution, and land pollution can all have detrimental effects on the ecosystem and human health.

(4) **Noise Pollution.** Frequent exposure to high sound levels can have negative consequences on people and other living beings. The World Health Organization states that no matter how long or how frequently a living thing is exposed, sound levels lower than 70 dB do not harm it. Continuous noise above 85 dB for longer than 8 hours could be dangerous. In addition, prolonged exposure to dangerous noises can harm people's

health in several ways, including hypertension, hearing loss, disturbed sleep, psychiatric disorders, and more.

(5) **Radioactive Pollution.** The physical contamination of living things and their surroundings caused by radioactive materials released into the atmosphere during nuclear explosions, nuclear weapon testing, nuclear weapon production and decommissioning, mining of radioactive ores, handling and disposal of radioactive waste, and nuclear power plant accidents is known as radioactive pollution. To ascertain the efficacy, yield, and explosive potential of nuclear weapons, tests are conducted.

d. **Deforestation Issues.** Only 31% of the world's land area is usable, and it is not dispersed uniformly around the planet, according to the State of the World Forests (2020) discussion. More than one-third of the forest area is primary forest, and nearly half of it is still largely intact. Only five countries like Brazil, Canada, China, the Russian Federation, and the United States of America have more than half of the world forests.

As a result, the rate of deforestation and forest degradation is still alarmingly high, and this greatly adds to the ongoing loss of biodiversity. The State of the World Forests (2020) Conversation estimates that, despite a decline in the preceding three decades, around 420 million hectares of forest have been lost due to conversion to other land uses since 1999. The extent of primary forest globally has shrunk by over 80 million hectares since 1990. The rate of deforestation between 2015 and 2020 was expected to be 10 million hectares per year, down from 16 million hectares per year in the 1990s. Expansion of large-scale agriculture contributed to deforestation, which may have altered biodiversity, eroded soil, raised greenhouse gas concentrations in the atmosphere, decertified areas, uprooted populations, and other effects.

e. **Loss of Biodiversity Issues.** The diversity of life on Earth, or biodiversity, is necessary for the ecosystem to function well. The impact of humans on the environment has been declining biodiversity at an alarming rate in recent years up to ten thousand times quicker than it was millions of years ago. By 2020, as a planet, we have failed to meet all of the targets established for slowing down the degradation of species, according to the Global Species Outlook Report (2020). Because of this, the following details can be used to highlight some of the primary factors influencing the decline in biodiversity;

(1) **Climate Change.** Numerous aspects of biodiversity, including species distribution, population dynamics, community structure, and ecosystem function are impacted by climate change.

(2) **Pollution.** When discussing pollution, automobile exhaust fumes that shoot into the sky come to mind, but noise and light pollution also have an impact.

(3) **Destruction of Habitats.** One of the main causes of biodiversity loss is habitats' damage. Deforestation, pollution, global warming, and overpopulation are the main causes of habitat loss. Ecosystems and the organisms that comprise them are harmed by soil contamination and alterations in their uses brought about by actions like deforestation.

(4) **Invasive Alien Species.** The second largest contributor to global biodiversity loss is introduced organisms overpopulating and damaging their new environments. These organisms are known as invasive alien species. While the majority

of introduced species are either beneficial or naturally occurring, inverse species hurt habitats and bioregions, leading to ecological, environmental, and financial harm.

(5) **Over Exploitation of Natural Resources.** When the demand for natural resources exceeds, their rate of natural regeneration decreases which is known as the overexploitation of such resources. In addition, the loss of biodiversity is being caused by unsustainable consumption patterns and rapid population expansion. The devastation of coral reefs can be cited as another example.

f. **Natural Resources Depletion Issues.** When natural resources are used up more quickly than they can be replenished, the resources become depleted. There are two categories of natural resources in the country i.e. nonrenewable resources and renewable resources. Natural resources play a major role in the country's economic growth. Because of the enormous demand placed on natural resources by humans so much in fact that it would take nearly 1.5 planets to meet our needs depletion of natural resources is another major environmental issue facing the planet today. Future increases in this will be brought on by the rapid industrialization of Asian nations like China and India. Air pollution, population growth, industrialization, and other environmental problems are caused by the increased use of natural resources.

An energy crisis also results from the depletion of natural resources brought on by an increase in demand over time. Many natural resources release chemicals into the atmosphere, which contributes to climate change. The use of fossil fuels contributes to greenhouse gas emissions, which are the main cause of climate change and global warming. People are working to switch to renewable energy sources like geothermal, wind, solar, and biogas on a global scale. As a result, the price of setting up the system and keeping these sources up to date has drastically decreased recently.

g. **Public Health Issues.** The current environmental problem poses a lot of risks to the health of humans and animals. Environmental factors can have a major influence on human health due to both natural and human-caused events. Dirty water is the biggest health risk in the world and poses a threat to the quality of life and public health. Apart from that here can explore key environmental factors that affect the health of humans;

- Chemical safety.
- Air pollution.
- Climate change and natural disaster.
- Diseases caused by microbes.
- Lack of access to healthcare.
- Infrastructure issues.
- Poor water quality.
- Global environmental issues.

Moreover, pollutants, chemicals, and organisms that spread disease are carried by runoff into rivers. Cardiovascular issues and respiratory conditions like asthma are brought on by pollutants. Warm weather promotes the spread of contagious illnesses like dengue. Another example of how the environment might affect well-being is poor industrial hygiene. Industries that exhibit recklessness in their manufacturing and waste management practices have the potential to contaminate the environment and negatively affect human health.

h. **Genetic Engineering Issues.** The process of modifying food through biotechnology is known as genetic engineering. Since genes from an allergic plant can spread to the target plant, genetic alteration of food increases poisons and diseases. Due to its strong potential to cause global warming, Methane, one of the worst greenhouse gases is produced in large quantities when this garbage ends up in landfills. It produces serious explosion risks. Given that a modified gene might be harmful to wildlife, this is a severe environmental issue. A further disadvantage is that organisms created as a result of the increased usage of toxins to create insect-resistant plants may develop antibiotic resistance.

The world population is growing at a faster rate than ever before, which has increased the demand for food. As technology has advanced, humans have turned to genetic engineering to fill the void in their needs without taking future generations into account. Because of our excessive consumption, plastic packaging, hazardous e-waste, and dangerous chemicals seep into our waterways and become non-biodegradable waste. There will not be a future for humanity to think about if they carry on those in such a destructive manner. Although it is a fact that we cannot physically stop our ozone layer from thinning (and scientists are still having trouble figuring out what is causing it exactly), there are still so many things we can do to try and put a dent in what we already know. Since modern technology allows us to access digital environments, many things that you need can be fulfilled in the cloud.

j. **Waste Disposal Issues.** Trash disposal can lead to major issues and has a significant negative influence on the ecosystem. The excessive use of resources and the production of plastics are contributing to the worldwide waste disposal dilemma since burning plastic releases harmful compounds like Dioxins. Developed nations are infamous for producing large amounts of waste or junk, which they then dump into the oceans, and less developed nations. While the ash from incinerators may include heavy metals and other contaminants, the gases from incineration may pollute the air and contribute to acid rain. Human health is threatened by inexpensive electronics, plastic, fast food, packaging, and other waste materials. Therefore, one of the most pressing environmental issues of the day is waste disposal.

k. **Protecting the Oceans Issues.** Sea levels are rising as a result of global warming. The world oceans are seriously threatened, despite making up more than 70% of the planet's surface. As a result, the threat to the ocean now presents the following major issues;

(1) **Plastic.** Hundreds of marine species perish every day as a result of the ocean's transformation into a massive garbage dump for plastic soup. Consequently, these millions of plastic fragments will eventually find their way into the human food chain.

(2) **Trash.** The quantity of trash dumped into interior waterways like rivers and streams or left on beaches will eventually end up in the ocean. When it comes to non-biodegradable debris, like plastics, which fragment into smaller pieces called micro plastics and are mistaken for food by many marine creatures, the situation is direr. Aside from that, some parts of the ocean have already experienced garbage islands.

(3) **Over-exploitation of Fishing Resources.** Fishing is a highly commercial endeavour. As a result, overfishing is currently a big worry, but it is also having a drastic impact on the future of both land and ocean inhabitants. Although catching as many fish as you can could seem like a beneficial strategy, overfishing has negative effects. The outcome has an impact on the social and economic well-being of the coastal communities whose livelihoods depend on fish as well as the ocean's biological equilibrium. Therefore,

many fish stocks are depleted to levels below tolerable levels due to increased overfishing without sustainable management.

In addition, there exist additional grave environmental issues associated with the oceans, including harm to ecosystems as a result of global warming, the disposal of pollutants and wastes, oil drilling and maritime engineering, fuel leaks, ocean acidification, and coral bleaching. The UN demands better management of protected areas, enough funding for them, and a decrease in pollution, overfishing, and ocean acidification brought on by global warming.

(4) The Energy Transition and Renewables. Opportunities for transformation can arise from energy. The UN estimates that 13% of the world population lacks access to power and that 3 billion people rely on fossil fuels for cooking, given that energy accounts for 60% of greenhouse gas emissions worldwide and that there are millions of people without access to electricity.

Thus, to hasten economic development and advancement, a revolution in energy centered on renewable and energy-efficient sources is desperately needed. In the meanwhile, communities that are more inclusive, resilient to environmental issues like climate change, and sustainable should be built using a more approachable and effective model centered on the utilization of renewable energy sources.

Solutions to Environmental Issues

According to Erich Lawson (2019), People have been abusing and poisoning the very environment that supports them for a long time. However, the widespread concern for the environment can sometimes be so overwhelming that people are unsure of where to begin or what steps to take to make a difference.

a. **Climate Change Mitigation and Adaptation to Global Warming.** Climate change mitigation involves human interventions that reduce greenhouse gas emissions from sources or enhance their removal from the atmosphere by the sink. Responding to climate change involves two possible approaches, such as reducing and stabilizing the level of heat-trapping greenhouse gases in the atmosphere and adapting to the climate change already in the pipeline.

Improving energy efficiency and substituting fossil fuel sources (oil, gas, and coal) with renewable energy sources (wind, solar, and hydropower) constitute the first approach to emission-reducing measures from sources. The second is the decarbonization of transportation and heat through the use of hydrogen and electricity as fossil fuel substitutes. Furthermore, the long-term heating of the earth's climate system brought on by a long-term worldwide change in temperature is known as global warming. As a result, the following is a list of some practical fixes for these issues;

- Invest in and encourage the production of sustainable technology.
- Commercial and residential buildings should aim to achieve zero-emission or zero-waste.
- Improve waste compaction in landfills with smart technology.
- Increase forest cover, restore sea grasses, and boost the use of agricultural cover crops to reduce the amount of CO₂ in the atmosphere.

b. **Solutions to Water Pollution and Ocean Acidification.** Given the continuous rise in pollution and the effects of humans on the environment, it has been said that humans are the biggest evolutionary force in history. Some of the main causes of water pollution are rapid urbanization, inappropriate sewage disposal by industries, oil spills, the disposal of chemical and radioactive wastes, and plastic pollution. Ocean acidification is the result of a sequence of chemical processes involving the CO₂ absorbed by the seawater. These reactions raise the concentration of hydrogen in the seawater, making it more acidic. Followings may aid in halting ocean acidification and water pollution;

- Practice more effective measures to contain spills.
- Curtail warm water runoff and plant trees near bodies to reduce soil erosion.
- Expand the network that monitors the measuring of acidity levels to provide researchers and shellfish farmers with long-term and real-term pH data.
- Incorporate ocean acidification threats into the coastal zone management plans of states.
- Increase marine protection measures.

c. **Solutions to Deforestation.** In the modern world, deforestation is a serious issue that exacerbates socioeconomic issues. One of the planet's most significant ecosystems is the forest. The livelihoods of about one-third of the world population directly depend on trees.

The best opportunity we have to preserve animals, maintain a stable climate, and save human health is to put an end to deforestation. It is our shared duty to preserve the forest, regardless of how far away we live from the closest one. Following tactics may contribute to halting the loss of additional trees;

- Plant trees.
- Use less paper, recycle paper and cardboard.
- Buy a recycled product and then recycle them again.
- Support the products of companies that are committed to reducing deforestation.
- Raise awareness in your circle and your community.
- Do not use Palm Oil or product with Palm Oil.

d. **Solutions to Loss of Biodiversity.** The projected number of undiscovered species on our planet is 86% due to its abundance of life. More and more, biodiversity is turning into an issue than we ever imagined. Biodiversity provides biological resources that are essential to human survival and aids in preserving the ecosystem's equilibrium. There are various strategies for combating biodiversity loss as follows;

- The government should create and implement stricter policies and laws related to the conservation of biodiversity.
- Stop habitat destruction and encourage its restoration.
- Practice sustainable living.
- Reduce invasive species.
- Research innovative ways to preserve biodiversity and educate the populace about it.

e. **Solutions to Natural Resources Depletion.** Footprint Network Worldwide (2018) describes, as economic development expanded, so did the need for natural resources. As a result, humans are utilizing more of the earth's natural resources and materials that allow for financial gain. These materials include soil, water, fertility, forests, minerals, and more. We are

frequently depleting these resources more quickly than nature can restore them. Although conserving the earth's resources is a large topic, it can be somewhat alleviated by sticking to the following guidelines;

(1) **Use Electricity More Efficiently.** Since coal and natural gas are the most common energy sources used worldwide to generate electricity, we may save electricity by simply unplugging and turning off our appliances when not in use, as well as switching to more energy-efficient light bulbs and appliances. Furthermore, cutting-edge technology that automatically turns appliances on and off as needed, like smart thermostats, also contributes to energy conservation.

(2) **Use More Renewable Energy.** At present, fossil fuels natural resources that replenish only very slowly account for 63% of the rise in energy use. As a result, renewable resources like sunlight and wind can also be utilized to create electricity. Furthermore, the greenhouse gasses that cause climate change are not released by renewable energy.

(3) **Promote Sustainable Fishing Rules.** Nowadays, fishing practices damage coastal economies that rely on fishing and change the entire ecology. The quickest progress may likely be made in reducing destructive fishing practices, as many fishing techniques cause reef destruction, capture undersized species, and produce a significant amount of bycatch. Aside from that, mitigating these issues and the need to lessen illicit fishing and the effects of environmentally harmful fishing techniques depend on passing new laws and making sure those that now exist remain in a place that safeguards at-risk fish populations and ecosystems. We also need to work together to lobby for the protection and conservation of our delicate oceans and to educate the public.

(4) **Avoid Single Use of Plastic.** Disposable or single-use plastics cause long-term problems. Since plastics take 450 years to break down, scientists estimate that by 2050, there will be 12 billion tons of plastic debris in the environment. To appreciate the significance of reducing single-use plastic, it is necessary to step back and consider the effects that excessive plastic waste has on the environment. This can be done by concentrating on the facts mentioned below;

- Educate yourself.
- Educate others.
- Purchase reusable items.
- Influence to find greener alternatives.
- Think ahead to reduce plastic waste.

(5) **Drive Less.** Reducing environmental pollution can be achieved more effectively by remaining close to home, adopting other modes of transportation, and introducing more eco-friendly vehicles, such as electric cars, or by making tiny modifications to driving habits.

(6) **Recycle More and Improve Recycling System.** Recycling is a different concept because of its many advantages, and there are some creative methods you can use to make recycling better;

- Return to the three R's (Reduce, Reuse, and recycling).

- Buy recycled.
- Anticipate recycling.
- Avoid using garbage bags.
- Refrain from shredding paper.
- Properly recycle e-waste.
- Keep recyclables clean, empty, and dry.
- Reuse your water.

(7) **Use Sustainable Agriculture Practices.** Foodstuffs are produced using plant and animal sources in a way that safeguards communities, the environment, human health, and animal welfare. Additionally, it helps preserve biodiversity, lowers costs, stops pollution and soil erosion, preserves the environment, saves energy for the future, and manages animals sustainably. We can produce and consume healthful meals thanks to sustainable agriculture without jeopardizing the ability of future generations to do the same. Finding the ideal balance between the need to produce food and the preservation of natural ecosystems is essential to sustainable agriculture. Thus, one could think of the subsequent actions as a sustainable agricultural strategy;

- Crop rotation.
- Permaculture.
- Cover crops.
- Soil enrichment.
- Natural pest predators.
- Bio-intensive integrated pest management.
- Polyculture farming.
- Agroforestry.
- Biodynamic farming.
- Better water management.

(8) **Promote Sustainable Forest Management.** Sustainable forestry benefits are multifold and embrace economic, social, and ecological aspects. The implementation of sustainable forestry practices is important as it helps protect forests, from conversion to agricultural, urban, and industrial use. In forestry, sustainability is preserved by balanced decision-making that takes the social, ecological, and economic facets of development into account. Implementing sustainable forestry won't be possible if any one of these three factors is undervalued or ignored. Together, they operate best and produce better results for forest management.

(9) **Treat Wastewater before Discharging it.** Water is used as wastewater. It contains oil, soap, chemicals, food scraps, and human waste etc. This includes water from toilets, washing machines, dishwashers, showers, and sinks at home. Industries and businesses also contribute a portion of the used water that needs to be cleaned. The natural world is very resilient to even minimal levels of pollution and wastewater. However, nature will not be able to handle the billions of gallons of wastewater and sewage products that are released into the environment every day. Therefore, by using wastewater treatment technologies to filter and treat the wastewater by removing impurities like sewage and chemicals, we may use wastewater as a remedy for discharging wastewater and making it potable and usable. Additionally, sludge treatment, biological water treatment, physical water treatment, and other methods are commonly used to treat wastewater.

f. **Solutions to Public Health Issues.** Our health is impacted by the environment in many different ways. There is a substantial relationship between human health and the environment. This relationship can be either direct, as when humans are exposed to dangerous substances, or indirect, as when the ecosystem's ability to support life is disrupted. The World Health Organization's leadership in health, the environment, and climate change is outlined in 2020. "After significant reductions in the environmental burden of disease and action to counter climate change and other environmental health threats, all people attain the highest possible level of health." That being said, the following is a list of the results of that;

- Governance mechanisms and capacity of the health sector are strengthened for inter-sectorial action and the health in all policy approaches.
- Norms, standards, and legal instruments are in place and enforced to protect people's health through primary prevention.
- Policies are implemented and regularly adapted through monitoring, evidence-supported solutions, and coordinated research.
- Populations that are vulnerable or in vulnerable situations are protected from environmental and climate change risks equitably, including during emergencies.

g. **A Sustainable Food Model.** In addition to giving people access to nutritious food, a sustainable food system fosters the development of a robust food-related social, economic, and environmental framework. Therefore, the establishment of sustainable food and agriculture systems began. Furthermore, not everyone can afford a healthy diet according to the current food system. As a result, the food system accounts for around 30% of greenhouse gas emissions worldwide, making it a significant contributor to climate change. As a result, to save energy and lower CO₂ emissions, the UN believes that we must alter both our eating habits and the model of food production. This includes shifting to a more plant-based diet that uses local resources.

Conclusion

From the moment we step outside our home, everything we see is a part of nature. Nature takes several years to fully blossom, it does not appear overnight. Scientists estimate that it has taken 4.5 billion years for nature to evolve into what it is today. Earth was unsuitable for supporting life of any kind at first.

Sadly, because of the pollution that modern humans are causing to the environment, the rate of healing has slowed. The environment will continue to face pressures. Today's major issues include the usage of plastic, CO₂ emissions, industrial waste production, increased chemical use, deforestation, poaching, and oil spills into aquatic bodies. Meanwhile, the world population growth, increasing affluence, and the expansion of agriculture and industry will unavoidably have unexpected and perhaps harmful effects on the environment, the economy, and human health. These not only contaminate the environment but also worsen its quality, which is necessary for the existence of humans, animals, and birds.

To protect and improve the surrounding natural beauty, a large number of people are presently working for and establishing connections with nature conservation organizations. Environmental researches are still prudent and essential investment since they have demonstrated the importance in assisting in the response to and prevention of numerous environmental crisis.

As the knowledge of the complexity, scope, and interdependence of environmental issues has grown, we have concluded that a new balance of research initiatives could be beneficial. Additionally,

general knowledge of preventative methods for environmental pollution will contribute to a better understanding of several issues both now and in the future. In addition, the creation of novel instruments and approaches to comprehending and handling environmental issues, and the long-term gathering and distribution of precise environmental data are becoming more important for comprehending the behaviour of the natural world.

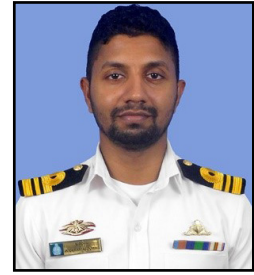
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CRAFTING A STRATEGIC BLUEPRINT FOR THE CONCEPT OF NAUTICAL TOURISM IN SRI LANKA

Lieutenant Commander (ASW) NN Wickramasooriya

Student Officer - 33rd Junior Naval Staff Course



Abstract

This paper explores the importance of nautical tourism by analysing the applications by other states in the world and how we can implement it within Sri Lanka. At present, the government has initiated some plans and the author tries to introduce a systematic approach to make it successful. Further, several challenges will have to be met in developing this concept within the territory of Sri Lanka, its way forward and the role could be played by the Sri Lanka Navy (SLN) being the seaward defence of the country, are systematically described in this paper.

Keywords: Nautical Tourism, Approach, Challenges, Sri Lanka Navy, Way Forward

Introduction

Ideally situated in the Indian Ocean, Sri Lanka boasts 1340 km of clean beaches and all necessary elements to make it a tourist haven for travelers from all around the globe. Furthermore, with over 100 rivers, together with lagoons and tanks, there are plentiful opportunities year-round for water sports. From a tourist standpoint, most people now use these stunning beaches that are endowed by nature primarily for recreational activities like swimming, tanning, surfing, snorkeling etc. (Doering, 2018). By bringing in foreign exchange and boosting the growth rate in the upcoming years, tourism is expected to play a significant role in the recovery of the nation's struggling economy. The tourist industry, which formerly brought great glory to Sri Lanka's economy, is anticipated to restore its fortunes as the nation searches for a way out of the financial quagmire it finds itself in. The tourism business has become more prevalent in the economics of most emerging nations due to the growing global tourist market.

Travelers who enjoy by water, whether by river or sea and have fun at marinas and ports that are specifically built to accommodate them, are said to be participating in a particular sort of tourism known as nautical tourism. Although the major benefits of this type of tourism are its favourable temperature, pristine environment, and stunning shoreline, the natural beauty alone can not sustain the industry. The infrastructure, amenities, and equipment of Sri Lanka's harbours and marinas are still far behind those of other nations, although each maritime investment raises these facilities to a higher standard. Given that boaters are not immobile and that tourists are specifically defined by their mobility, nautical tourism encompasses the whole range of activities. Including marine vessels and ports as their stations, nautical tourism is a multifaceted tourist activity with a significant maritime component.

Being an island nation, Sri Lanka offers many of opportunities to draw tourists from other countries for its marine tourism industry. However, in spite of this clear potential, the appropriate authorities have not taken any action to capitalize on the rapidly expanding market (Doering, 2018). The obvious lack of nautical tourism on the island nation, however, is something that is sometimes overlooked. This is also the moment at which partners and stakeholders in the tourist sector draw divisions (Rehan, 2022). Since nature has already given us all the necessary elements, it is now

the right moment for us in Sri Lanka to emphasize that we should truly focus on growing nautical tourism as a unique specialty in the new era of tourism development (Doering, 2018).

Significance of Nautical Tourism

Under the umbrella term ‘Water Tourism’, nautical tourism is a subset of travel that combines boating and sailing with vacation and holiday activities. Europe and South America were where the concept’s first industrial segment definition was found. Countless numbers of visitors visit developing maritime tourism destinations every year, including the Netherlands, the Czech Republic, and the United States. Large bodies of water, whether they be fresh water or even salt water sources, are a common feature shared by all these nations (Rehan, 2022). Nations like Singapore, Malaysia, Indonesia, and the Maldives, among others, have solidly built the infrastructure required for recreational boating and nautical tourism, which in turn provides significant income for the country (Mirror, 2021).

Nautical tourism has been defined more scientifically in 2007 by Lukovic and Grzetic. They defined it as the sum of poly-functional activities and relations that are caused by the tourists-boaters stay within or out of the ports of nautical tourism, and by the use of vessels or other objects related to the nautical and tourist activities, for the purpose of recreation, sports, entertainment, or other needs. Furthermore diving, surfing, rafting, rowing, fishing, adventures, and Robinson tourism are extensions of the tourist idea of this nautical tourism.

According to Herath, who spoke at the opening of the Virtual Boat Show 2021, there has to be growth in nautical tourism, but there isn’t currently a suitable plan in place for it. At least a million more visitors would be able to visit Sri Lanka if it is possible to bring marine tourism (Mirror, 2021).

Elements that Propel the Concept of Nautical Tourism

Nautical tourism, a dynamic industry that merges the allure of the sea with travel, is propelled by a constellation of essential elements, each contributing to its magnetic appeal. These key factors collectively craft an immersive experience, drawing enthusiasts to embark on maritime adventures.

- a. **Adventure and Recreation.** Nautical tourism blends adventure and recreation, offering thrilling experiences on the open waters. From water sports like jet skiing to exploring marine life through scuba diving, it is a dynamic playground for excitement. Sailing, fishing, coastal hikes, and cultural exploration add to the multifaceted appeal of this maritime adventure.
- b. **Diversity of Marine Life.** Marine life diversity is a draw in nautical tourism, enticing travelers to explore vibrant underwater wonders. Coastal areas showcase a rich array of species, from colourful coral reefs to majestic marine mammals. This diversity not only captivates but emphasizes the need for sustainable practices to preserve these ecosystems for future nautical enthusiasts.
- c. **Accessible Coastal Beaches.** Easy access to coastal beaches is crucial for the success of nautical tourism, blending natural beauty with recreational opportunities. Well-maintained parking, walkways, and amenities like beachfront accommodations make these beaches inviting for sun-seekers, enhancing the satisfaction of nautical enthusiasts.
- d. **Gateways to Rivers and Estuaries.** Rivers and estuaries are natural entry points for maritime adventures. Easy access to these waterways enables various nautical activities.

Clear routes, easy navigation, and safe docking points make it simple for sea enthusiasts to explore. The ease of reaching these scenic spots enhances the overall experience, whether it is a relaxed river cruise or an exciting exploration of estuarine waters. These accessible gateways not only connect people to the beauty of the sea but also provide an opportunity to appreciate the unique landscapes and ecosystems of rivers and estuaries.

e. **Infrastructures.** Success of nautical tourism relies on a well-planned infrastructure meeting the varied needs of maritime fans. Along the coast, essential amenities like lodgings, eateries, and shops are crucial for a smooth and enjoyable nautical experience. Coastal accommodations, from cosy inns to luxury resorts, offer a comforting escape, while waterfront restaurants serve local flavours with scenic views. These, along with lively shopping spots, create a maritime hub for essentials and souvenirs. This integrated infrastructure not only meets practical needs but also ensures a comfortable and convenient journey on land and at sea, including leisure parks, hotels, ship repair facilities, marinas, malls, and recreation areas.

f. **Marinas.** Marinas are essential for nautical tourism. They provide a safe place for boats and yachts, making sailors and boat owners feel confident. Marinas offer more than just a place to berth. They have fuelling stations, maintenance services, and waste disposal to keep vessels running smoothly. Beyond practicalities, marinas also create a sense of community among sailors, providing spaces for social activities. Overall, marinas play a key role in making coastal areas vibrant hubs for both practical and recreational needs, turning them into havens for aquatic adventures.

Proposed Approach to Apply the Concept

Despite its small size, the island nation of Sri Lanka experiences a surprisingly varied climate, influenced by two monsoon seasons that affect different parts of the country at different times of the year. These seasons are rarely completely reliable as the rains shift their pattern each year but there are months where the weather is just right for the nautical tourism. The proposed chart is designed as the regions where nautical tourism can be done within Sri Lankan waters by considering the following factors;

- Two major monsoons throughout the year.
- Density of merchant shipping or Sea Lines of Communication (SLOCs).
- Poaching of Indian trawlers.

Table 1: Propose Nautical Tourism Plan for Sri Lanka

Ideal Region for Yacht and Cruise	Presence of Marine Resources and Animals	Rivers and Estuaries	Propose Marina and Tourist City	Beaches	Suitability of Conducting Water Sports
North Western Udappu - Kalpitiya	Dolphins and Whales -Kalpitiya Coral - Bar Reef Uchchamuni, Kandakkuliya, Talawila	Kala Oya Mundal Lagoon	Negombo Kalpitiya	Negombo Kalpitiya	Kite Surfing Canoeing
Eastern Trincomalee- Nilaweli	Dolphins and Whales - Trincomalee	-	Nilaweli Trincomalee	Nilaweli Uppuweli Coral Cove	Snorkelling at Pigeon Island Diving at the Underwater Museum
South Eastern Panama - Pottuvil		Wila Oya	Arugambay Pottuvil	Arugambay Beach Pottuvil Beach	Surfing Canoeing

Source: Developed by the Author

The suitability of conducting nautical tourism within these four regions depends on the natural elements that have been discussed previously and it is required to develop other man-made elements in achieving the full scale of nautical tourism in Sri Lanka. The columns of these proposed nautical tourism charts can be interconnected as follows;

- The Yacht sails to the area of marine life and conducts scuba diving or snorkeling for tourists to explore the said marine resources.
- Embarkation of tourists from Yachts to motor boats in suitable anchorage locations at sea and explore inland waters, mangroves, and other specific features as per the region.
- The consideration of proposed locations of Marinas where Yachts could be berthed, depends on the availability of shopping complexes, restaurants, good hotels and beaches where travelers can enjoy water sports etc. But these infrastructures and services have to be developed in these proposed areas.

Future Challenges in Developing this Concept

Embarking on the maritime journey of advancing nautical tourism in Sri Lanka while promising exciting possibilities, presents a set of future challenges that demand strategic foresight and collective effort.

a. **Natural Disasters.** Sri Lanka faces formidable challenges due to the country's susceptibility to natural disasters. The threat of cyclones, tropical storms, and seismic activity in the region such as 2004 Indian Ocean tsunami, pose risks to the safety of vessels and tourists. The vulnerability of infrastructure, including marinas and docking facilities, demands resilient design and comprehensive risk mitigation strategies.

b. **Safety.** Developing nautical tourism and yachting services in Sri Lanka faces significant challenges concerning the safety of passengers, craft, marine resources, and animals. Safety concerns for passengers involve the risk of accidents during water-based activities, and the development of emergency response mechanisms to address technical failures or

accidents. Marine resources are vulnerable for overexploitation, habitat degradation, and pollution associated with increased tourist activities, emphasizing the need for sustainable practices and conservation measures. Additionally, the disturbance caused by maritime activities poses a threat to marine animals, such as dolphins and whales, underscoring the importance of responsible tourism practices. Balancing the growth of nautical tourism with the preservation of safety and environmental concerns is essential for the long-term success and sustainability of the industry in Sri Lanka.

c. **Knowledge Gap.** A lack of awareness and understanding about these activities among local communities, businesses, and potential tourists pose a hurdle to the industry's growth. Limited knowledge about safety protocols, equipment usage, and environmental considerations could compromise the overall safety of participants and the sustainability of water-based tourism. Bridging this knowledge gap through targeted training, public awareness campaigns, and collaboration between industry stakeholders is essential to ensure responsible and sustainable development in nautical tourism.

d. **Unavailability of Assets.** This scarcity can hinder the growth of the industry, limiting the capacity to meet the demand of tourists interested in water-based activities. The lack of a diverse fleet of boats, including yachts, sailboats, and water sports equipment, may curtail the range of experiences offered to visitors. Additionally, the absence of well-maintained and modern vessels may compromise safety standards, potentially deterring tourists and affecting the overall reputation of Sri Lanka as a nautical tourism destination.

e. **Workforce.** A shortage of skilled and trained personnel in various capacities, including boat operators, instructors, guides, and support staff, poses a significant hurdle to the growth of the industry. The specialized nature of these roles requires a workforce with a nuanced understanding of safety protocols, customer service, and environmental considerations.

f. **Maritime Threats.** Given its strategic maritime location, there are concerns about potential security risks, including piracy, robberies, terrorism, and geopolitical tensions, which could adversely impact the safety and attractiveness of the region for tourists. Additionally, the proximity to international shipping lanes raises concerns about accidents, collisions, and oil spills, posing environmental and safety risks. Addressing these challenges requires close collaboration between relevant authorities, the implementation of robust security measures, and the establishment of emergency response protocols to ensure the safety and well-being of participants in nautical tourism and water sports.

Voyage Ahead by SLN to Address the Challenges

Sri Lanka Navy plays a crucial role in addressing the challenges associated with the development of nautical tourism, yachting services, and water sports in the country's waters. Following recommendations are derived for the Sri Lanka Navy to proactively address these challenges;

- Development of maritime disaster response capabilities by Sri Lanka Coast Guard.
- Establishment of life-saving duties at proposed tourist beaches by Rapid Response, Rescue and Relief Units in Sri Lanka Navy.
- Providing training to the stakeholders on payment basis.
- Designing motor boats for tourism by Naval Boat Yard, Welisara on payment basis.
- Arranging training opportunities and job opportunities for naval personnel in the

tourism industry after their retirement.

- Ensuring of maritime security in the proposed regions with special emphasis on the nautical tourism.
- Strengthening measures in protection of marine resources.

Conclusion

As Sri Lanka sets sail to a position itself as a premier nautical tourism destination, thoughtful consideration on challenges as discussed above is imperative. By addressing various challenges comprehensively which include safety concerns, environmental conservation, workforce development, and potential maritime threats, Sri Lanka could position itself as a premier destination for nautical tourism. In conclusion, the systematic approach to nautical tourism in Sri Lanka is pivotal for unlocking the full potential of its maritime attractions. Anchoring their efforts in collaboration with key stakeholders, including local communities and the tourism sector, the Sri Lanka Navy's aim to ensure that the journey towards positioning Sri Lanka as a premier nautical tourism destination is not just a mere expedition but a sustainable and prosperous voyage into a brightful future.

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HEADING TOWARDS SUCCESS

Lieutenant Commander NAT Yasassri

Student Officer - 04th Long Executive Specialization Course (Gunnery)



Abstract

This comprehensive article examines Sri Lanka's intricate economic challenges, exacerbated by the recent financial crisis and the ongoing COVID-19 pandemic. It delves into the alarming surge in poverty rates, particularly impacting the middle class, projecting a rise to 27.4 percent in 2023. The government's ambitious reform agenda, including tax reforms and debt restructuring offers hope but resolute actions and a united front are deemed essential for national upliftment. In the backdrop of widespread economic difficulties the article advocates for self-employment as a crucial strategy, supported by statistical insights from the International Labour Organization. Shedding light on home-based workers particularly women, it highlights the need for recognition, labour protection and a comprehensive policy framework. The article concludes by emphasizing personal qualities like determination and vision, stressing their role in achieving self-employment goals and envisions a collective effort leading Sri Lanka towards a brighter future.

Keywords: Self-Employment Success, Adaptability, Passion-driven, Strategic Planning

Introduction

It is firmly believed that each individual should harbour a personal ambition, goal, or dream with the aspiration of emerging as a successful contributor to their community. Across the spectrum, people traverse diverse paths, whether these trajectories are of their own volition or circumstantial in nature. In author's view, the journey towards success is inherently shaped by the prevailing economic and political landscape of the country, intricately interwoven with the individual interests of members within the community.

Navigating the path to success proves to be a formidable undertaking, especially given the prevailing circumstances in the country. Upon introspection of the recent years, it is evident that Sri Lanka has grappled with pronounced economic challenges, culminating in a substantial financial crisis. Multiple factors have converged to create this complex scenario, impacting both the overarching economy and day-to-day lives of its citizens. Challenges such as a depletion in foreign currency reserves, a substantial accumulation of foreign debt, the devaluation of the currency, the political volatility, and the susceptibility of the agricultural sector to natural calamities like droughts and floods collectively contribute to the economic tribulations faced by the nation.

Even before the onset of the COVID-19 pandemic, Sri Lanka's economic landscape exhibited signs of vulnerability. Over the past five years, both economic growth and poverty reduction witnessed a notable deceleration. Factors such as a precarious investment climate, periods of slack monetary policy, and the maintenance of an artificially managed exchange rate have collectively contributed to external imbalances. In 2020, due to credit rating downgrades, Sri Lanka found itself cut off from international financial markets. Despite this setback, the country managed to navigate external debt payments and meet import costs through official reserves and loans procured from the banking sector.

By April 2022, Sri Lanka had declared an external debt service suspension and subsequently engaged legal and financial advisors to facilitate debt restructuring. Even after the assumption of the new presidency in July 2022, political tensions are persisting against the backdrop of the ongoing economic crisis. The country grapples with the complex interplay of economic challenges, necessitating strategic measures for recovery and stability.

The increased cost of living and the economic crisis in Sri Lanka are poised to thrust over 3.18 million middle-class individuals into poverty, thereby doubling the national poverty rate to 25 percent, as revealed by Faris Hadad-Zervos, the World Bank Country Director for Maldives, Nepal, and Sri Lanka, during a recent address in Colombo. This dire situation has been exacerbated by a substantial loss of income and employment, with half a million jobs disappearing from the industrial and service sectors.

The surge in living expenses has contributed to the stark rise in the national poverty level, soaring from 13.1 percent in 2022 to a staggering 25 percent in 2023. A notable consequence of this economic downturn is the widening gap in regional disparities. Urban areas experienced a 15 percent increase in poverty while rural areas witnessed an alarming spike to 52 percent (Central Bank, 2022).

Several factors over the past five years have played a pivotal role in this unsettling development. These include a constrictive trade regime, an unfavourable investment climate and a lax monetary policy, compounded by the profound impact of the COVID-19 pandemic. As the nation grapples with these multifaceted challenges, it becomes imperative to address the root causes and implement strategic measures for economic recovery and social stability (Writer, 2023).

According to World Bank statistics, approximately 13.1 percent of Sri Lanka's population, which equates to nearly 2.9 million people out of the 22.15 million total were grappling with poverty. Disturbingly, this figure has surged to 25 percent in 2022, affecting 5.54 million individuals out of a population of 22.18 million. This indicates a drastic increase, with 2.64 million middle-class individuals slipping below the poverty line.

The World Bank director forewarns that the number of impoverished individuals is expected to rise further to 27.4 percent of the population in 2023, projecting a total of 6.08 million people in dire economic straits within a population of 22.20 million. According to mathematical model predictions, the number of individuals in poverty is anticipated to climb from 2.90 million in 2021 to 3.18 million by the end of 2023.

It is alarming to note that a significant portion of the population is teetering on the edge of poverty. The World Bank estimates that 5.7 percent of the population lives with less than a 10 percent buffer above the poverty line, while an additional 5.6 percent hovers between 10 and 20 percent above the poverty line. This substantial increase in poverty and vulnerability over decades underscores the pressing need for human capital gains and profound reforms to stabilize the economy (Central Bank, 2022).

Recognizing the gravity of the situation, the government has committed to an ambitious reform agenda. Several impactful reforms have already been implemented, including tax reforms, cost-reflective utility pricing, the establishment of a robust social safety net and debt restructuring aimed at economic stabilization. These bold actions are crucial for protecting the poor and vulnerable amidst the challenging economic landscape (Director, 2030).

Given the multitude of significant challenges currently confronting Sri Lanka, it is imperative to undertake resolute and decisive actions to rectify the prevailing issues. The situation demands a collective mission where every possible effort must be exerted to restore equilibrium, leaving no room for hesitation. It transcends mere choice; rather, it is an imperative task that demands unequivocal success. The 'do or die' ethos encapsulates the gravity of the situation, presenting a clear and serious choice – either usher in substantial changes and ameliorate the circumstances or confront dire consequences.

This mission extends beyond mere survival; it is about forging a path towards a better and stronger nation in the long run. Addressing these challenges requires astute planning that encompasses crucial facets such as revitalizing the economy, prudent financial management and targeted solutions for specific issues like debt management. Vital to this endeavour is the encouragement of businesses to invest in Sri Lanka, serving as a linchpin for overall improvement.

A collaborative effort is paramount; it necessitates the concerted engagement of every stakeholder, from the government to ordinary citizens. Only through a united front and coordinated actions could ensure the success of this collective mission to uplift and fortify our nation.

In straightforward terms, it is a moment that calls for collective unity, astute decision-making, and concerted actions to transform Sri Lanka into a better place. While the current situation poses challenges, by acting judiciously and collaborating effectively, we have the capacity to steer things toward improvement.

Potential Solutions

Currently, extending help is a challenge for everyone in the community due to the widespread economic difficulties. Picture a family relying on a sole earner each month managing the soaring cost of living in the country becomes an uphill task. Many individuals resort to taking on part-time jobs or initiating small-scale businesses, driven by the disparity between their earnings and the escalating expenses. Despite the formidable hurdles posed by the high cost of living, people are compelled to find solutions. When discussing avenues for success and financial stability, embracing self-employment such as starting one's own business becomes a pivotal part of the equation. Despite the inherent challenges, particularly in the current circumstances, pursuing independent ventures could serve as a crucial strategy for navigating financial hardships.

Self-employed individuals are those who work independently or in small partnerships, relying on the profits derived from their produced goods or services for compensation. This category encompasses various types of self-employed workers, including those who operate independently (referred to as own-account workers), individuals working collaboratively in a group setting (members of producer's cooperatives), and even family members who contribute to the overall work effort (Ranjith, 2018).

In the context of Sri Lanka, it becomes crucial for individuals to contemplate the prospect of becoming self-employed. Successfully managing your own business not only results in increased production but also generates more income, contributing significantly to the alleviation of poverty. Embracing self-employment in Sri Lanka serves as a means to not only empower individuals as their own bosses but also to create additional job opportunities for those seeking employment.

From 1991 to 2017, the proportion of individuals working for themselves within the overall job market experienced fluctuations, oscillating between 36% and 46%. In 1991, approximately 37.60% of the workforce were self-employed, and by 2017, this figure had risen to 42.80% as reported

by the International Labour Organization in 2014. This highlights the significance of education, training, and experience in shaping the success of individuals engaged in self-employment (Ranjith, 2018).

Self-employment activities in Sri Lanka can be broadly categorized into two types: non-farm and farm. The predominant focus lies on non-farm activities, encompassing a diverse array of endeavours such as crafting and selling sweets, spices, incense sticks, soaps and engaging in activities like baking, beauty services, and various fashion-related work. Additionally, there are individuals who opt for farm-related self-employment, involving activities such as cultivating mushrooms, flowers, vegetables, and fruits or tending to animals associated with farming.

Achieving success when working for yourself involves various critical factors. Research indicates that monthly earnings, educational background, training, experience, adept utilization of technology, age and even gender can influence one's performance in self-employment. In addition to these external factors, personal attributes such as talent, ability, skills and effective time management are also essential components for becoming a prosperous self-employed individual (Ranjith, 2018).

Opportunities for Self-employees in Sri Lanka

Workers who operate from home are frequently overlooked despite their pivotal role in economies. The advent of the COVID-19 pandemic has precipitated substantial shifts in our work dynamics, resulting in an increased number of individuals working remotely. This scenario has brought to the forefront the hardships and challenges confronted by those engaged in home-based work, shedding light on the arduous conditions and the informal nature of their employment. Addressing the unique problems encountered by these workers necessitates a deeper understanding of their reality, prompting the need for comprehensive and effective solutions (Singh, 2021).

The International Labour Organization, with the backing of the Government of Japan, undertook a comprehensive study in Sri Lanka. The primary objective was to gain insights into home-based work within the country, with a specific focus on informal workers involved in small businesses connected to the lower tiers of both the global and local supply chains. This research, conducted through desk studies, explored into the nature of jobs, working conditions, labour rights, and the benefits accessible to these workers.

The study revealed that a significant majority of home-based workers in Sri Lanka operate without the protection afforded by labour and employment laws, lack access to social support systems, remain unorganized or are not part of unions and consequently, lack a collective voice. Another noteworthy finding was the inadequacy of data concerning home-based workers in Sri Lanka. Both the national census and labour force data fall short in providing specific details about homes serving as workplaces. Additionally, the study emphasized the predominant involvement of women in home-based work in Sri Lanka. This is primarily attributed to the fact that women often shoulder caregiving responsibilities and necessitate workplaces and working hours that offer more flexibility (Singh, 2021).

Engaging in remote work from home represents a substantial means for both men and women to earn a living. Nevertheless, there is a notable gender disparity in the types of jobs undertaken, with women more commonly involved in roles that offer lower compensation, demanding a considerable attention. Consequently, women often find themselves without a reliable income, rendering them vulnerable to instances of violence and harassment. The economic crisis has presented a dual impact on those working from home, bringing forth both challenges and opportunities (Singh, 2021).

Home-based workers merit recognition and protection under labour laws, afford them the same rights and benefits as officially recognized workers. Inclusion in data and statistics is imperative, considering the burgeoning nature of home-based work, particularly in the aftermath of economic crisis. The establishment of a comprehensive policy framework becomes pivotal, ensuring equitable and decent working conditions for both men and women, often overlooked in official labour force statistics. Collaborative efforts with various stakeholders including the government employers, worker organizations and entities within the supply chain are vital to establish a robust system that upholds fair working conditions for self-employed individuals (Singh,2021).

The Seed of Ambition

Confronting challenges on the journey to self-employment and success necessitates the cultivation of personal qualities like determination, organization, risk-taking, vision and passion. Establishing and diligently pursuing goals, especially in the face of obstacles, markedly enhances the prospect of success. Determination proves indispensable in the realm of self-employment where individuals must self-motivate and persevere through initial challenges before witnessing results. Organizational skills, encompassing both short-term and long-term planning emerge as critical components for the effective achievement of goals.

Engaging in calculated risks is inherent in the realm of self-employment, particularly when confronted with uncertainties in sales and product demand. The ability to steer these uncertainties is indispensable for the successful operation of a business. Vision, coupled with a flexible mindset, equips self-employed individuals to adapt to unexpected situations, proving to be a critical quality in a perpetually evolving business landscape. Passion, arguably the most crucial quality, serves as the driving force to endure routine tasks and remain motivated during challenging times. Without passion, sustaining self-employment becomes a formidable challenge. Recognizing and nurturing these qualities constitute the initial steps toward achieving self-employment goals. For those embarking on or already traversing the self-employment journey, seeking support and engaging in online learning can further enrich their path.

Conclusion

In the face of unprecedented economic challenges, Sri Lanka is navigating a critical juncture that demands collective resilience and decisive actions. The surge in living expenses and the alarming increase in poverty rates underscore the urgency for strategic measures to ensure economic recovery and social stability. The government's commitment to an ambitious reform agenda including tax reforms, cost-reflective utility pricing and debt restructuring offers a beacon of hope amid the challenging economic landscape. However, the gravity of the situation requires a united front and coordinated efforts from all stakeholders, transcending mere survival and aiming for a better and stronger nation in the long run.

As the nation grapples with multifaceted challenges, embracing self-employment emerges as a pivotal strategy for individuals to navigate financial hardships. The historical trends in self-employment in Sri Lanka highlight the importance of education, training and experience in shaping successful ventures. Furthermore, the overlooked but crucial role of home-based workers, especially women, demands recognition, protection under labour laws and the establishment of a comprehensive policy framework. Collaborative efforts involving the government, employers, worker organizations and supply chain entities are vital to ensure fair working conditions for self-employed individuals particularly those engaged in home-based work.

Confronting challenges on the journey to self-employment and success requires the cultivation of personal qualities like determination, organization, risk-taking, vision and passion. Recognizing and nurturing these qualities constitute the initial steps toward achieving self-employment goals and seeking support and engaging in online learning can further enrich this path. The journey may be challenging but with determination, vision, and collaboration, Sri Lanka can navigate through adversity and emerge stronger. The combined efforts of the government, businesses, and individuals, particularly those embracing self-employment can lead Sri Lanka toward a brighter and more prosperous future.

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SUSTAINABLE DEVELOPMENT IN SRI LANKA: CHALLENGES AND MEASURES

Lieutenant KAN Nuwan

Student Officer - 04th Long Executive Specialization Course (Anti Submarine Warfare)



Abstract

This article explores the multifaceted challenges and potential measures for achieving sustainable development in Sri Lanka. Focusing on economic, social, and environmental aspects, the challenges include the impact of global pandemics, regional disparities in poverty, healthcare deficiencies, and environmental issues. The paper identifies 14 key challenges, ranging from economic downturns to governance issues, and proposes strategic measures to overcome them. To address the economic challenges, the article suggests strengthening the microfinance sector, promoting sustainable tourism, and investing in infrastructure development with minimal environmental impact. Social measures involve enhancing healthcare access, human capital development through education, and sustainable urban development. Environmental measures encompass enforcing environmental laws, promoting renewable energy, and addressing negative externalities from sectors like agriculture. The article underscores the pivotal role of administrators in achieving sustainable development, emphasizing the importance of good governance, community engagement, human resource capitalization, and environmental stewardship. It calls for transparent policy implementation, capacity building, positive attitudes, and exemplary behaviour among administrators to navigate the complex landscape of sustainable development. In conclusion, the article advocates for a comprehensive approach to sustainable development in Sri Lanka, aligning with three pillars of economic growth, social equity, and environmental protection. By embracing these measures, administrators can lead the way towards a resilient and inclusive future for the country.

Keywords: Sustainable Development, Budget, Poverty Infrastructure, Population

Introduction

Development and Sustainable Development (SD) represent distinct facets, with development denoting the enhancement or expansion of a country's economic and social conditions (Sustainable Development Goals, 2019). On the other hand, sustainable development goes beyond mere progress, encapsulating a model that meets the present generation's needs while safeguarding the capacity of future generations to fulfil their own requirements. At its core, sustainable development intertwines economic growth, social equity, and environmental protection.

In a pivotal move in 2015, the United Nations established 17 Sustainable Development Goals (SDGs) aimed at eradicating poverty and fostering sustainable development globally by 2030. These goals are structured under three overarching pillars: social, ecological, and economic (The Sustainable Development Goals Report, 2022). The 17 SDGs encompass a comprehensive vision for a better world, addressing various dimensions of human well-being and environmental health. The goals are as follows;

- No poverty.
- Zero hunger.
- Good health and well-being.
- Quality education.

- Gender equality.
- Clean water and sanitation.
- Affordable and clean energy.
- Decent work and economic growth.
- Industry, innovation, and infrastructure.
- Reduced inequality.
- Sustainable cities and communities.
- Responsible consumption and production.
- Climate action.
- Life below water.
- Life on land.
- Peace and justice strong institutions.
- Partnerships to achieve the goal.

These goals collectively reflect a commitment to building a more equitable, sustainable, and harmonious world by addressing key challenges across social, economic, and environmental domains. As we navigate the path toward 2030, the pursuit of these sustainable development goals stands as a global imperative, fostering collaboration and shared responsibility in creating a better future for all (Kates et al., 2015), (Challenges and Strategies for sustainable development, 2018).

Sri Lanka, having emerged from a prolonged civil war over the past three decades, aspires to transition into a sustainable developed nation. However, akin to India, Sri Lanka grapples with various challenges impeding its journey towards sustainable development.

- a. **Global Pandemic Situations.** The global COVID-19 pandemic has adversely affected all the sectors such as its economy, social, health, and education sectors. As a developing country, the focus has diverted from broader sustainable development goals to upgrade essential requirements of the people of the country.
- b. **Poverty.** While extreme poverty is not prevalent, Sri Lanka contends with poverty at a certain level, particularly marked by regional disparities. Inequalities in income distribution contribute to variations between urban, rural, and estate sectors, with the estate sector experiencing higher poverty rates. Agricultural communities in rural areas face declining productivity and income due to factors like natural resource degradation and irregular rainfall.
- c. **Lack of Knowledgeable Persons.** Despite a commendable literacy rate of 92.9%, there remains a concern about the knowledge depth of the literate population. Achieving sustainable development necessitates not just literacy but a populace equipped with substantial knowledge.
- d. **Insufficient Hospital Facilities.** The inadequacy of hospital facilities has become glaringly evident during emergencies, such as the COVID-19 pandemic, posing challenges to healthcare management.
- e. **Lack of Infrastructure Development and Literacy in IT Sector.** The pandemic has underscored deficiencies in Sri Lanka's IT infrastructure, hindering the smooth transition to remote work. Technical issues, insufficient devices, and a lack of IT literacy pose challenges to sustaining development in the current digital age.
- f. **Lack of Social Security.** Deep-rooted societal mind-sets and attitudes present challenges to fostering social security, impacting the country's overall development outlook.

g. Aging Population. The demographic shift towards an aging population poses economic challenges, requiring increased spending on healthcare for non-communicable diseases and impacting the workforce.

h. Environmental Issues. Sri Lanka grapples with severe environmental pollution, including air and water pollution, deforestation, and inadequate solid waste management. These issues directly impede progress toward sustainable development goals, particularly those related to health and environmental well-being.

j. Natural Disasters and Climate Changes. Annual occurrences of landslides, floods, and droughts contribute to loss of life, property, and environmental stability. Human activities exacerbate these disasters, posing a continual threat to sustainable development.

k. Increasing Urban Population. Unplanned urbanization, driven by the migration of rural populations, strains essential services such as water supply, waste management, and sewage disposal, challenging the sustainable development of urban areas.

l. Negative Economic Growth. Sri Lanka faces a persistent trend of negative economic growth since 2016, with the COVID-19 pandemic exacerbating economic challenges.

m. Heavy Debt Burden. A substantial national debt of around 65.65 billion USD poses a significant burden on Sri Lanka's economic stability.

n. Budget and Balance of Payment Deficits. Budget deficits, as evidenced by -11.88% of GDP in 2020, and balance of payment deficits, largely driven by imports exceeding exports, strain the economic landscape.

p. Governance Side Issues. Issues on the governance side, such as out-dated laws, corruption, lack of policy continuity, and deficient mechanisms for policy coordination, devolution, and power-sharing, present challenges to the overall stability required for sustainable development in Sri Lanka.

Addressing these multifaceted challenges requires a comprehensive and coordinated effort, emphasizing resilience, innovation, and inclusivity in the pursuit of Sri Lanka's sustainable development goals (Little, 2022).

Measures to Overcome Sustainable Development Challenges in Sri Lanka: Economic, Social, and Environmental Pillars

Sustainable development, encompassing economic, social, and environmental dimensions, necessitates strategic measures to overcome challenges. Here, we delineate specific actions under each pillar to propel Sri Lanka towards comprehensive sustainability (Sri Lanka Strategy for Sustainable Development, 2007).

a. Economic Measures for Sustainable Development. Nurturing Prosperity with Responsibility - Sustainable development intertwines with economic sustainability, addressing a spectrum of goals vital for societal progress. In this context, we delve into three pivotal measures aimed at fostering economic sustainability.

(1) **Poverty Eradication and Financial Empowerment.** Following points are to be highlighted;

- The central tenet of economic measures is the eradication of poverty, extending beyond mere income levels.
- A comprehensive approach encompasses educational and health-related aspects of poverty, recognizing their pivotal role in economic well-being.
- The primary objective is to reduce poverty by elevating income levels, fostering conditions for social sustainability.
- The development of the microfinance sector emerges as a robust strategy, fortifying the financial foundations of marginalized households and small enterprises.
- Financial stability becomes a catalyst for improved social conditions, including enhanced education and healthcare, contributing to reduced inequalities.

(2) **Social Security and Sustainable Practices.** Implications are as follows;

- To combat poverty effectively, the focus extends to providing social security services and subsidies.
- However, sustainable development transcends mere financial aid; it necessitates building the underlying financial stability of communities.
- Ceasing the perpetual reliance on subsidies and aids encourages self-sufficiency among the economically disadvantaged.
- Importantly, financial support should extend beyond monetary assistance, incorporating the transfer of cutting-edge technologies and environmentally conscious practices to micro and small enterprises.
- The holistic approach ensures economic progress aligns with environmental stability.

(3) **Industry, Innovation, and Infrastructure.** Following implications to be adopted;

- The establishment of internationally recognized principles and standards in industries becomes imperative for sustainable economic development.
- Strategic measures include promoting the tourism industry, a significant source of foreign exchange for Sri Lanka.
- Emphasizing environmental and social sustainability in tourism promotion safeguards cultural values and pristine natural landscapes.
- To fortify economic sustainability, a focus on the three core production sectors: industrial, agricultural, and service is crucial.
- Infrastructure development, encompassing road networks, sea and air ports, and economic centres strategically located, propels economic growth, enriching the lives of citizens.

In the pursuit of sustainable development, economic measures go beyond monetary considerations, embracing a holistic perspective that ensures prosperity while safeguarding environmental and social equilibrium. The strategic interplay of these measures embodies the essence of the industry, innovation, and infrastructure goal within the sustainable development framework.

b. **Social Measures.** Nurturing welfare and knowledge for sustainable societal progress in Sri Lanka, acknowledged as a welfare state, endeavours to enhance the social fabric through an array of government programmes, reflecting a commitment to improving the well-being of its citizens. Noteworthy initiatives include income maintenance programmes (e.g., Gemidiriya, Divineguma), poverty reduction efforts (Samurdhi, Janasawiya), food and production subsidies (e.g., fertilizer), and the provision of free healthcare and education. Within the framework of sustainable development goals, the social pillar encompasses targets such as no poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, reduced inequality, sustainable cities and communities, and peace and justice strong institutions. This narrative explores key strategies and measures vital for achieving social sustainability.

(1) **Health and Well-being as Pillars of Social Sustainability.** As the pillars of social sustainability, followings are to highlighted;

- The pursuit of social sustainability begins with prioritizing the creation of a healthy society, ensuring equitable access to healthcare services.
- Initiatives to promote traditional ayurvedic treatments domestically and globally contribute to a holistic approach to healthcare.
- Equitable healthcare access plays a dual role, not only fostering well-being but also enhancing citizens' capacity to participate in economic activities.
- Environmental factors directly impact public health; thus, preserving a clean environment is integral to sustaining good health.

(2) **Knowledge-based Society and Building Human Capital.** Following implications to be adopted;

- Elevating societal development requires a concerted effort to build human capital for a knowledge-based society.
- Ensuring equality in the distribution of educational facilities and resources is paramount for fostering social sustainability.
- Access to information and information technology must be equitable, with capacity building and retraining initiatives for service providers, including teachers and technology transfer professionals.
- An educated populace contributes not only to social sustainability but also becomes a catalyst for economic and environmental stability, fostering innovation and environmental consciousness.

(3) **Urban Development Aligned with Principles of Sustainability.** This can be achieved by;

- Ensuring the provision of essential utility services in urban areas is a crucial social measure within the sustainable development framework.
- Integrated urban planning, harmonizing with environmental and health standards, forms the bedrock for sustainable cities and communities.
- Effective management of water supply and sewerage systems, sustainable housing development, and the incorporation of sustainability principles contribute to the realization of the sustainable cities and community goals.
- Sustainable urban spaces not only foster economic activities but also cultivate an awareness of environmental preservation, exemplified by concepts such as the green city.

In essence, these social measures encapsulate Sri Lanka's commitment to fostering a society marked by well-being, knowledge, and environmental consciousness-a vital step towards achieving sustainable development.

c. Environmental Measures. Safeguarding the Foundation of Sustainable Development - The sustainability of the environment stands as the cornerstone of the overarching goal of sustainable development. Recognizing that no meaningful development can occur without a healthy environment, this narrative delves into the pivotal role of environmental measures in securing the fundamental needs of humans and animals-food, water, shelter, and clean air. Key goals under the environmental pillar include ensuring clean water and sanitation, responsible consumption and production, climate action, and safeguarding life below water and life on land.

(1) Sustainable Resource Management. It can be ensured by adhering with followings;

- Central to environmental sustainability is the judicious management of natural resources. This involves the enforcement of environmental laws through training initiatives, instilling a sense of responsibility and discipline among the populace.
- Fiscal measures, such as promoting the three 'R's in waste management (Reduce, Reuse, Recycle), play a crucial role in encouraging environmentally friendly practices. This includes the protection of water bodies, canal systems, and wetlands in urban areas, emphasizing the importance of preserving natural resources through education.

(2) Transition to Renewable Energy. Transition can be done with the steps as mentioned below;

- A significant strategy for environmental sustainability involves promoting the use of economically viable and environmentally friendly renewable energy resources. Emphasis on non-conventional sources such as solar power and tidal waves is pivotal.
- Shifting towards renewable energy not only contributes to environmental well-being but also aligns with economic stability, relieving the government of substantial expenditures associated with traditional energy sources like oils and coals. Moreover, the use of eco-friendly sources contributes to improved public health by reducing environmental pollution.

(3) Mitigating Negative Externalities. Mitigation of negative externalities can be ensured through;

- Addressing the adverse impacts stemming from agriculture, industry, energy, and other sectors is crucial for environmental sustainability. Land degradation, a significant concern, necessitates policies and regulations to prevent negative externalities such as reduced land fertility, agricultural productivity, floods, and landslides.
- Curbing the use of harmful agricultural chemicals and minimizing industrial waste is imperative for preventing water pollution. Beyond safeguarding the environment, these measures contribute to economic growth by enhancing the productivity of the agricultural sector. Moreover, the reduction of negative

externalities positively influences social sustainability, contributing to the well-being of communities.

These environmental measures intricately link the three pillars of sustainable development—economy, society, and environment. The interconnection highlights the need for a holistic approach, where safeguarding the environment is not just an isolated goal but an integral part of fostering enduring and balanced development.

The Crucial Role of Administrators in Advancing Sustainable Development in Sri Lanka

Administrative officers, as stewards of public service, bear a profound responsibility in fostering good governance to propel Sri Lanka towards sustainable development across economic, social, and environmental dimensions. Good governance is acknowledged as an indispensable tool to be woven into the fabric of sustainable development strategies. Administrative officers, entrusted by the people, must champion accountability, transparency, and efficiency while judiciously managing human, natural, economic, and financial resources to attain sustainable development (Sri Lanka Voluntary National Review on the Status of Implementing Sustainable Development Goals, 2018).

Active participation of civil society in the decision-making process is paramount. At present, challenges persist due to a lack of practical knowledge about the ground-level realities faced by the people of Sri Lanka. Government officers must possess a clear understanding of the genuine issues affecting the population. Service as a government officer holds value only when it significantly contributes to enhancing people's livelihoods (Sustainable Sri Lanka 2030 Vision and Strategic Path, 2019).

Notably, government officers strive to align human resources with government strategies. Administrative officers act as vital links between the government and the people of Sri Lanka. An administrator must possess the ability to comprehend the needs and sentiments on both sides. Without this holistic understanding, the administrative process cannot flow smoothly, and development cannot be realized overnight. Sustainable development requires collective efforts, a shared vision, and a collaborative spirit.

To contribute to the sustainable development of Sri Lanka, government officers, including administrators, must work tirelessly without confining themselves to one facet of their roles. Recognizing the interconnected nature of development, all stakeholders should unite under a common goal, setting aside individualistic tendencies. Being an administrative officer is a significant opportunity to actively contribute to Sri Lanka's development process rather than passively observing from the side-lines.

Attitude emerges as a linchpin for development. Positive attitudes serve as organizational foundations, guiding administrative officers in any context. Maintaining a mindset that resonates with the aspirations of development is crucial. As implementers of policies, administrators must uphold transparency and equality, identifying vulnerable individuals and sectors within society.

Administrators ought to be exemplars for their peers and endeavour to safeguard the environment through personal actions and educational initiatives. Any actions contrary to environmental sustainability should be met with appropriate measures in adherence to national regulations. Administrators must convey the intrinsic link between a thriving environment and economic and social sustainability.

Practicing good attitudes facilitates a deeper understanding of subordinates. This understanding aids in deciphering societal behaviours, providing insights into the potential outcomes of specific actions. Administrators must possess a comprehensive knowledge base encompassing both theoretical and practical aspects of Sri Lanka's ground realities. In the pursuit of development, administrators require a set of skills to identify, apply, and manage knowledge effectively. Management skills, coupled with a strong knowledge foundation, contribute significantly to handling diverse situations and aligning efforts with government expectations.

To be an effective administrative officer in the development process necessitates a keen understanding of the actual problems faced by the people and formulating solutions within their local context. The quest for sustainable development demands a focus on the grassroots level, where administrators must engage with the community to effect positive change. As guardians of public service, administrators must cultivate an understanding of the authentic challenges faced by the people and devise solutions within their local environments. Incremental changes at the grassroots level, guided by administrators, are indispensable for the realization of sustainable development in Sri Lanka. Though the journey may be gradual, the enduring impact and permanence of these efforts contribute significantly to the future prosperity of Sri Lanka (De Silva et al., 2022).

Conclusion

To achieve sustainable development in Sri Lanka, a holistic strategy is imperative, encompassing the intricate dimensions of economics, society, and the environment. Administrators, wielding pivotal roles, should ardently espouse the tenets of good governance, actively involve communities, and prioritize the prudent utilization of human and environmental resources. Through the conscientious implementation of measures aligned with the triad of sustainable development pillars, Sri Lanka can surmount existing challenges, laying the groundwork for a future characterized by resilience and sustainability.

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SAILING INTO THE FUTURE: ARTIFICIAL INTELLIGENCE AND THE NAVY

Lieutenant TGDD Purnimal

Student Officer - 04th Long Executive Specialization Course (Navigation)



Abstract

This article delves into the transformative intersection of Artificial Intelligence (AI) and naval operations, offering a comprehensive exploration from historical contexts to future projections. Beginning with an overview of the evolution of naval warfare, we traverse pivotal technological advancements that have shaped naval strategies throughout history. Examining the current state of naval operations, the article highlights the integration of AI as a cornerstone for redefining maritime strategies and capabilities. From enhancing surveillance to revolutionising decision-making processes, AI emerges as a strategic ally, promising unprecedented efficiency and precision in naval endeavours. The article then forecasts future trends, envisioning AI's continued evolution in naval applications. Anticipated developments include enhanced decision-making capabilities, increased autonomy, and the integration of emerging technologies such as quantum computing and advanced robotics. However, it also addresses challenges such as ethical considerations, potential arms races, and the need for international collaborations. The strategic implications of AI in naval operations are explored, analysing its influence on global geopolitics and military strategies. The potential for arms races and the prospects for collaborative efforts in AI-driven naval capabilities underscore the need for careful navigation in the international arena.

Keywords: Evolution, Strategic Implications, Artificial Intelligence, Integration of AI, Autonomy, Quantum Computing, Advanced Robotics, Ethical Considerations

Introduction

The landscape of naval operations stands at the brink of a profound technological transformation, and at its core is the integration of artificial intelligence. Throughout history, the trajectory of naval warfare has been intimately connected to technological advancements, dictating the course of nations and the dynamics of global power. Reflecting on the past, pivotal moments emerge where technology has fundamentally altered the naval arena. Transitioning from sail to steam power in the 1800s and the adoption of radar and sonar during World War II are examples of how technology consistently propelled naval forces into uncharted territories. The Cold War ushered in nuclear propulsion, a paradigm shift that reshaped the potency of navies and the global power equilibrium. Today, we stand on the precipice of a new era, where the synergy of AI and naval operations promises revolutionary changes.

The significance lies in the fact that AI is not merely enhancing traditional naval tasks, it is fundamentally redefining how naval forces operate. AI functions as an exceptionally intelligent assistant, making decisions, identifying threats, and strategizing autonomously. It is a computational entity capable of independent thought and learning. This is not an incremental improvement, it represents a monumental leap forward. What makes this development intriguing is the profound impact AI is having in three key domains: surveillance, communication, and combat. It is similar to providing the Navy with an arsenal of superhero tools, enhancing their vision, improving communication efficiency, and enabling precision in combat.

This article aims to delve into the current intersection between the Navy and AI, elucidating how AI aids in threat detection, enhances communication protocols, and transforms combat strategies. Additionally, we will cast a forward-looking gaze into the future, analysing emerging trends, anticipating challenges, and examining how AI continues to reshape the Navy's role. Through this exploration, we endeavour to offer a comprehensive view of how technology is steering the course of naval forces, stimulating crucial discussions on policy, security, and the evolving technological landscape.

Evolution of Naval Warfare

Naval warfare boasts a rich history punctuated by technological milestones that have not only transformed the mechanics of ships but also significantly influenced how nations navigate global waters. Let us embark on a journey through time to unravel the pivotal role technology has played in shaping naval strategies and tactics. In the historical overview, we find that naval warfare was not always characterised by hightech vessels and gadgets. In earlier times, ships relied on sails, wind, and oars for propulsion. However, as time sailed on, technology emerged as a transformative force in naval battles. The 19th century witnessed a notable shift from sail to steam power, granting ships enhanced speed and control and ushering in a new era of naval capabilities.

During the tumultuous period of World War II, radar and sonar technologies emerged as game-changers. Radar allowed ships to detect enemies from a distance, providing a substantial advantage, while sonar enabled navigation beneath the ocean's surface, revolutionising underwater warfare. The Cold War introduced nuclear propulsion, fundamentally altering naval power dynamics. Nuclear-powered submarines, capable of prolonged submersion, heightened strategic capabilities and reshaped naval strategies globally.

Each technological leap brought about a transformation in naval strategies. The ability to detect enemies from a distance altered the approach to naval battles, while nuclear power shifted the focus to stealth and prolonged endurance, influencing tactics for offence and defence. The historical developments in naval warfare underscore the symbiotic relationship between technology and strategy. Examining the past provides insights into how advancements continually reshape naval operations, laying the groundwork for the contemporary intersection of naval affairs with artificial intelligence.

In the current role of navies, their responsibilities extend beyond traditional warfare. They play a crucial role in safeguarding their countries' interests at sea, dealing with challenges such as piracy and disaster response, and ensuring smooth trade. Utilising cutting-edge technologies, navies employ advanced tools like satellites, drones, and radars for surveillance, enabling them to monitor activities on the water and in the skies. Communication is facilitated through hightech systems, allowing navies to coordinate effectively, whether in close proximity or oceans apart. Weaponry, the cornerstone of naval strength, encompasses a diverse array of technologies, from powerful guns and missiles to stealthy submarines. However, it is not merely about firepower, it is about employing these tools with intelligence and strategy to ensure the effective defence of the waters. The synthesis of technology and strategic acumen defines the modern naval landscape.

Artificial Intelligence in Naval Operations

In the upcoming sections, author will plunge into the advanced realm of naval operations and explore the significant impact of artificial intelligence. AI, far beyond being limited to robots, has become an integral component shaping the modus operandi of navies worldwide. Examining the current applications of AI reveals its role as the secret sauce empowering navies globally. One

prominent domain is threat detection, where AI serves as a digital detective onboard, analysing vast datasets encompassing satellite images and underwater sounds to identify potential dangers. This strategic use of AI ensures that navies stay ahead of potential threats, contributing to the overall safety of maritime operations.

Yet, AI's influence extends beyond threat detection, it emerges as a decision-making superstar. Navies leverage AI to swiftly process information and make intelligent choices, akin to having a super-smart assistant aiding commanders in making optimal decisions amidst dynamic operational scenarios. The integration of AI in naval operations is not confined to decision making, it extends to autonomous vehicles. Drones and underwater robots, propelled by AI, navigate the seas independently, collecting valuable information and executing designated tasks. This fleet of hightech autonomous helpers alleviates the burden on human crews, allowing them to focus on intricate and demanding missions.

In the realm of cyber security, an increasingly crucial facet in the digital age, AI assumes a pivotal role for navies. It serves as a guardian, actively detecting and preventing cyber threats and ensuring the safeguarding of critical data. Machine learning algorithms, coupled with sensor technologies, enable quicker data analysis for enhanced situational awareness, empowering naval forces to make informed decisions in real-time. With AI as a cybersecurity stalwart, navies can confidently operate in a digitally secure environment, mitigating potential risks associated with information breaches.

Advancements in AI for Naval Operations

In the dynamic landscape of naval operations, artificial intelligence is undergoing thrilling advancements, propelling naval capabilities into uncharted territories. Let us embark on a journey through recent breakthroughs in AI technologies, exploring how machine learning, Natural Language Processing (NLP), and other AI subfields are reshaping the future of maritime prowess.

Recent advancements in AI technologies are not standing still in the fast-paced world of technology, instead, they are steering naval operations towards unprecedented efficiency and sophistication. Machine learning, a dynamic subset of AI, is making waves by enabling systems to learn from data and enhance performance over time. Navies are capitalising on machine learning to elevate decision making processes, making them more adaptable and responsive to the complexities of dynamic situations.

Another noteworthy player in this technological evolution is natural language processing, which involves teaching computers to understand and respond to human language. Navies are integrating NLP into communication systems, fostering seamless interactions among personnel and AI. This goes beyond mere conversations with machines, it is about creating a natural and effective way for naval crews to interact with AI systems. The potential impact of these AI advancements on naval capabilities is profound. Machine learning facilitates predictive analytics, allowing navies to anticipate potential threats based on patterns in historical data. This foresight proves invaluable in strategizing and preparing for diverse maritime scenarios.

Natural language processing enhances communication efficiency and envisions sailors interacting with AI systems using everyday language, simplifying complex commands and responses. This not only streamlines operations but also ensures a faster and more accurate exchange of information. Moreover, other AI subfields, such as computer vision, are being applied for enhanced surveillance and identification. Smart cameras and sensors equipped with AI can identify objects at sea, contributing to both navigation and threat detection.

Challenges and Considerations in Implementing AI in Naval Operations

As we set sail into the era of artificial intelligence in naval operations, it is crucial to navigate the challenges and considerations that accompany this technological transformation. While AI brings forth a wave of possibilities, it also stirs up challenges ranging from ethical dilemmas to cybersecurity risks and international regulations. Let us delve into these concerns and explore potential solutions for smooth sailing in AI-integrated naval operations.

a. **Challenges Associated with AI Implementation.**

(1) **Ethical Considerations.** Followings could be considered;

- As AI becomes more integrated into naval decision-making, ethical questions arise.
- Who is responsible if an AI system makes a wrong decision?
- How do we ensure fairness and avoid bias in AI algorithms?
- These ethical dilemmas require careful consideration to uphold the principles of accountability and fairness in naval operations.

(2) **Cybersecurity Risks.** Followings could be considered;

- With increased reliance on AI comes an amplified vulnerability to cyber threats.
- Sophisticated AI systems can become targets for malicious attacks, potentially compromising sensitive naval data.
- Securing these systems against cyber threats becomes paramount to maintaining the integrity and confidentiality of naval operations.

(3) **International Regulations.** Followings could be considered;

- The use of AI in naval operations raises questions about compliance with international laws and regulations.
- As countries adopt AI at different paces, establishing common ground becomes essential to ensure that AI equipped navies operate within agreed upon legal frameworks.
- This includes addressing issues related to sovereignty, jurisdiction, and the use of force.

b. **Potential Solutions and Mitigations.** Following solutions could be identified;

(1) **Ethical Frameworks.** Followings could be listed out;

- Developing and implementing ethical frameworks is crucial.
- This involves establishing guidelines for the ethical use of AI in naval decision-making, ensuring transparency, accountability, and fairness.
- Training naval personnel on the ethical considerations of AI is equally important to foster responsible use.

(2) **Cybersecurity Measures.** Following measures could be listed out;

- Implementing robust cybersecurity measures is a non-negotiable aspect of AI integration.
- This includes regular cybersecurity audits, encryption of sensitive data, and continuous monitoring for potential threats.
- Collaboration with cybersecurity experts and organisations can enhance the resilience of naval AI systems against cyberattacks.

(3) **International Collaboration.** Following collaborations could be listed out;

- Establishing international norms and regulations for the use of AI in naval operations requires collaboration between nations.
- Forums for discussions and agreements on AI governance can facilitate the development of common standards.
- This collaborative approach ensures that AI is harnessed for collective benefit, promoting stability and preventing misuse.

In addressing these challenges and considering potential solutions, navies can confidently navigate the seas of AI integration. By prioritising ethical practices, fortifying cybersecurity measures, and fostering international cooperation, naval forces can harness the full potential of AI while safeguarding against potential pitfalls.

Future Trends and Projections in AI for Naval Operations

As we embark on the journey into the future, the horizon of naval operations holds the promise of even more advanced and sophisticated applications of artificial intelligence. Let us navigate through the anticipated developments, exploring how AI is expected to evolve and shape the future of naval landscapes. We will also peer into the integration of emerging technologies like quantum computing and advanced robotics, forecasting the seascape of tomorrow.

a. **Anticipated Developments in AI.** Following developments could be anticipated;

(1) **Enhanced Decision-Making.** Followings could be identified;

- The future envisions AI evolving to become even more adept at decision-making.
- Naval commanders may benefit from AI systems that not only process vast amounts of data but also provide nuanced insights, assisting in complex strategic choices.
- This development could revolutionise how navies approach planning and execution.

(2) **Autonomous Systems.** Following systems could be listed out;

- The integration of AI in naval operations is expected to lean towards increased autonomy.
- Picture unmanned vessels navigating the seas, guided by AI algorithms that enable them to perform tasks independently.
- This shift towards autonomy has the potential to redefine naval capabilities and enhance efficiency.

(3) Predictive Maintenance. Followings could be listed out;

- AI is used for predictive maintenance of naval assets, including ships and submarines.
- Machine learning algorithms analyse historical maintenance data to predict potential equipment failures, allowing for proactive maintenance and reducing downtime.

(4) Target Recognition and Tracking. Followings could be listed out;

- AI-powered image recognition systems enhance target identification and tracking capabilities.
- Computer vision algorithms analyse sensor data, including radar and camera feeds, to automatically identify and track potential threats, improving response times.

(5) Mine Countermeasure Operations. Following measures could be listed out;

- AI is applied to mine countermeasure operations to detect and neutralise underwater mines.
- Autonomous underwater vehicles equipped with AI algorithms can identify and classify mines, reducing the risk to naval vessels.

b. Integration of Emerging Technologies. Following integrations could be listed out;**(1) Quantum Computing.** Followings could be listed out;

- Quantum computing represents a quantum leap in processing power.
- In the future, navies may harness the computational prowess of quantum computers to handle complex calculations at speeds currently unimaginable.
- This capability could transform data analysis, cryptography, and simulation processes in naval operations.

(2) Advanced Robotics. Followings could be listed out;

- The future naval landscape may witness the integration of advanced robotics powered by AI.
- This could include AI-driven robotic vessels capable of tasks ranging from surveillance to maintenance.
- These robots, operating autonomously or in collaboration with human crews, could augment naval capabilities and perform tasks in challenging environments.

(3) Weather Prediction and Route Optimization. Followings could be listed out;

- AI is utilised for weather prediction and route optimisation in naval operations.
- Machine learning algorithms analyse weather patterns and historical data to recommend optimal routes, ensuring the safety and efficiency of naval missions.

While these advancements offer exciting possibilities, considerations come with such leaps forward. Ensuring the ethical use of AI remains a priority, particularly as autonomy increases. Cybersecurity measures must evolve alongside technological advancements to safeguard naval systems from emerging threats.

Strategic Implications of AI Integration in Naval Operations

As we embark on the integration of artificial intelligence in naval operations, it is crucial to examine the strategic implications that ripple across the vast seas of global geopolitics and military strategies. Let us navigate through the potential impact of AI on shaping international relations, exploring the likelihood of arms races and the prospects for collaborative efforts in the realm of AI-driven naval capabilities.

- a. **Influence on Global Geopolitics.** Following influences could be identified;
 - The integration of AI in naval operations transcends of individual countries naval capabilities, it is a game changer in global geopolitics.
 - Nations adopting advanced AI driven naval technologies gain a strategic edge, influencing how power is perceived and wielded on the international stage.
 - This shift in maritime capabilities can reshape alliances, alter the balance of power, and redefine geopolitical landscapes.

- b. **Potential for Arms Races.** Following potentials could be identified;
 - The race for AI driven naval capabilities poses a potential challenge.
 - As countries strive to outpace each other in adopting and advancing AI technologies, there is a risk of triggering arms races.
 - The fear of falling behind in naval AI capabilities could lead to an acceleration of military developments, intensifying competition and raising concerns about stability in international waters.

- c. **Opportunities for International Collaboration.** Following opportunities could be identified;
 - Conversely, the integration of AI in naval operations also presents opportunities for international collaborations.
 - Shared concerns about the responsible use of AI, addressing ethical considerations, and establishing common standards could foster cooperation between nations.
 - Collaborative efforts may lead to the development of frameworks that promote stability and prevent the misuse of AI technologies in naval settings.

- d. **Considerations for Future Strategies.** Following considerations could be identified;
 - Strategic planners must carefully navigate the evolving landscape shaped by AI in naval operations.
 - Crafting effective military strategies requires an understanding of how AI influences not only technological advancements but also the dynamics of international relations.
 - Nations will need to strike a delicate balance between competition and cooperation, weighing the benefits of technological superiority against the risks of destabilising arms races.

Ethical and Legal Considerations in AI for Naval Operations

Navigating the ethical and legal waters surrounding the transformative technology of artificial intelligence in naval operations is paramount. Let us delve into the ethical implications and explore the legal frameworks guiding the use of AI in military settings, particularly in naval operations.

- a. **Ethical Implications.** Following implications could be identified;
 - The use of AI in naval operations raises significant ethical questions that demand careful consideration.
 - Key considerations include accountability for AI driven decisions, the potential for bias in algorithms, and ensuring that AI applications adhere to ethical standards in the context of warfare.
 - Establishing ethical guidelines is essential to govern the responsible use of AI, preventing misuse and ensuring that naval operations align with moral principles.
- b. **Legal Frameworks and Regulations.** Followings could be identified;
 - Legal frameworks play a vital role in shaping the use of AI in military contexts, including naval operations.
 - International laws and agreements that govern the conduct of armed forces must adapt as AI becomes more prevalent in naval operations.
 - Addressing issues of accountability, transparency, and adherence to humanitarian principles is crucial in developing regulations that guide the ethical deployment of AI technologies at sea.
- c. **Striking a Balance.** Followings could be considered when striking a balance;
 - Balancing the integration of AI for enhanced naval capabilities with ethical and legal considerations is a delicate task.
 - While AI offers advantages in efficiency and strategic decision-making, ensuring alignment with international laws and ethical norms is imperative.
 - Striking this balance requires collaboration between nations to create comprehensive legal frameworks that foster the responsible and ethical use of AI in naval operations.

Conclusion

Exploration into the integration of artificial intelligence in naval operations has unveiled a transformative journey spanning history, current realities, and future possibilities. From the evolution of naval warfare to the present state of operations, advancements in AI, and strategic implications of each phase have illuminated the profound impact AI. In the historical context, it could be observed how technological leaps consistently shaped naval operations, laying the foundation for the current intersection with AI. Examining the current state, it is evident that AI is not merely a tool but a strategic ally, augmenting surveillance, communication, and combat capabilities.

Looking ahead, anticipated developments in AI promise even more sophisticated naval capabilities. As we peer into the horizon of the future naval landscape, the integration of artificial intelligence promises to usher in a new era of unprecedented capabilities and challenges. Beyond the realms explored thus far, the trajectory of AI in naval operations points towards a convergence of cutting-edge technologies that extend beyond traditional paradigms. Quantum computing,

with its potential to exponentially increase processing speeds, and advanced robotics, capable of executing intricate tasks with precision, are poised to redefine the very fabric of naval warfare. The synergy between AI and these emerging technologies holds the promise of unparalleled efficiency and strategic advantage.

However, this evolution is not smooth sailing, ethical considerations demand vigilant oversight to prevent misuse, and the global community must collaborate to establish comprehensive regulations. Navigating the uncharted waters of AI integration requires a delicate balance between innovation and responsibility, ensuring that the future naval landscape is shaped by the principles of ethical stewardship and international cooperation. In the realm of global geopolitics, the strategic implications of AI integration are profound. The potential for arms races and the opportunities for international collaboration underscores the need for careful diplomacy and international cooperation.

In conclusion, it is evident that AI is not merely a tool for naval forces, it is a paradigm shift that will redefine how nations navigate the seas. The journey does not end here and it marks a waypoint for further research, development, and ethical considerations as we navigate the future seas with AI at the helm of naval operations.

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සුළු නිලධාරී එස්පීඅයිඑස් පතිරණ

ජ්‍යෙෂ්ඨ උපදේශක - ගිනි නිවීම හා ආපදා මර්ධන පාසල



සාගර දූෂණය පිළිබඳව තොරතුරු බිඳක්

මීට වසර කිහිපයකට පෙර, ශ්‍රී ලංකාවේ නැගෙනහිර වෙරළ ආසන්නයේ ‘නිව් ඩයමන්ඩ්’ නම් නෛමානව ගිනි ගැනීමකට ලක්ව පැවති අතර, නෛමානව තුළ ගින්න පැතිර යමින් එහි තිබූ ඉන්ධන කාන්දු වී මුහුදට එකතු වීමට ඉඩ තිබුණු අවස්ථාවේ ක්ෂණිකව ගින්න නිවා දැමීම සඳහා මෙහෙයුම් ආරම්භ කරන ලදී. එම අවස්ථාවේ මෙම නෛමානව ඉන්ධන සාගර ජලයට එකතුවීමෙන් විශාල පරිසර හානියක් සිදුවිය හැකි බවට පරිසරවේදීන් අනතුරු අඟවනු ලැබූහ. එබැවින් පාර්ශව ගණනාවක දායකත්වයෙන් ගින්න මැඩපැවැත්වීම සඳහා සාර්ථකව කළ මෙම මෙහෙයුමක් මගින්, විශාල පාරිසරික හානියක් වලක්වා ගැනීමට හැකි විය.

සාගර දූෂණය යනුවෙන් හඳුන්වන්නේ කුමක්ද?

සාගරය මිනිසාට සම්පතක් වේ. විවිධාකාර මත්ස්‍යයෝ, වෛවර්ණ කොරල්පර, මුහුදු හතු සහ මුහුදු ඇල්ගී වැනි මිලියන ගණනක් විවිධ ජෛවීය සම්පත් සාගරයේ වාසය කරති. එහෙත් මිනිසා අනෙකුත් අතීතයේ සිට අපද්‍රව්‍ය මුදා හැරීම සඳහා භාවිතා කරනු ලබනුයේ සාගරයයි. ඒ තුළින් සාගරයටත්, එහි වෙසෙන ජීවීන්ටත් විවිධ ජෛවීය සම්පත් වලටත් හානි සිදු වන අතර, එම ක්‍රියාවලිය සාගර දූෂණය ලෙසින් හඳුන්වනු ලබයි.

සාගර දූෂණය සිදුවන ආකාර

සාගර දූෂණය සිදුවන ප්‍රධානම ක්‍රමය වන්නේ සෘජුවම සාගරයට අපද්‍රව්‍ය මුදාහැරීම හෝ වක්‍ර ලෙස ගංගා, ඇළ දොළ හරහා අපද්‍රව්‍ය සාගරයට මුදාහැරීමයි. ප්‍රධාන වශයෙන් එහිදී සිදුවන්නේ කර්මාන්ත ශාලා, රෝහල්, තෝපනාගාර සහ නිවෙස් වැනි ස්ථානවලින් ඉවතලන විවිධ අපද්‍රව්‍ය සාගරයට එකතුවීමයි. පසුගිය දශක කිහිපය පිළිබඳව අවධානය යොමු කිරීමේදී මෙම ක්‍රියාවලිය නිරන්තරයෙන් සිදු වන බවට සාධක සපයා ගත හැක.

සාගරයට මුදාහරින අපද්‍රව්‍ය අතර ඝන අපද්‍රව්‍ය, ද්‍රව අපද්‍රව්‍ය, ලෝහ අපද්‍රව්‍ය සහ අහිතකර රසායනික ද්‍රව්‍ය වැනි දේ අඩංගුවේ. එහි දී කර්මාන්ත ශාලාවලින් පිටකරන අපද්‍රව්‍ය සමගින් මුහුදු ජලයට එකතුවන බැර ලෝහ සහ රසායනික ද්‍රව්‍ය නිසා සාගර දූෂණය විශාල වශයෙන් සිදු වන අතර ඒ සඳහා හොඳම උදාහරණය වන්නේ 1950 වසරේ දී ජපානයේ ‘මිනමාටා බොක්ක’ ආශ්‍රිත ප්‍රදේශය තුළ පැතිර ගිය ‘මිනමාටා රෝගය’ යි. 1950 වර්ෂයේදී මිනමාටා බොක්ක ආසන්න ප්‍රදේශයේ ජනතාවට අමුතුව ආකාරයේ රෝගයක් වැළඳුණ අතර පසුව කළ සොයා බැලීමකදී අනාවරණය වූයේ එම ප්‍රදේශයේ කර්මාන්ත ශාලාවකින් පිට කරන ලද රසදිය මෙම මිනමාටා බොක්කට මුසු වී මත්ස්‍යයන්ගේ ශරීරයට ඇතුළු වී ඇති බවයි. එම මත්ස්‍යයන් පරිභෝජනය කල මිනිසුන් හට ‘මිනමාටා රෝගය’ වැළඳුණු බව පැහැදිලි වී ඇත.

ඉන්දියාව, බංගලාදේශය සහ චීලී ඇතුළු රටවල් ගණනාවක්ම මිනිස් මළ අපද්‍රව්‍ය සෘජුවම මුදාහරිනු ලබන්නේ සාගරයටයි. එහි ප්‍රතිඵලයක් වශයෙන් මිනිස් මළ අපද්‍රව්‍ය සමග විවිධ රෝගකාරක ද මුහුදු ජලයට එක්වී දියවැල් ඔස්සේ සමුද්‍රය පුරා පැතිරීම සිදු වේ. එසේම මිනිස් මළ අපද්‍රව්‍ය නිසා මුහුදු දිය නෂ්ටයේ යෙදෙන පුද්ගලයන් විවිධ ආසාදන හා රෝගාබාධවලට ලක්වීමේ ප්‍රවණතාවයක් දක්නට ලැබේ. ඇතැම් සාගර ප්‍රදේශ ආශ්‍රිතව බෝවන මුහුදු ජීවීන් මිනිස් ආහාරයට නුසුදුසු තත්වයට පත්වීමට ද මෙය හේතු සාධකයක් වී ඇත.

සාගර දූෂණය සිදුවන තවත් ප්‍රධාන කාරකයක් වන්නේ මුහුදු ජලයට ඉන්ධන වර්ග එකතුවීමයි. ඒ අනුව මෙම ක්‍රියාවලිය ඉන්ධන ප්‍රවාහනය සිදු කරන නෛමානව මගින් ඉන්ධන පිරවූ ටැංකි සේදු ජලය මුහුදට එක්කිරීම, ඉන්ධන නෛමානව අනතුරුවලින් මුහුදුබත් වීම සහ මුහුදු හරහා ඉන්ධන ප්‍රවාහනය කරන නල මාර්ග

මගින් ජලයට ඉන්ධන කාන්දුවීම හේතුවෙන් සාගර ජලය විදිනෙදා දූෂණයට ලක්වේ. මෙම වැරදි ක්‍රියාමාර්ග මගින් සාගර ජලය දූෂණය වීම ඉහල ගොස් ඇත.

සාගර දූෂණය නිසා ලැබෙන අහිතකර ප්‍රතිඵල

මෙම ක්ෂේත්‍රය සම්බන්ධව අවධානය යොමු කිරීමේදී, පසුගිය දශක කිහිපය තුළ සාගර ජලය දූෂණය වීමේ වර්ධනයක් සිදුවීම දැකිය හැකි අතර ඒ තුළින් අහිතකර ප්‍රතිඵල රැසක් අපට අත්විඳීමට සිදුව ඇත. පහත දැක්වා ඇත්තේ වචන් සාගර දූෂණය හේතුවෙන් ලැබී ඇති අහිතකර ප්‍රතිඵල කිහිපයකි.

- සාගර දූෂණය නිසා සාගරය තුළ සහ අවට දිවි ගෙවන මුහුදු ජීවීන් විනාශයට ලක් වන අතර වම ජීවීන්ගේ කරමල් තුළ තෙල් හා ක්ෂුද්‍ර ජලාස්ථික් සිරවීම මගින් ඔවුන්ට මරණය උරුමවීම හිදසුනක් ලෙස දැක්විය හැකියි.
- කොරල්පර විශාල ලෙස විනාශයට පත්වීම හේතු කොටගෙන මුහුදු ඛාදනය වැඩි වීම.
- ආහාර දාම ඔස්සේ බැර ලෝහ මිනිසාගේ සිරුරට ඇතුල් වීම. උදාහරණ වශයෙන් 1950 වසරේ ජපානයේ ‘මිනමාටා බොක්ක’ ආශ්‍රිතව රෝගයක් පැතිරයාම පෙන්නාදිය හැකියි.
- ඇල්ගී, ඇතැම් දිලීර, සහ බැක්ටීරියා අධි වර්ධනයක් පෙන්නීම.
- සාගර ජීවීන්ගේ ස්වාභාවික වාසස්ථාන අහිමි වීම.
- සාගර ජීවීන්ගේ ප්‍රජනන හැකියාව අහිමි වීම.
- සාගර ජලයේ ඔක්සිජන් මට්ටම අඩු වීම.
- සාගර ජලයේ උෂ්ණත්වය ඉහළ යාම.
- ඉස්සන්, කකුළුවන්, මත්ස්‍යයන් වැනි සත්තු මිනිසාගේ පරිභෝජනය සඳහා නුසුදුසු තත්වයට පත්වීම.
- ධීවර කර්මාන්තය අඩපණ වීම.

සාගර දූෂණය වැළැක්වීම සඳහා ඇති කරන ලද සම්මුතීන්

සාගර දූෂණය ලොව විශාලතම පාරිසරික ගැටළුවක් බවට පත්වී ඇත්තේ මීට දශක ගණනාවකට පෙර සිටය. වම හේතුව නිසා සාගර දූෂණය වැළැක්වීමට ජාත්‍යන්තර වශයෙන් ද පියවර ගෙන ඇත. එහි ප්‍රතිඵලයක් වශයෙන් පහත සඳහන් සම්මුතීන් ත්‍රිත්වය සම්මත කර ගැනීමට කටයුතු කර ඇත.

- නැව් මගින් සිදුවන සාගර දූෂණය වැළැක්වීම සඳහා 1973 වසරේ දී ඇති කරන ලද ‘මාර්පෝල් සම්මුතිය’.
- නැව් සහ ගුවන් යානා මගින් අපද්‍රව්‍ය මුහුදට දැමීම අත්හිටුවීම සඳහා 1975 වසරේ දී ඇති කරන ලද ‘ලන්ඩන් සම්මුතිය’.
- ගොඩබිම් ජල මාර්ග වලින් අපද්‍රව්‍ය මුහුදට ගලායාම වැළැක්වීම සඳහා 1976 වසරේ දී මධ්‍යධරණී මුහුද අවට රටවල් විසින් ඇතිකරගන්නා ලද ‘බාර්සිලෝනා සම්මුතිය’.

නමුත් සාගර දූෂණය පාලනය කිරීම සඳහා 70 දශකයේ සිට මෙවැනි සම්මුතීන් ඇතිකරනු ලැබුවත්, සාගර දූෂණයේ අඩුවීමක් දක්නට නොලැබේ. විශේෂයෙන් ලෝකය කාර්මීකරණයට ලක්වීමත් සමග වර්ධනය වූ සාගර දූෂණය ඉදිරි දශක කිහිපය තුළ තවත් වර්ධනය වීම නොඅනුමානයයි.

පරිසරික මූලාශ්‍ර

Liyanagedara, N.(2020). සාගර දූෂණය පිළිබඳව තොරතුරු බිඳක් roarmedia, (<https://roar.media/sinhala/main/environment-wildlife/ocean-pollution>)

සමුද්‍රීය ඉතිහාසය

සාමාන්‍ය නැව් එච්ඒඑච්සී අඛේකෝන්

තුන්වන අදියර ජලශාස්ත්‍රීය මිණුම් පාඨමාලාව - 02/2023



හැඳින්වීම

සමුද්‍රීය ඉතිහාසය යනුවෙන් අදහස් කරනු ලබන්නේ මිනිසුන් සාගරය සමග සිදු කරනු ලබන ක්‍රියාකාරකම් අධ්‍යයනය කිරීමයි. ජාතික සහ කලාපීය ඉතිහාසය ප්‍රමුඛව පැවතුනද, සමුද්‍රීය ඉතිහාසය බොහෝවිට ගෝලීය ප්‍රවේශයක් භාවිතා කරනු ලබන අතර, එමඟින් පුළුල් පරාසයක ක්‍රියාකාරකම් ආවරණය කරනු ලබයි. එමෙන්ම අධ්‍යයන විෂයක් ලෙස සමුද්‍රීය ඉතිහාසය බොහෝවිට සම්මත විෂයන්වල සීමාවන් ඉක්මවා ගියද, සමුද්‍රීය ඉතිහාස විෂය, සාගරය සහ ලෝකයේ ප්‍රධාන ජල මාර්ග සමඟ මානව වර්ගයාගේ විවිධ ක්‍රියාකාරකම් අවබෝධ කර ගැනීම කෙරෙහි අවධානය යොමු කරනු ලබයි. තවද, නාවික ඉතිහාසය පිළිබඳ අවධානය යොමු කිරීමේ දී නැව්ගත කිරීම් සහ නාවිකයින් සම්බන්ධ අතීත විවිධ ක්‍රියාකාරකම් වාර්තාකර නිරූපණය කරනු ලබයි.

සමුද්‍රීය ඉතිහාසයේ පැතිකඩ

සමුද්‍රීය ඉතිහාසයේ පැතිකඩ පිළිබඳව අවධානය යොමු කිරීමේදී සමුද්‍රීය මසුන් ඇල්ලීම, ජාත්‍යන්තර මුහුදු සීමාවන්, සමුද්‍රීය හීනි, නාවික ඉතිහාසය, විවිධ සමුද්‍ර ආශ්‍රිත විද්‍යාවන්හි ඉතිහාසය, සාගර සිතියම් විද්‍යාව, ජල විද්‍යාව ඇතුළු විවිධ පැතිකඩවල් පිළිබඳව කරුණු අනාවරණය කර ගැනීම සිදු කරනු ලබයි. මීට අමතරව මුහුදු ගවේෂණය, සමුද්‍රීය ආර්ථික විද්‍යාව සහ වෙළඳාම සඳහා නැව්ගත කිරීම්, යාත්‍රා කිරීම්, මුහුදු වෙරළේ නිවාඩු හිඤ්ඤත, ප්‍රදීපාගාර ඉතිහාසය සහ මුහුදු ආශ්‍රිත වාසය කරනු ලබන ප්‍රජාවන් ආදී වශයෙන් මෙම ක්ෂේත්‍රයේ නොයෙකුත් ප්‍රවේශයන් පවතින බව අනාවරණය කරගත හැකි වේ.

සමුද්‍රීය ඉතිහාසයේ මූලාශ්‍ර

විවිධ රටවල ඉතිහාසඥයන් මෙම ක්ෂේත්‍රය පිළිබඳව විද්වත් ලිපි සහ විවිධ කෘති නිර්මාණ ප්‍රකාශයට පත් කර ඇත. එම ප්‍රකාශ අතර වැදගත් මූලාශ්‍රයක් ලෙස ජාත්‍යන්තර සමුද්‍රීය ඉතිහාසය නැමැති මූලාශ්‍රය දැක්විය හැකි අතර, එය කැනඩාවේ ආර්ථික සංගමයක් විසින් වසරකට දෙවතාවක් ප්‍රකාශයට පත් කරනු ලබයි. තවද, මෙම සඟරාව ජාත්‍යන්තර කතෘ මණ්ඩලයක් මගින් සිදු කරනු ලබන අතර, ආර්ථික, සමාජීය, සංස්කෘතික සහ පාරිසරික ඉතිහාසයේ සමුද්‍රීය මානයන් ගවේෂණය සිදුකර ඇති බව දක්නට ලැබේ. මීට අමතරව සමුද්‍ර ඉතිහාසය පිළිබඳව ජෝන් බී හැටෙන්ඩෝෆ් (John B Hattendorf) විසින් සංස්කරණය කරන ලද වෙළුම් හතරක විශ්වකෝෂය සමුද්‍රීය ඉතිහාසයේ පුළුල් විශ්ලේෂණයක් සඳහා මග පෙන්වනු ලබයි. සමුද්‍රීය ඉතිහාසය පිළිබඳ විද්වත්තු 400 කගේ ලිපි 900 කට අධික ප්‍රමාණයක් ඔක්ස්ෆර්ඩ් (Oxford) විශ්වකෝෂයේ අඩංගු වන අතර, එය පිටු 2900 කින් සමන්විත වේ. තවද, මේ සම්බන්ධව ඇති ලිඛිත ප්‍රකාශයන් ලෙස සන්ජීව් සන්යාල් (Sanjeev Sanyal) විසින් රචිත 'Incredible History of the Indian Ocean' ග්‍රන්ථය ද ආර් බ්‍රූස් මැක්ඩොනල්ඩ් (R Bruce Macdonald) විසින් රචිත 'Sister of the Ice' ග්‍රන්ථය ද ට්‍රෙවර් බෝල්ට් (Trevor Boulton) විසින් රචිත 'ST Helena Maritime' ග්‍රන්ථය ද පෙන්වාදිය හැකිය. පොදු වෙළඳ නැව්ගත කිරීම් සහ ආරක්ෂක නාවික හමුදාව පිළිබඳ අධ්‍යයනයන් වෙනම ක්ෂේත්‍රයන් ලෙස සලකනු ලබයි. මීට අමතරව ගොඩබිම්වල අභ්‍යන්තර ජල මාර්ග සාගර ඉතිහාසය විෂය ක්ෂේත්‍රයට ඇතුළත් වේ. විශේෂයෙන් උතුරු ඇමරිකාවේ සාගර හා සමානව පවතින විල් වැනි අභ්‍යන්තරික ජලාශ සහ ලොව පුරා යාත්‍රා කළ හැකි ප්‍රධාන ගංගා සහ ඇළ මාර්ග සාගර ඉතිහාසයට අයත් වේ.

ප්‍රාග් ඓතිහාසික යුගයේ ජල යාත්‍රා

සමුද්‍රීය ඉතිහාසය පිළිබඳව විමසා බැලීමේදී ප්‍රාග් ඓතිහාසික යුගයේදී සිදු වී ඇති ජල යාත්‍රා පිළිබඳව අධ්‍යයනය කිරීම සලකා බැලිය යුතුම කාරණාවක් වේ. විශේෂයෙන් පුරාවිද්‍යා කැණීම් මගින් ප්‍රාග් ඓතිහාසික

යුගයට අයත් යාත්‍රා හමුවී ඇත. එමෙන්ම බ්‍රිතාන්‍යයේ අයිල් ඔෆ් වයිට් ප්‍රදේශයෙන් මධ්‍ය ශිලා යාත්‍රා අංගනයක් සොයාගෙන ඇත. සමුද්‍රීය ඉතිහාසය වසර දහස් ගණනක් දිව යන අතර ශිෂ්ටාචාර සමුද්‍රීය වෙළදාම පිළිබඳව සාක්ෂි අවම වශයෙන් අයත් යාත්‍රා හමුවී ඇත. සමුද්‍රීය වෙළදාම පිළිබඳව සාක්ෂි අවම වශයෙන් සියවස් දෙකක් පමණ ඇතට දිවයයි. පළමු ප්‍රාග් ඓතිහාසික යුගයේ ජනයා විසින් වෙරළබඩ මසුන් ඇල්ලීම සඳහා කුඩා යාත්‍රා භාවිතා කළ බවට ඉතිහාසගත සාක්ෂි හමුවේ. පුරාවිද්‍යාඥයෝ සහ ඉතිහාසඥයන්ගේ තොරතුරු වලට අනුව පාරු සහ බෝට්ටු වැනි ජල යාත්‍රා ප්‍රාග් ඓතිහාසික යුගයේ සිට භාවිතා කර ඇති අතර ඇතැම් විට වසර මිලියනයකට පෙර හෝමෝ ඉරෙක්ටස් මානවයා විසින් ගොඩබිම් අතර පවතින සමුද්‍රීය සන්ධි හරහා ගමන් කිරීමට මෙම යාත්‍රා භාවිතා කොට ඇති බවට සිතිය හැකිය.

අතීත මානවයා සමුද්‍රීය තරණය කිරීම සම්බන්ධව තොරතුරු සහ සාක්ෂි සාගරික පුරාවිද්‍යාඥයන් විසින් විවිධ කැණීම් ඔස්සේ සොයා ගෙන ඇත. නිදසුනක් වශයෙන් මානවයා මහා ඕස්ට්‍රේලියාවට ළඟාවීමට සාගරය තරණය කළ යුතු අතර එම මානවයා වසර පහක් දාහක් හෝ ඊට වැඩි කාලයකට පෙර සමුද්‍රීය තරණය කොට ඕස්ට්‍රේලියාවට ගොඩ බැස ඇත. එසේ නම් ඒ සඳහා අවශ්‍ය දැනුම හා තාක්ෂණය ආදී මානවයාට තිබූ බවට සිතිය හැකිය. ඕස්ට්‍රේලියාවේ පළමු ජනාවාසයේ සන්ධිස්ථානයට පෙර මුහුදු ගමන් මොහොත දැයි අපි නොදනිමු. එකල තිබී සොයාගත් පැරණිතම බෝට්ටු වලින් එකක් වන්නේ ‘පෙසි ඔරුව’ වන අතර සාගරික පුරාවිද්‍යාඥයින් විසින් සිදු කරන ලද කාබන් කාල නිර්ණය මගින් එහි නිර්මාණය කිරීම ක්‍රිස්තු පූර්ව 7510 සිට 8040 දක්වා ඇස්තමේන්තු කර ඇත. ඊට අමතරව තවත් ජල යාත්‍රාවක පැරණිතම නිරූපණයක් හොර්වේ වලින් හමුවේ. හෝර්වේ වල Eale හි පාෂාණයක මීටර් හතරකට වඩා දිග බෝට්ටුවක කැටයමක් නිරූපණය කර ඇති අතර එය වසර 10,000 සිට 11,000 දක්වා පැරණිය. ඉතිහාසය පුරාම සමුද්‍රීය හරහා යාත්‍රා කිරීම ශිෂ්ටාචාරයේ වර්ධනයට ඉවහල් වී ඇති අතර, වෙළදාම, ප්‍රවාහනය, යුද්ධය සහ මසුන් ඇල්ලීමේ හැකියාව සඳහා ගොඩබිම හරහා ගමන් කිරීමට වඩා මානවයා සමුද්‍රීය හරහා ගමන් කිරීමට උත්සුක වී ඇත. ක්‍රිස්තු පූර්ව 3,500 සිට 3,000 දක්වා කාලය තුළ භාවිතා කරන ලද සමුද්‍රීය රුවල් යාත්‍රාවන්හි පැරණිතම අනුරුවන් පර්සියානු බොක්කේ මෙසපොතේනියාවේ හමු වී ඇත. ඒවා මැටි භාජන ආකෘති හා තීන්ත තැටි වලින් නිරූපණය කර ඇත. ඒවා සාදන ලද්දේ ‘දැලිස්’ බඳුන් සාදන ලද බට වලින් ය. මෙම යාත්‍රා මත යොදන ලද ආරක්ෂිත ආලේපනයේ කොටසක් ලෙස අර්ථකථනය කරන ලද තාර මිශ්‍රණයේ අවශේෂ ද සොයාගෙන ඇත. තවද පිඟන් මැටි කැබැල්ලක ඇති යාත්‍රාවක රූපයක් ‘Bipod Mast’ සහ ‘රුවල් නිරූපණ’ රූපයක් හමු වී ඇත. පැරණි ඊජිප්තුවේ සහ මධ්‍යධරණී මුහුදේ ගංගා සහ වෙරළබඩ ජලය සඳහා මුල් රුවල් හැවි භාවිතා කරන ලදී. රුවල්වල රූපමය නිරූපණයන් පුරාණ ඊජිප්තුවෙන් ද හමුවන අතර එය ක්‍රි: පූ 3,100 පමණ අවධියකට අයත් යැයි උපකල්පනය කළ හැකිය. කෙසේ වෙතත් මුල්ම මුහුදු වෙළඳ මාර්ගය වර්තමාන මුහුදේ ක්‍රිස්තු පූර්ව හත්වන සියවසේ සිට පමණ සිදු වූ බවට කරුණු අනාවරණය වේ. තවද මීට වසර 5,000 කට පමණ පෙර, අරාබි මුහුදු දිගේ ද ප්‍රධාන වෙළඳ මාර්ගයක් නිර්මාණය විය. කොල්ලකරුවෝ තවලම් වලට පහර දීම නිසා ගොඩබිම ගමන් කිරීම අනතුරුදායක වූ අතර නාවිකයෝ මුහුදේ ගමන් කිරීමට පටන් ගත්හ. ඔවුන් ජලයේ සැරිසැරීමට තාරකා ශාස්ත්‍රය භාවිතා කළ බවට ඉතිහාසගත සාක්ෂි හමුවේ.

සමුද්‍රීය සංක්‍රමණික පිබිදීම

ක්‍රිස්තු පූර්ව 300 දී පමණ ඕස්ට්‍රේලියාවේ තායිවානයේ සිට අග්නිදිග ආසියාව හරහා බටහිරට සංක්‍රමණය වීමක් සිදු වී ඇති අතර පසුව පැසිෆික් සාගරයේ දූපත් වලට ව්‍යාප්ත වීමට පටන් ගන්නා ලදී. එමෙන්ම තව දුරටත් ඔවුහු පැසිෆික් සාගරය හරහා ක්‍රමානුකූලව ඉදිරියට ගොස් හවායිහි ජනාවාස වීමත් සමඟ අවසන් වී ඇත. ඊට අමතරව නවසීලන්තය ක්‍රි:ව 1,300 දී පමණ බෝට්ටු තැනීමේ තාක්ෂණය අතින් ඉහළ ස්ථානයක සිටි බවට සාක්ෂි හමුවන අතර රුවල් යාත්‍රා සෑදීම සඳහා පුළුල් නාවික ශිල්පීය ක්‍රම සහ සුවිශේෂී නාවික තාක්ෂණයක් භාවිතා කොට ඇති බවට කරුණු අනාවරණය වේ. ඕස්ට්‍රේලියානු ව්‍යාප්තිය අතරතුර ඉන්දු පැසිෆික් කලාපයේ විශාල කොටසක් යටත් විජිතයක් බවට පත් කිරීමට ඕස්ට්‍රේලියානුවන්ට හැකි වී ඇත. 16 වන සියවසට පෙර ඕස්ට්‍රේලියාවේ වඩාත් පුළුල්ව පැතිරුණු ජන වාර්ගික කණ්ඩායමක් වූ අතර ඔවුන්ගේ ව්‍යාප්තිය හැඟෙනහිර පැසිෆික් සාගරයේ කුඩා දූපත් වල සිට බටහිර ඉන්දීය සාගරයේ මැඩගස්කරය දක්වා ව්‍යාප්ත විය.

එමෙන්ම පුරාණ ඊජිප්තුවේ ජාතිකයෝ රුවල් නිර්මාණය කිරීම පිළිබඳ දැනුමක් තිබූ බවට කරුණු අනාවරණය වේ. ග්‍රීක ඉතිහාසඥයෙක් වූ හෙරඩෝටස්ගේ ප්‍රකාශයට අනුව රුසියානු දෙවන නිකොලස් රජතුමා විසින් ඉන්දියානුවන්ගේ ගවේෂණ කණ්ඩායමක් සාගරයට පිටත් කර යැවූ බවත්, එය වසර දෙකයි මාස හයකින් අප්‍රිකාව වටා යාත්‍රා කොට පසුව රතු මුහුදේ සිට නයිල් නදියේ මුඛය දක්වා යාත්‍රා කල බව සදහන් වේ. ඔවුන්

දකුණට සහ පසුව යාත්‍රා කරන විට මධ්‍යම සූර්යයා උතුරට යන බවට ඔවුන් නිරීක්ෂණය කර ඇත. ඔවුන්ගේ සමකාලීනයෝ එය විශ්වාස නොකළ නමුත් නූතන ඉතිහාසඥයෝ මෙය සමකයට දකුණින් යාත්‍රා කළ බවට පිළිගනිති.

නූතන සොයාගැනීමේ යුගය යනුවෙන් අදහස් කරනු ලබන්නේ පහළොස්වැනි සියවසේ මුල් භාගයේ සිට 17 වන සියවසේ මුල් භාගය දක්වා වූ කාල පරිච්ඡේදයයි. එම කාලය තුළදී යුරෝපා ජාතිකයන් හට සාගරය තරණය කිරීම සඳහා නැව් තැනීමේ අවශ්‍යතාවයක් දැඩිව ඉස්මතු විය. විශේෂයෙන්, 1453 දී කොන්ස්තන්තිනෝපල් නගරය තුර්කින් අතට පත්වීමෙන් පසුව නව වෙළඳ මාර්ග සෙවීම සඳහා ලොව පුරා සංචාරය කිරීමට යුරෝපා ජාතිකයින්ට සිදුවිය. ඉතිහාසඥයෝ බොහෝවිට නූතන සොයාගැනීමේ යුගය ලෙස හඳුන්වනු ලබන්නේ ඊට පුරෝගාමී වූ පෘතුගීසීන් සහ ඉන්පසුව ස්පාඤ්ඤ ජාතිකයන් දිගු දුර සමුද්‍ර ගමනා ගමනය කර නැගෙනහිර ඉන්දියාව වෙත විකල්ප වෙළඳ මාර්ග සොයමින් ගමන් කිරීමයි. පෘතුගීසීන් විසින් පෙරදිගට පැමිණීම සඳහා මුහුදු මාර්ග සොයා ගැනීම තුලින් යුරෝපය ලෝකය පිළිබඳ දැනුම වෙනස් කර ගන්නා ලදී. ක්‍රිස්ටෝපර් කොලොම්බස් දේශ ගවේෂකයකු හා සමුද්‍ර ගවේෂකයකු වූ අතර ඔහු ඇමෙරිකාව සොයා ගත් තැනැත්තා ලෙස සැලකේ. ඒ අනුව ඔහු සමුද්‍ර තරණය කරන ලද දේශ ගවේෂකයින් කිහිප දෙනෙකුගෙන් වැදගත් පුද්ගලයෙකු ලෙස සැලකේ. කොලොම්බස්ගේ මුහුදු ගමනත් සමඟ ඔහු අත්ලාන්තික් සාගරය හරහා බටහිර අර්ධගෝලයේ ගවේෂණය කිරීම හේතුවෙන් නව භූමි, ජනපද අල්ලා ගැනීම සහ කතෝලික ආගම ප්‍රචාරය කිරීමට යුරෝපා ජාතිකයින් විවකට උත්සාහ කර ඇත. 1492 දී කොලොම්බස්ගේ පළමු මුහුදු ගමනට ඉතිහාසයේ විශාල වැදගත් ස්ථානයක් හිමිව ඇත. මේ හේතුවෙන් විශාල වශයෙන් ස්වයං අධ්‍යාපනය ලැබූ කොලොම්බස්, භූගෝල විද්‍යාව, තාරකා විද්‍යාව සහ ඉතිහාසය පිළිබඳ දැනුමක් ඇති අයෙකු බවට පත් විය. ඔහු ලාහදායී කුඩ්බඩු වෙළඳාමෙන් ලාභ ලැබීමේ බලාපොරොත්තුවෙන් නැගෙනහිර ඉන්දියාව වෙත වෙනත් මුහුදු මාර්ගයක් සෙවීමට සැලැස්මක් සකස් කළ අතර ග්‍රනාඩා යුද්ධයෙන් පසුව විවිධ රාජධානිවලට කොලොම්බස් නොනවත්වා බලපෑම් විල්ල කරන ලදී. එමෙන්ම කතෝලික රජවරු වන පලවන ඉසබෙලා රැජින සහ දෙවන ෆර්ඩිනන්ඩ් රජු බටහිර දෙසට ගමන් කිරීම සඳහා අනුග්‍රහය දැක්වීමට කොලොම්බස් සමඟ එකඟ වී ඇති බවට ඉතිහාසය සාක්ෂි දරයි.

ඉන්දියන් සාගර ඉතිහාසය හා එහි වැදගත්කම

ඉන්දියන් සාගරය ලොව සාගර පහෙන් තුන්වන විශාලතම සාගරය වන අතර, එය වර්ග සැතපුම් 27,240,000 පමණ ප්‍රමාණයකි. එනම් පෘථිවියෙන් 19.8% ක් ආවරණය කරයි. ඉතිහාසය පුරාවට ඉන්දියානු සාගරයේ වෙළඳාම නැගෙනහිර සිට බටහිරට භාණ්ඩ හුවමාරු කරගැනීමේ ප්‍රධාන සාධකයක් විය. එම වෙළඳාම සඳහා DHOWS වැනි යාත්‍රා ඉන්දියානු ජාතිකයන් විසින් යොදා ගන්නා ලදී. 2004 වර්ෂයේ ඉන්දියානු සාගරයේ සිදු වූ භූමිකම්පාව හා සුනාමි ව්‍යසනය ඉන්දියන් සාගරයේ වාර්තාගත මාරාන්තික ස්වභාවික විපත් වලින් එකක් ලෙස ඇස්තමේන්තු කර ඇති අතර මෙයින් රටවල් දාහතරක පුද්ගලයින් දෙලක්ෂ විසි හත් දහස් අටසිය අනූ අටක් මිය ගොස් ඇත. ඒ අනුව ඉන්දියන් සාගර ඉතිහාසය විවිධ සංස්කෘතීන්, වාර්ගික කණ්ඩායම්, ස්වභාවික සම්පත් සහ නාවික මාර්ගවල අද්විතීය සම්මිශ්‍රණ වූවක් බව දක්නට ලැබේ. එය 1960 ගණන්වල සහ 1970 ගණන්වල ආරම්භයේ දී වැදගත්කමකින් වර්ධනය වූ අතර සීතල යුද්ධයෙන් පසුව එය දේශපාලන අස්ථාවරත්වයේ කාල පරිච්ඡේදවලට ලක්ව ඇත. මෙහි ප්‍රතිඵල ලෙස ඉතා මෑතක දී ඉන්දියාව සහ චීනය කලාපීය බලවතුන් ලෙස මතු වී ඇති බව දක්නට ලැබේ.

සාරාංශය

ඉහත කරුණු කෙරෙහි අවධානය යොමු කිරීමේදී සමුද්‍රීය ඉතිහාසය පිළිබඳ විවිධාකාර විශ්ලේෂණාත්මක චේතිහාසික කරුණු අනාවරණය වන අතර එය වඩාත් පුරාවිද්‍යාත්මක දේශාටක හා ප්‍රාග් චේතිහාසික විවිධ සාගර විද්‍යාඥයින්ගේ ලිපි ලේඛන මගින් සාක්ෂි සහිතව තහවුරු වෙනු ලබයි. තවද, ජනාවාසකරණය, යාත්‍රා නිර්මාණයේ දියුණුව, නව නාවික වෙළඳ මාර්ග සොයා ගැනීම, සාගර හීනි සකස් කිරීම, සාගර විද්වතුන්ගේ සාගර ගවේෂණය හා සාගර ඉතිහාසය සෙවීමට උත්සුකවීම ද සිදු විය. එමගින් සාගර සම්පත් මිනිස් වර්ගයාගේ යහපැවැත්ම සඳහා මෙන්ම අන්තර් සාගරික සම්බන්ධතාවයන් පුළුල් වීම සඳහා ද සාගර ඉතිහාසයේ ඉතිහාසගත සිදුවීම් තුඩු දී ඇති බව මෙමගින් පෘථුල ලෙස ගම්‍ය වේ.

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