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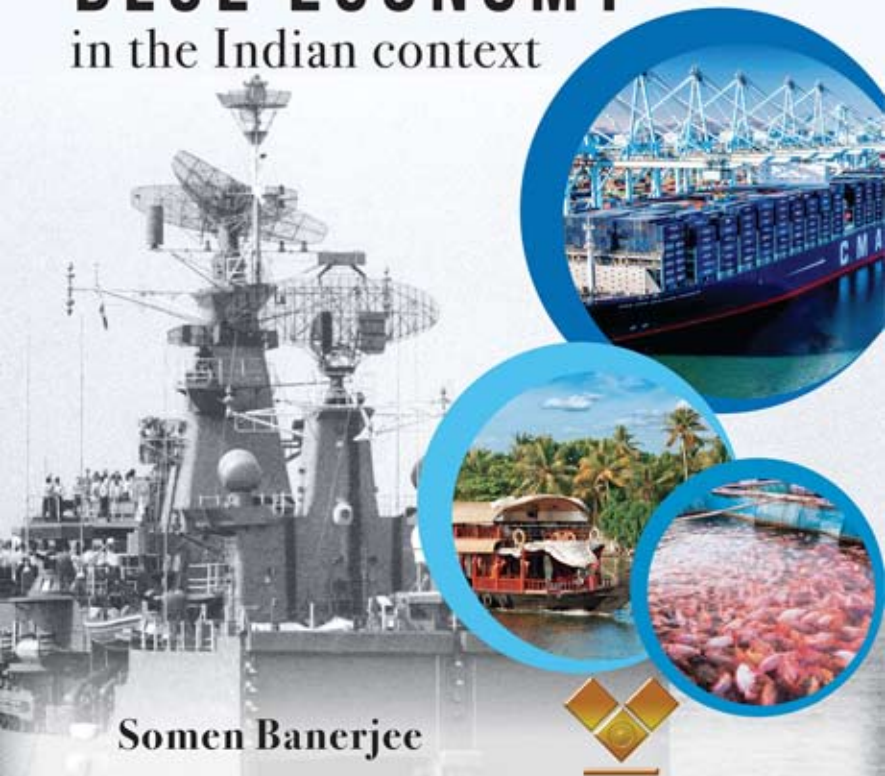
MARITIME POWER THROUGH BLUE ECONOMY

in the Indian context



Somen Banerjee

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Contents

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Foreword

Maritime security is a key element of India's overall national security matrix. In recent years India has devoted considerable resources to modernise its naval forces. However, Naval Power is not sufficient for India to emerge as a Maritime Power which has many dimensions. It is equally essential to develop them all in a balanced manner.

The key argument of the monograph is that Maritime Power can be enhanced through the development of Blue Economy and the two should be linked. The author points out that of the 169 targets of sustainable developmental goals, 33 pertain to Blue Economy. Underlining the linkage between Blue Economy and Maritime Power, he recommends that the government should focus on the development of eight key industrial sectors, namely, shipbuilding, ship breaking, cruise tourism, inland waterways, seabed mining, port-led development, fishing and oil and gas.

The monograph points out that while India is Naval Power of some reckoning, it lags behind in other attributes

of Maritime Power. It recommends that in order to prepare a comprehensive blue print of a comprehensive policy which would help transform India into a genuine Maritime Power, the NITI Aayog should appoint a maritime adviser with sufficient knowledge of maritime domain and skills,

Dr Arvind Gupta
Director
Vivekananda International Foundation, Delhi
March 2018

Preface

At the outset, this monograph has sought to resolve the ambiguities in comprehending the oft used phrase 'Maritime Power'. It has established that constituents are those permanent attributes which make a country easier or harder to be at sea. On the other hand enablers of Maritime Power are its potentials. Thus, long coastline is a constituent and the fishing industry that spawns on the coast is an enabler.

The paper has then discussed the varied interpretations of Blue Economy, especially its preponderant bias towards the sea, under the aegis of initiatives steered by the Small Island Developing States (SIDS). In the Indian context such an outlook would be myopic due to an equally large water capital inland. In addition, Blue Economy also seeks to integrate social equity and environmental protection with economic development.

Agenda 2030 has become the foundation for sustainable development world over. The Indian government too has earmarked Centrally Sponsored Schemes (CSS) to steer all the

17 goals under 169 targets. The paper has identified 33 out of 169 targets that can be moored to the Blue Economy for policy implementation and emphasis.

During the course of the research, the paper discovered the convergence between Blue Economy and Maritime Power. This led to localising eight industries where they both coalesce, namely – shipbuilding, ship breaking, cruise tourism, inland waterways, seabed mining, port led developments, fishing and oil and gas.

Any economic development to be sustainable, it has to be socially inclusive and environmentally viable. Thus, India's growth as a Maritime Power has to be sustainable. The paper has reflected upon the various initiatives already begun by the government and then explained how each of these industries can be made sustainable, thus demonstrating that Maritime Power can be achieved through Blue Economy.

India is naturally endowed with most constituents of Maritime Power, yet lags behind in realising its full potential. This, in some ways, could be attributed to the lack of central coordination on maritime affairs in the government. A suitable maritime advisor with maritime skills and knowledge needs to be appointed to the NITI Aayog for providing comprehensive policy direction in order to transform India into a Maritime Power.

Chapter 1

India's Aquatic Ecosystems and Opportunities

For 157 years, since the departure of Suffren in 1784 to fall of Singapore in 1941, the mastery of the sea over Indian history was complete but unobtrusive. The question of Sea Power did not arise as the Indian Ocean was a British lake. It was as natural and normal as the air we breathed during that time and no one was interested in discovering relation of the sea to Indian defence.[1]

—KM Panikkar

THE WORLD VIEW that India's security is perpetually linked to its land frontiers in the north and west has undergone little change since colonial times. This entirely one-sided view of national security can be traced back to five centuries when the Portuguese arrived at Calicut in the 15th century. Prior to that, there was no power strong enough to challenge the Indians in Indian waters till about the 13th century. Panikkar's quote notes how the control of the seas washing the Indian shores

have impacted/shaped her history, although this happened very unobtrusively.

Between the 13th and the 15th century, Arab supremacy that succeeded the Chola Naval Power was primarily commercial and not an instruments of state policy.[2] The subsequent naïve-looking trade incursions by the European seafarers cost India her very freedom. The subjugation thereafter has been so profound on the Indian economy, society, education and psyche that she has been tottering to realise her potential even after 70 years of independence. This has started to change with the impetus provided by the Bharatiya Janata Party leadership. India has made some significant strides to shake-off the old vestiges of sea blindness and has once again been imbued with her civilisational confidence. This resurgence can be seen in Prime Minister Narendra Modi's vision of Sagarmala, Neel Kranti and Sagar (India's vision document for the region).

Panikkar had exhorted that a Naval Power, however well organised, cannot count for much unless it is supplemented by a great national mercantile marine. He had lamented that complete lack of attention to the sea by the British India authorities in the 19th century had led to the monopoly of foreign mercantile fleets in this subcontinent.[3] Alfred Thayer Mahan too has pointed out the importance of indigenous mercantile marines to nations in his seminal work, *The Influence of Sea Power upon History.* He has famously written that the profound influence of sea commerce upon wealth and strength of countries is clearly seen before the true principles which govern their growth and prosperity are detected.[4] Though he has been emphatic about the need for Naval Power, he has also acknowledged that the economic elements of the seas are indeed significant for Maritime Power[5] and so has Panikkar.[6]

Since 2014, India's rise as a Maritime Power has begun to be visible in all its maritime assets like ports, inland waterways, fisheries, shipping, tourism, Naval Power as a part of the armed forces as well as a merchant power and related maritime

services. The challenges that confront the policy-makers are how this growth can be *lagom* (not too little, not too much). *Lagom* is a popular Swedish term that captures the essence of balanced growth to save the planet for future generations as well. This is in keeping with the mantra of development today, 'sustainable economic growth', which combines economic vigour with preservation of the environment and promises of inclusive growth.

India has registered an impressive growth in the last two decades. Despite this tremendous performance, one ponders why she continues to be strained by challenges that hold her back? According to Nandan Nilekani, India has barely scratched its potential. Almost two decades after economic liberalisation, majority of Indians continue to struggle in their daily lives due to the absence of critical economic reforms.[7] Millions of marginal farmers in the rural hinterland are unable to find alternatives to their hard livelihood and millions more live in urban slums for want of adequate employment and cheaper housing. This throws up the stark reality that India's stupendous economic growth has definitely not been equitable and only a fraction has truly benefitted from it. The Government of India is already seized of these issues and all-round effort is underway under the auspices of the NITI Aayog for inclusive growth.

India's rapid economic growth has also exposed her to environmental challenges. Contaminated food, polluted waters and deteriorating environment have proven that the current trajectory of growth has become utterly unsustainable. India needs to worry about the environment right now, rather than trying to salvage it after unplanned industrialisation has done irreversible damage to its natural resources. This will require incorporation of modern technologies and innovations into the economy. VS Naipaul once said that 'the politics of a country can only be an extension of its human relationships'.[8] Extrapolating this to the Indian growth story, society's indifference to nature has influenced India's genteel polity too, which has failed to

stop the disastrous unraveling of India's natural ecosystem. Therefore, the abuse of adjoining seas and sparse water resources of the rivers, lakes and aquifers has gone unchecked and threatens the very lifeline of this country. Though the trend is being reversed by government policies, altering public ethos is far more challenging. The problem is even more acute in a populous country such as India, where resources have always been limited. It is, therefore, a quid pro quo, 'Development' cannot be sustained only through government initiatives without the involvement of society at large.

Norwegian Prime Minister Gro Harlem Brundtland is credited with having introduced the discourse of 'sustainable development' in the UN in 1987. The Brundtland Commission provided an intergenerational concept of sustainable development and defined it as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.[9] The answer to such 'sustainable' development in the maritime domain lies in what is known as the 'Blue Economy'. The concept of Blue Economy was elevated to prominence by Gunter Pauli in his famed book, *The Blue Economy: 10 years, 100 innovations, 100 million Jobs* (published in 2010). In more ways than one, Blue Economy is linked to the United Nations' campaign on Sustainable Development Goals (SDGs) which has been discussed in specific contexts in the subsequent chapters of this monograph.

Literature Survey

While India has embarked upon implementation of the UN Agenda 2030 in all earnest, also known as Sustainable Development Goals (SDGs), there is no explicit mention of Blue Economy in the UN Agenda. Even though India has been participating actively in Ocean conferences that propagate the ocean economy, the linkages between the SDGs and the Blue Economy are still mired in confusion, especially in the Indian context. There is a need to explicitly establish this connect

in order to identify the shortfalls and facilitate India's policy deductions for the future generations.

While Blue Economy deals with all the economic issues in the maritime domain, Maritime Power too encompasses some components of the maritime economy. However, there is no literature linking the two. As a result, there is considerable misunderstanding on the convergence, leading to incoherence in prioritisation. The Indian government has laid significant emphasis on the development of maritime infrastructure. However, government reports by Ministries and Departments do not explicitly state how these projects integrate with SDGs and the nation's Blue Economy. This paper seeks to bridge these gaps in the literature.

Research Questions

Consequent to literature survey, some of the research questions that this paper seeks to address are as follows:

- What does Blue Economy mean for India?
- Is there a relationship between Sustainable Development and Blue Economy and what is the policy relevance of Blue Economy in the Indian context?
- What is Maritime Power and is there a relationship between Blue Economy and Maritime Power?
- Can pursuit of Blue Economy transform India into a Maritime Power?

Sources

The sources of research are both primary and secondary encompassing literature on Maritime Power, Blue Economy and SDGs.

Relevance of Study

The past two years has seen a spate of publications on SDGs, Blue Economy and Policy Initiatives by the Modi government to enhance India's Maritime Power. There is ample international

literature connecting the Blue Economy with SDG, but the same is not true for India. India's mega developmental projects like Sagarmala have the potential to transform the maritime economy and establish India as a Maritime Power, in other words enhance India's Comprehensive National Power (CNP). But the policy linkages between these developmental initiatives, Blue Economy, SDGs and Maritime Power are conspicuous by their absence.

Chapterisation

The paper has been structured as follows:

Chapter 2 titled *Maritime Power - Constituents and Enablers,* deals with the debate on Maritime Power and attempts to resolve the ambiguities in comprehension through the study of literature by Mahan, Geoffrey Till and the Indian Navy in addition to its constituents and economic enablers.

Chapter 3 on *Blue Economy and its Enablers* discusses the Blue Economy as envisaged by its founder Gunter Pauli and the current debate in international and national forums. The restrictive scope of Blue Economy as envisaged by Small Island States (SIDs) *vis-à-vis* its wider application to large countries like India has been discussed. Subsequently, a working definition of Blue Economy for India and its neighbourhood nations has been arrived at along with the type of industries that can be incorporated as its enablers.

Chapter 4 pertains to *Policy Relevance of Blue Economy for India* and brings out the ambiguities that have risen due to the omissions made in the UN Agenda 2030 with respect to Blue Economy. As a result, despite concerted efforts by ministries and departments pursuing SDGs, certain areas of Blue Economy need additional emphasis. These areas have been enunciated in the chapter to strengthen India's Blue Economy.

Chapter 5 is titled *Maritime Power through Blue Economy.* Whilst maritime developments enhance a country's Maritime Power, linking them to the Blue Economy makes these developments sustainable. There is ample primary source

literature on developmental projects initiated by the Indian government in the maritime domain over the years; however, the measures to integrate these developments with environmental factors and social inclusion have not received due emphasis. This chapter tries to establish these linkages and dissipate the assumptions prevalent in some quarters that such environment and society-conscious developments are regressive for India.

Chapter 6 concludes the monograph with findings and policy recommendations.

CHAPTER 2

Maritime Power
Constituents and Enablers

Introduction

CHINA IS ALREADY the largest shipbuilder in the world and leads the world's fish produce. As much as 24 per cent of her maritime trade is shipped to the hinterland through inland waterways.[10] In other words, China has already realised most of the elements of Maritime Power and is now on its way to create a strong navy to protect her maritime interests. India, on the other hand, is a Naval Power of sorts but lags behind in all other disciplines of Maritime Power. Thus, China's Naval Power is sustainable and India's is not, an analogy of which can be seen in Alfred Mahan's comparison of the French and British navies during the reign of Louise XIV.[11] The Modi government is trying to reverse these trends by reviving the maritime industries in all sectors. Prime Minister Modi's interpretation of the *Blue Chakra* in India's national flag as 'blue revolution' emphasises

the centrality of water-based economy in India's sustainable development.

'Maritime Power' is a loosely used phrase that can be interpreted in several ways. It comprises two words 'maritime' and 'power', both of which have many claimants. The naval community world over often emphasises its relationship with Maritime Power as *primus inter pares*. However, it would be incorrect to blame the navies for their claimancy on 'Maritime Power'. The responsibility of such misinterpretation actually lies squarely on the shoulders of acclaimed naval strategists like Mahan and his contemporaries. Whilst the scholarship on Maritime Power is copious, most scholars on the subject have either been naval officers or have been on the faculty of reputed naval war colleges. Their natural bias towards the navy is, therefore, understandable which often seem to endorse the fungible usage of 'Naval Power' as 'Maritime Power'. Notwithstanding the putative emphasis on the navy, scholars have always conceded the wider ambit of 'Maritime Power' that is beyond and subsumes the Naval Power. Literature by Mahan, Geoffrey Till and the Indian Navy has been researched in order to explain the ambiguities in comprehension, especially with respect to its constituents and enablers of Maritime Power.

Mahan

Possibly Alfred Mahan's biggest disservice to maritime affairs has been his reluctance to explicitly define 'Maritime Power'. To make matters worse, he has used maritime-power and sea-power interchangeably. The closest Mahan came to defining Sea Power (read Maritime Power) is as follows:

> *…Sea Power in the broad sense, which includes not only the military strength afloat, that rules the sea or any part of it by force of arms, but also peaceful commerce and shipping from which alone a military fleet naturally and healthfully springs, and on which it securely rests.*[12]

A comparison between the contributions of the French Navy and her mercantile trade in his seminal work *The Influence of Sea Power* is a classic example of both complimentarity and disparities between Naval Power and Maritime Power. Mahan demonstrates how Louise XIV was unyielding in his effort to maintain and expand French Naval Power in Europe and Africa during the Nine Years War with the Dutch and English navies. This was spurred primarily by his extreme ambition which sapped the strength of France from the exhaustion of war. Such naval expeditions were undertaken by most European powers and were essential for access to new colonies, resources and safe trade at sea. These belligerent actions are unthinkable in today's context, barring a few instances in the South China Sea. The success of the French Navy during the brief period was rooted primarily in the salutary contributions made by Jean Batiste Colbert who restored the finances of the nation through deft pursuit of maritime trade, navy, colonial expansion and maritime shipping. According to Mahan, '*some of these (colonies)are sources, others the actual constituents of Sea Power; which indeed may be said in a seaboard nation to be the invariable accompaniments, if not the chief source, of its strength*'.[13]

In his genial elucidation on Sea Power (read Maritime Power), Mahan admits the role that mercantile shipping plays in building a navy. He writes that when '*the mercantile shipping* (of France) *was stricken, the splendid growth of Royal Navy* (French) *that exited the jealousy of England, was like a tree without roots, it soon withered away under the blast of war*'.[14] A similitude can be seen today in India, where a fledging naval shipbuilding does not have the backing of commensurate mercantile shipbuilding industry. In contrast, the South Korean Maritime Power today is predominated by her shipbuilding industry, whilst it also possesses a respectable Navy. Thus, Mahan suggests that navies alone cannot be the flag-bearers of Maritime Power of a nation, but is just one of its manifestations. Hence it could be inferred that in a maritime nation, the size of a navy will always be limited

by its national interest and affordability, but the size of mercantile shipping and related industries need not be confined and could eventually become the forebearing elements of Maritime Power, whilst the navies retain their symbolism.

Geoffrey Till

A British naval historian, Prof Geoffrey Till, in his book, *Seapower for the 21st Century,* describes three reasons for the existing confusion in defining Maritime Power (Sea Power). '*The the first is purely to do with English semantics. Some of them are adjectives without nouns (maritime, marine, nautical), some are nouns without adjectives (sea, Sea Power) and some are nouns that have adjectives (ocean-oceanic, navy-naval). Unfortunately, this semantics makes the consistent use of words difficult.*'[15] The second reason is about the word 'power' and what it means. '*Some analysts focus on inputs—the characteristics that make a country's people powerful (military, economic strength etc)—while others concentrate on the output; a country is powerful because others do what it wants.*'[16] So, power can either be potential or its consequence or both. Thirdly, *people do actually mean different things in the sense that they wish either to include or exclude various phenomenon related to sea,*[17] ie. naval, non-military or both.

Fortuitously, Till has qualified the components of Sea Power (Maritime Power) as maritime capabilities (Military) and maritime capabilities (Civil).[18] He quotes Prof Richard Harding as having said, '*British Sea Power lay not just in the navy or the battle fleet,* (but) *in the effective integration of her administration, political system, army, colonies and maritime economy towards the ends of the state*'.[19]

Indian Maritime Security Strategy 2015

Patronage for the navies as the predominant element of Maritime Power can be found in other navies too. The telltale signature of this can be traced in the *Indian Maritime Security Strategy 2015,* which proclaims that the Indian Navy is the principal

manifestation of India's Maritime Power as it plays central role in safeguarding and promoting her security and national interests in the maritime domain.[20] Despite these assertions, the existing ambiguity within the Navy itself can be gleaned from the variance between the titles of the Navy's doctrine (2009) and strategy (2015). The former document was titled *Indian Maritime Doctrine,*[21] which implies that only the Navy is synonymous with the maritime domain. However, the latter document was titled *Indian Maritime Security Strategy,*[22] succinctly conveying up front that the Navy dealt only with the security elements of India's Maritime Power. In other words, there are other components of Maritime Power, which is the subject of this paper. Similar claims on 'Aerospace Power' are made by many Air Forces too, albeit much subdued. Interestingly, the Armies never make such claims on land power.

The preponderance of the Navy as primary element of Maritime Power was endorsed by a former President of India during his address at a ceremonial reception of INSV Mhadei, at Mumbai, on 6 April 2013:

'...a nation's social and economic wellbeing is intricately linked to the seas, not only for trade but also how it faces threats to its own security that develop across the seas...our resolve to achieve high growth can be realised only if our maritime frontiers and assets are safe, stable and act as enablers. The Indian Navy, as the primary element of India's Maritime Power, has the challenging task of safeguarding the country's maritime interests.'[23]

Such pronouncements tend to further hijack the narrative on Maritime Power. Coincidently, the extant document has made amends to this percept by identifying the major economic elements of Maritime Power and has gone even further to establish their linkages to the national power as key enablers for national growth and development.

From a medium of transportation for trade, economy and the projection of power on to land, the oceans have become the primary conduits of international trade and are central to the global economy.

The oceans and seabed are increasingly looked upon today as resource providers and critical contributors to national growth and prosperity. Maritime power is an important component of national power and is a key enabler for national growth and development.[24]

Indian Maritime Doctrine 2009

The dichotomy in the Indian Maritime Doctrine 2009 (revised in 2015) is stark. On one hand the title of the Doctrine suggests that Maritime Power only includes the naval component. However, the chapter on historical perspective states that the military component of Maritime Power was first introduced in India after the arrival of the Portugese in 1498 at Calicut.[25] Thus, it can be construed that the Doctrine acknowledges the existence of non-military constituents of Maritime Power. The chasm gets further widened due to loose usage of Naval Power with Maritime Power interchangeably, a mistake even Mahan made. However, in the Doctrine's definition, Maritime Power has been correctly identified as use of seas to progress the nation's interests in addition to safeguarding it.

'*Maritime power is the ability of a nation to use the seas, to safeguard and progress its national interests.*'[26] This definition in the *Indian Maritime Doctrine,* therefore, is clearly inclusive of all the non-military elements as well.

At some places the Doctrine (version 2009) becomes inconsistent, because of the repeated usage of the phrase 'Maritime Power' for sea control and power projection.[27] There is no mention of Naval Power. For the uninitiated, it would be difficult to comprehend how non-military elements of Maritime Power can be used for sea control and power projection. Fortunately, the 2015 version of the Doctrine has tried to correct this confusion and for the first time has used the phrase 'Naval Power' nine times and has made a clear distinction between maritime and naval as follows:

> 'Maritime' is an all-encompassing word, including everything that is connected to the seas. The Indian Maritime Doctrine,

> however, deals specifically with the concepts and principles of employment of India's Naval Power.[28]

Since the words 'maritime' and 'naval' have been deconflicted by the Doctrine (version 2015), the problem can now be narrowed down to the word 'power'. The word 'power' mechanically implies that it should be able to control, project, deter or influence. Hence, ostensibly, the Navy's preponderance over Maritime Power appears legitimate. But when reflected upon from the prism of 'Comprehensive National Power' (CNP), the essence of 'power' becomes ubiquitous and does not restrict itself to the military alone.

Comprehensive National Power (CNP)

In the phrase 'Maritime Power' the word 'power' creates much miscommunication and is construed as Naval Power by navalists. To correct this misinterpretation, Maritime Power could be approached from the prism of Comprehensive National Power (CNP) or the National Power (NP). Both NP and CNP have the word power in them but do not suggest predominance of the military.

The concept of national power is not alien in India. Kautilya, in his treatise *Arthashastra*, has referred to its constituents as the king, ministers, territory, population, fort, treasury and the allies.[29] In modern times, Hans Morgenthau, a leading international relations exponent, in 1954, proposed that national power should include geography, food, raw materials, industrial capacity and military preparedness, technology, leadership, quantity and quality of armed forces, population, national character, morale, diplomacy and governance. In China the concept of CNP gained greater acceptance after propagation by Deng Xiaoping. Deng said, 'In measuring a country's national power, one must look at it comprehensively and from all sides'. The Chinese define CNP as, *'comprehensive capability of a country to pursue its strategic*

objectives by taking the necessary actions internationally', or it is mobilisation and utilisation of strategic resources of a country, to realise national objectives.[30]

According to Gurpreet Khurana, the sea has to be understood comprehensively, and then explored as a medium of immense economic, scientific, political, social and military potential so as to be contributory factor in the building of CNP. However, this requires the foundation blocks to be painstakingly placed for the nation to pull together towards maritime super power status.[31] In China, the State Oceanic Administration (SOA) reflects a strong manifestation of China's Maritime Power and contributes to the CNP. But the SOA does not encompass the PLA Navy (PLAN). It is a centralised organisation that steers the Chinese ocean governance and has subsumed the previous SOA, China Maritime Surveillance (CMS), Maritime Police of the Border Control Department (BCD), China Fisheries Law Enforcement Command (FLEC) and the General Administration of Customs (GAC).[32] According to RAdm Michael McDevitt (Retd), USN, in the Chinese context Maritime Power encompasses more than Naval Power. The Maritime Power equation includes a large and effective coast guard; a world-class merchant marine and fishing fleet; a globally recognised shipbuilding capacity and an ability to harvest or extract economically important maritime resources, especially fish.[33] Thus, it could be inferred that 'Maritime Power' is a subordinate to the CNP and it encompasses all the dimensions of maritime elements and agencies such as economics, maritime governance, navy etc.

Constituents of Maritime Power

Prof Till states that Sea Power is a product of an amalgam of interconnected constituents that are difficult to tease apart. The constituents are attributes of a country that make it easier or harder for it to be at sea.[34] Sea Power can be of two types. When other peoples' behaviour is influenced by the fact that you maintain a large commercial fleet, it would be a direct

constituent. But when it influences through effectiveness, like that of the navy, it is an indirect constituent. Geoffrey Till has identified the constituents of Maritime Power and Naval Power as:[35]

- Population, Society and Government
- Maritime Geography
- Resources
- Maritime Economy
- Other means

Mahan has called the constituents as principle conditions affecting Sea Power of a nation. According to him, the constituents of Sea Power are:[36]

- Geographical position.
- Physical conformation, including, as connected therewith, national production and climate.
- Extent of territory.
- Number of population.
- Character of people.
- Character of government including national institutions.

Geoffrey Till's explanations on the constituents of Sea Power veer away towards Naval Power due to the context of his book *Seapower* : *A Guide to 21st Century*. Mahan's observations in this regard are more wholistic, and hence the essence of the two have been fused to arrive at the constituents of Sea Power in the present context. Some of these have been clustered together because of their similitude.

Maritime Geography – For a country's security and prosperity, maritime geography plays an important role in setting the strategic agenda. India needs Maritime Power to protect the territorial integrity of India's far flung islands, long and porus coastline and its interests in the EEZ and beyond. India's large disputed land borders mean that India will also have to strike a balance between protection of land frontiers and

exploiting maritime opportunities. Geography also sometimes makes enemies due to sheer proximity.[37] India's geography also offers her a large expanse of opening into the seas or abundant deep sea fishing, especially important if crops were to fail due to unpredictable monsoons. Coasts also offer entry and exist for trade and oil exploration. But landlocked States and hinterland areas need to be connected to the ports through efficient road and rail systems. Inland waterways and protocol routes through neighbouring countries also need to be optimised for access to land-locked territories. India's position not only places her centrally in the Indian Ocean, but also astride some of the busiest sea lanes in the world. Transhipment ports like Singapore, Colombo and Dubai have exacted immense economic advantage due to their strategic location and offer India a few lessons. In short, the geographical position, shape and size of the maritime front has naturally endowed India with the potential of being a Maritime Power.

Population – According to Till, the onus is on the maritime community of a country to raise awareness of maritime trade in a society and the government, thus producing the conditions for trade to flourish. There is also a requirement to elevate the merchant class socially and politically, thereby encouraging a value system and style of government that encourages trade.[38] Mahan has split this into two separate constituents—number of population and national character. Mahan exhorts that the number of seafarers should be proportionate with a country's coastline and population.[39] Herein lies a lesson for India to build the vocation of seafarers proportionate to her size, which will require maritime universities and institutions to be set up. The next requisite for Sea Power pointed out by Mahan was national character that essentially comprises two traits—ability to settle down in new country and instincts to develop the resources of the new country.[40] People of Indian Origin (PIO) have demonstrated this trait in good measure, but on their own steam. Incentives from the government can encourage these

PIOs to reinvest in India like the Chinese, which can transform India's CNP speedily.

Government – Mahan writes that historically, it is not the form of government that dictates long-term development of Maritime Power, but administrative efficiency in raising money, resources and spending wisely. As a general rule, these qualities are associated with free, stable and more mercantile style of government. This is similar to the Modi government's idiom on '*minimum government maximum governance*'. Mahan states that when excessive prudence or financial timidity becomes national trait, it tends to hamper the expansion of mercantile shipping.[41]

He further asserts that Maritime Power has been successfully realised through intelligent direction of governments, imbued with the spirit of people. Under Oliver Cromwell British Maritime Power had reached its zenith in the mid 17th century. This was not only achieved through naval conquest but also through deft governance such as the famed Navigation Act, that had declared that all imports to England or her colonies would be exclusively on British-bottom ships. This decree was primarily aimed at the Dutch that used to be the common carrier of Europe.[42] In the present context, China is in a position to issue a similar decree, once she develops an equally imposing Navy. On the other hand, number of Indian-bottom ships are almost insignificant compared to the volume of Indian trade and leaves her vulnerable. From history it can be seen that the influence of government upon the sea career of people are of two distinct types—in peace and in war. In peace, the government by its policy can favour natural growth of people's industry to take advantage of the sea, or develop such industries, when they naturally do not exist. In preparation for war the government has to maintain an armed navy commensurate with its interests and suitable naval bases in distant world.[43] Both the attributes of Sea Power are amply visible in Chinese policies. India will also have to show similar enterprise.

Resources – Geoffery Till considers resources as constituents, which may include all the potentials that could contribute to the Maritime Power—human, protected and deep shores, navigable rivers, size of EEZ, number and spread of islands etc. These have been implicitly considered by Mahan at various places in his narrative. Mahan mentions that Cardinal Richelieu (Foreign Secretary to King Louise XIII, 1616) had predicted that France could become a Sea Power based on her geographical position and resources.

Enablers of Maritime Power

Unlike Geoffery Till, Mahan has not considered economy a constituent of Sea Power, but an enabler. This paper agrees with Mahan in this regard. Mahan mentions how the Dutch were forced to fishing due to lack of adequate arable land, which was a manifestation of their physical geography.[44] Therefore, geography is a constituent (constant) and the fishing economy is an enabler (potential) of Maritime Power. The Indian Maritime Doctrine defines enablers as follows:[45]

- The geography of a nation and its adjacent seas, including its access to the seas, proximity to ISLs and the share of these ISLs in transportation of global trade.
- The maritime bent of mind of the government, the people and other organs of the state.
- The size of seafaring population and its enterprise, including merchant marine, fishing, off-shore commercial activities, naval forces etc.
- The shipbuilding capability, technological ability and industrial support infrastructure.
- The number, type and functional efficiency of major and minor ports. This includes cargo handling capacity and infrastructure for multi-modal transport of seaborne goods.
- The size, age and condition of the merchant fleet – both coastal and oceangoing.

- The percentage of imports and exports being carried in national flagged vessels.
- The state, size and technological advancement of the coastal and deep-sea fishing fleets, their geographic spread and fish catch.
- The size, state, characteristics and combat preparedness of the naval forces.

The Indian Maritime Doctrine has listed nine major enablers of a nation's Maritime Power, which also includes the constituents of Maritime Power. However, going by Geoffrey Till's definition, the first three are constituents of Maritime Power and not enablers. This narrows down the enablers mentioned in the *Indian Maritime Doctrine* to the last six. The Naval Power is one of the six enablers of Maritime Power. However, enablers of Maritime Power are not restricted to the six identified by the Indian Navy above. Some of the other enablers have been discussed in the following chapter on Blue Economy.

Enablers such as fisheries and commerce was encouraged as a basis of Sea Power by Cardinal Richelieu. He supplemented these commercial developments with a robust Navy.[46] When Jean-Baptiste Colbert took over office from Richelieu, under Louis XIV, he organised the French Maritime Power into three distinct areas of concern – firstly he organised industrialists and merchantmen to secure unity of effort in achieving a industrial excellence. Secondly, he organised seamen, ship building and shipping. Thirdly, he proposed to buy colonies in far away lands. So Colbert did not just concentrate on one aspect of Sea Power to the exclusion of the other. He revamped the economy by simultaneously addressing agriculture, industry, internal trade route, regulations, shipping, customs, shipbuilding, colonial administration, development of markets abroad, treaties with countries, impost on foreign trade etc which made France a Maritime Power. Mahan calls these 'enablers' of Sea Power as 'details'.[47] Mahan's recommendations serve as an advisory for

India to steer its Maritime Power by synergising all the enablers simultaneously, of which Sagarmala is an intrinsic element.

Going by Mahan's formulation, India is naturally endowed with constituents of Maritime Power, yet lags behind in realising its full potential. This in some ways can be attributed to lack of central coordination on maritime affairs in the government. India is a Naval Power, but cannot be counted amongst Maritime Powers due to its abysmal state of sea-/river-based manufacturing and services industries. China, on the other hand, is already an established Maritime Power, on the strength of which it is building its Naval Power. Therefore, a suitable maritime advisor with maritime skills needs to be appointed to the NITI Aayog for providing comprehensive policy direction for all—round and speedy development of India's Maritime Power by aggregating all maritime capacities of the nation. Richelieu and Colbert, of the 17th century France, could serve as inspiration in this regard. There is also a requirement to tide over the conflict between Centre and State subjects. Some independent Union Ministries and certain States Chief Ministers have already commenced implementing plans such as Sagarmala, Raythu Kosum (Andhra Pradesh) etc, that are discussed later in the paper.

CHAPTER 3

Blue Economy and its Enablers

ACCORDING TO THE World Wildlife Fund(WWF), *Living Blue Planet Report 2015,* nearly 3 billion people rely on fish as a major source of protein and 10–12 per cent of the world's population depends on it for livelihood. The ocean generates economic benefits worth at least USD 2.5 trillion per year. However, unchecked exploitation of the ocean habitat and species by human intervention has brought the oceans to the brink of collapse. Marine vertebrate population has declined 49 per cent between 1970 and 2012. Number of fish species utilised by humans too has fallen by half. Around one in four species of sharks, rays and skates is now threatened with extinction due to overfishing.

Tropical reefs have lost more than half their reef-building corals over the last 30 years and nearly 20 per cent of mangrove cover was lost between 1980 and 2005. More than 5 trillion

plastic pieces weighing over 250,000 tons are in the sea and oxygen-depleted dead zones are growing as a result of nutrient run-off. If the current rates of temperature rise continue, the ocean will become too warm for coral reefs by 2050.[48] It is evident from the above statistics presented by the WWF, that decline of the coral reefs, mangroves and sea-grasses have been rapid. As a result the species that survive in these ocean habitats have also started to dwindle. The chief cause of this degradation is anthropogenic, due to the collective mismanagement of the ocean resources by human activity. Other industries like tourism, shipping, oil exploration etc too have contributed their part to the unsustainable economic exploitation and aggravated the pressure on the oceans.

Oceans produce half the oxygen we breathe and absorb 30 per cent of carbon dioxide emissions.[49] However, overfishing, pollution, habitat destruction, ocean acidification and climate change are endangering the oceans' capacity to support its organic economy and its living marine resources. Brad Ask, Senior Vice President for Oceans at the WWF, says, 'the oceans are our "natural capital", a global savings account from which we keep making only withdrawals. To continue this pattern would lead one to bankruptcy'.[50]

In the words of the Director General WWF Marco Lambertini, 'considering the vital role of the oceans in our economies and food security, a collapse of its ecosystem may trigger next global recession or undermine the progress made on eradicating poverty'. According to him, there are plausible solutions to reverse the decline. It would require smart fishing practices that eliminate by-catch, waste and overfishing; getting rid of harmful subsidies and unregulated fishing; protecting key habitats of the ocean to enable the regeneration of its living resources; conserving iconic species and inspirational places and cutting CO_2 emissions that threaten a potentially catastrophic acidification of the ocean.[51] There is hope in Lambertini's message which is premised on the fact that the oceans are a

dynamic ecosystem that can bounce back relatively quickly if the current pressures are dealt with effectively. However, the pace of decline has been so rapid and discernible in our own lifetime that it needs immediate course corrections.

At the same time one has to appreciate that large sections of the populace in developing countries like India are still below the global per capita income and rightfully aspire for rapid escalation to higher strata. The lack of awareness and urge for profits amongst developing country entrepreneurs further compounds this rudderless chaos in the seas. It is not fair to expect a government to satiate all its population's needs through Centre Sponsored Schemes (CSS), nor can it regulate the scores of million diverse industries. This is where Gunter Pauli's Blue Economy finds relevance in countries like India.

Genesis of Blue Economy

The UN University (UNU) first conceptualised Blue Economy in 1994.[52] A Belgian born economist and entrepreneur, Gunter Pauli, was invited by the University to establish a think tank with the objective of creating a new economic model that added jobs and value to society without increasing polluting waste, emissions or cost of investments. Interestingly, this initiative was seeded by the UNU almost three years prior to the Kyoto Protocol. Consequently, Pauli established the Zero Emissions Research and Initiatives (ZERI) in Switzerland. ZERI's focus was to move commerce and industry towards sustainability without subsidies and tax cuts. As a result, 3000 cases[53] were identified by ZERI to examine the feasibility of coalescing diverse scientific innovations with the aim to advance the 'ecosystems' approach for development.

In 2004 ZERI's concepts were put to test by the corporate world, academics, financers, journalists and policy makers. But the most enduring test that the concept had to face was from the market forces which included the collapse of global financial markets in 2007-08 that resulted in the loss of almost

50 million jobs worldwide.[54] Finally in 2010, ZERI narrowed down its proposal to 100 innovations (Annexure) and presented it in a Report to the Club of Rome (official site: https://www.clubofrome.org/) titled *The Blue Economy.*[55] Thus ZERI could be considered the cradle of Blue Economy. The innovations proffered are available free of cost for access on the official website of *The Blue Economy* (http://www.theblueeconomy.org/).

Pauli's first book, titled *10 Years, 100 Innovations, 100 Million Jobs,* was published in 2009. The book advocates that as a business model Blue Economy has the potential to transform society from scarcity to abundance with 'what is locally available'. It highlights the long-term benefits of Blue Economy in tackling environmental degradation and high costs. This is indeed a profound vision, but its success will depend entirely on the intent of business leaders, industrialists, governments and the society at large. Gunter Pauli followed his seminal work with a second book, *The Blue Economy 2.0.* This book is a description of 200 projects that were set up with an investment of USD 4 billion and had created 3 million jobs. It also presents few case studies from the work of a lesser known authority, the *Development Alternatives* (India) (official site: http://www.devalt.org/)which is the Indian counterpart of the ZERI (official site*:* http://zeri.org/) network.

Blue Economy has since been studied extensively by most international and national agencies and customised to their context for implementation. Many have formulated strategies and some continue to debate in various seminars. In India too, FICCI (the Federation of Indian Chambers of Commerce and Industry) has enunciated a *Blue Economy Vision 2025 - Harnessing Business Potential for India Inc and International Partners*. Despite the omniscient awareness, its implementation is still not palpable. Thus, Blue Economy appears to be another adage of the industry which needs the government's policy direction and enforcement to see it through.

Definition of Blue Economy

Although Blue Economy has been present in international discourse from the beginning of this decade, there has been no consensus on its definition, since the concept of Blue Economy is still nebulous and evolving. Admiral Sunil Lanba, Chief of the Naval Staff (CNS) and Chief of Staff's Committee (COSC) at a Maritime Power Conference–2017 (organised by the National Maritime Foundation, New Delhi) defined Blue Economy as: *Marine-based economic development that leads to improved human wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities.*[56] This definition was adopted from the UN conference on sustainable development in Rio de Janeiro conference 2012. In the current discourse, Blue Economy has been used synonymously with marine economy, coastal economy, ocean economy or even Green Economy.

In January 2014, the participants of Blue Economy Summit adopted the Abu Dhabi Declaration, which describes it as: *Conserve and sustainably use the oceans, seas and marine resources for sustainable development.*[57] The Commonwealth Blue Economy Paper (2016) explains it as: *one that can maximise the economic value of the marine environment in a sustainable manner that preserves and protects the sea's resources and ecosystems. By that explanation, the blue economy can be broadly defined to include 'economic activity which directly or indirectly uses the sea as an input'*.[58] India's Economic Intelligence Unit has adopted a working definition as: *A sustainable ocean economy emerges when economic activity is in balance with the long-term capacity of ocean ecosystems to support this activity and remain resilient and healthy.*

None of the above definitions seem to capture the spirit of the Blue Economy in the Indian context. The Rio definition (2012) errs by including the word 'reduce' which implies that reduced environmental degradation is permissible. The second declaration (not necessarily a definition) at Abu Dhabi (2014) restricts its scope to oceans, seas and marine resources. The Commonwealth Paper (2016) spares an entire chapter on

definition but stops short of defining it explicitly. However, the Commonwealth Paper has expanded the scope of Blue Economy from mere direct exploitation of ocean resources to include indirect use of the oceans as well. The last postulation by the Economic Intelligence Unit (EIU, India) was a briefing paper for the World Ocean Summit (2015). EIU has made a bold attempt to provide a working definition on ocean economy by stressing on the term 'long-term' in order to state that just minimising harm to the ocean is not adequate, rather restoration of the damage already caused also needs to be undertaken. However, it fails to distinguish between Blue and Ocean economy.

A recent report by the World Bank and the UN in June 2017, titled, *The Potential of the Blue Economy,* acknowledges that there is no universal definition of Blue Economy. Instead, it prefers to spell out the characteristics of a sustainable Blue Economy as:[59]

- Provides social and economic benefits for current and future generations by contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity and political stability.
- Restores, protects, and maintains the diversity, productivity, resilience, core functions, and intrinsic value of marine ecosystems—the natural capital upon which its prosperity depends.
- Is based on clean technologies, renewable energy, and circular material flows to secure economic and social stability over time, while keeping within the limits of one planet.
- Is governed by public and private processes that are inclusive; well-informed, precautionary, and adaptive; accountable and transparent; holistic, cross-sectoral, and long-term; innovative and proactive.
- Actively cooperate, sharing information, knowledge, best practices, lessons learned, perspectives and ideas, to realise a sustainable and prosperous future for all.

Even the above characteristics restrict Blue Economy to oceans and related activities.

Definition of Blue Economy in Indian Context

Since Blue Economy was patronised by Small Island Developing States (SIDS), the narrative was hijacked by the oceans, as these states do not have the inland resources of large countries like India. India is the 7th largest country in the world in terms of area with the 2nd largest population. Therefore, her dependence on the seas is immense for food security, transportation, energy and tourism. Fortuitously, India also has a large coastline that is able to partly meet these necessities. But India's geography has also endowed her with fresh water resources like rivers, lakes, dams, reservoirs, tanks and ponds that share the responsibilities of fulfilling India's necessities in equal measure. These too contribute to the Blue Economy. These fresh water resources are possibly more stressed than the oceans due to human exploitation.

Thus, in the Indian context, it may not be prudent to restrict the Blue Economy to the oceans. The ambiguity becomes pronounced when one tries to segregate the aquacultures of Hyderabad or Kashmir from coastal ventures, despite the two being steered by the same ministry and department in the government. The inland water transportation on river Ganges, energy generated by dams and river run-offs from similar activities conducted on the India coasts, all form a part of this economy. After all, the energy grids do not distinguish between its sources, be it ocean or inland water systems. Neither is any distinction made by producers and consumers of inland or coastal fishing. As regard transportation, five of the 111 inland waterways are part of the Sagarmala project that intends to connect the seas with the Indian hinterland. The river cruise on the river Brahmaputra requires similar infrastructural support and indulgence as does the backwater cruises of Kerala. In other countries, inland waterways play a much more significant part than it does in India. As much as 24 per cent of China's freight transportation is by its inland waterways. Similarly, freight transportation on Rhine, the river cruise on the Yangtze, the

canal water-bridge of Magdeburg in Germany tend to further highlight that industries associated with inland waters cannot be dissociated from their economic contribution to the nation's Blue Economy. Thus, restricting the scope of the Blue Economy to the oceans becomes artificial.

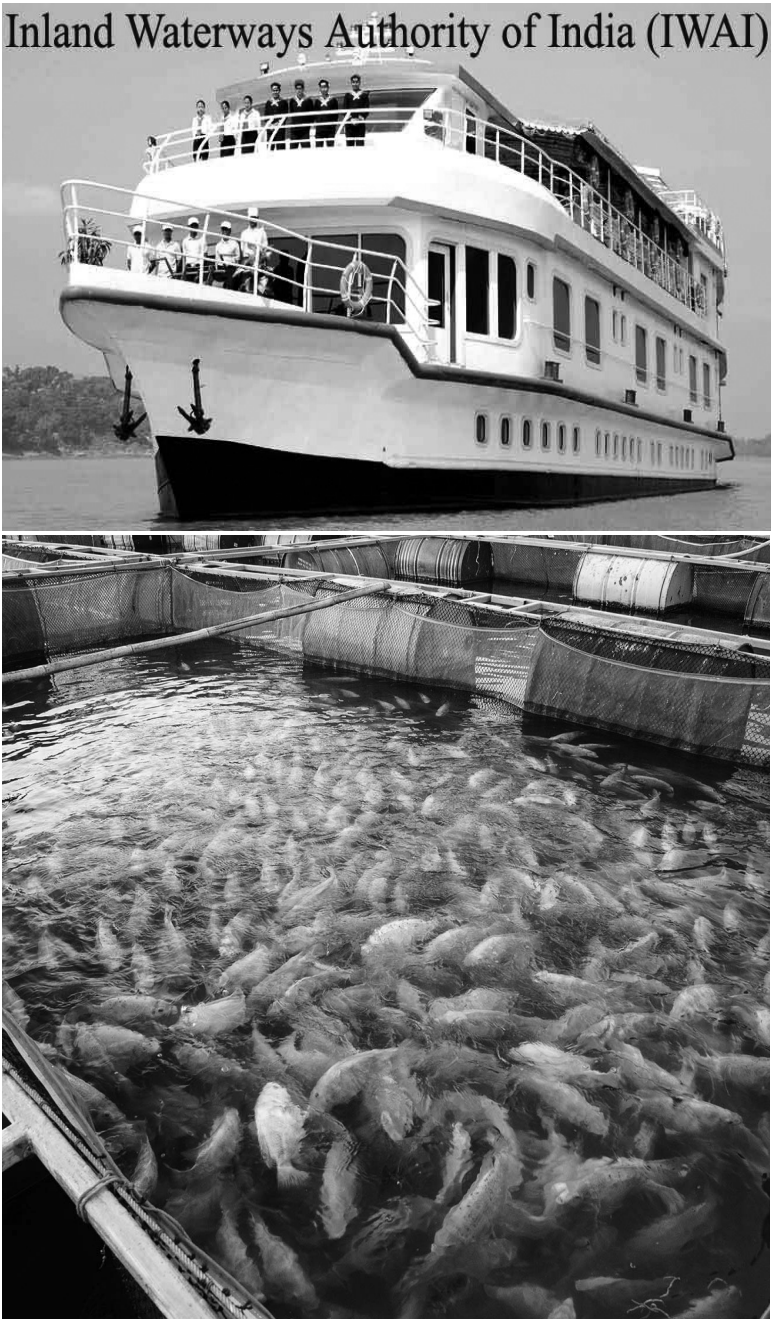
This argument is vindicated by an explanation provided in *Africa's Blue Economy: a Handbook 2016* sponsored by the UN:

The Blue Economy in the African context covers both aquatic and marine spaces, including oceans, seas, coasts, lakes, rivers and underground water. It encompasses a range of productive sectors, including fisheries, aquaculture, tourism, transport, shipbuilding, energy, bio-prospecting and underwater mining and related activities.[60]

The handbook encapsulates the aspirations of all African states, including those in the hinterland and does not restrict Blue Economy to the perspectives of SIDS and coastal States. Similarly, in India, only 13 out of 36 States and Union territories have a coastline. That does not mean, the remainder 23 States cannot be included in the narrative of Blue Economy. There is no doubt of a similitude between industries on the coast and inland water bodies.

Research and Information System (RIS) for Developing Countries, in its report, *Prospects of Blue Economy in the Indian Ocean,* has also acknowledged that the Blue Economy should include all the water bodies including fresh water bodies. A part of the RIS report reads as follows:[61]

The blue economy paradigm puts emphasis on the term 'blue' which primarily refers to water. In that perspective, the coverage of blue economy can be expanded to all water-bodies and water-related activities over the land and in the seas within the sovereign jurisdiction of a country. Logically, the whole range of activities involving fresh as well as marine water would comprise blue economy for any typical economy—blue economy activities are deeply entrenched into almost all sectors of an economy.


Inland Waterways Authority of India (IWAI)

Hence limiting the scope of Blue Economy to the oceans becomes tenuous. Despite many ambiguities, the preponderant need to stress on the Indian context led this paper to propose a definition. The aim is to *cover* both aquatic and marine spaces, including oceans, seas, coasts, lakes and rivers. It should encompass *all water-borne activities* that contribute to the country's GDP. Thus it should include fisheries, aquaculture, tourism and sport, transport, shipbuilding, energy, bio-prospecting, and underwater mining and related activities. It should also ensure social inclusion and restoration and preservation of the environment. India's Blue capital in the maritime and aquatic domains is large and needs equal attention and similar policies for sustainable development. Interestingly, Inland Water Transport (IWT) is an important component of the Government of India's National Maritime Development Project (NMDP) as part of the overall maritime policy of the country.[62]

The blue capital of India assimilated from multiple sources can be summarised as under:

- Coastline–7,516.6 km
- EEZ–2.37 mnsq km
- Islands–1208
- Brackish water–1.24 Mha

} Maritime domain (related to sea)

- Rivers and canals – 0.19 Mha
- Dams–4857 Mha
- Reservoirs–2.93 Mha
- Tanks and ponds 2.43 Mha
- Flood plain lakes–0.08Mha

} Aquatic domain (to inland waterbodies)

In the Indian context, a working definition of the Blue Economy could be as follows:

Blue Economy is sustainable development of aquatic and marine-based economic activities that leads to economic growth and social equity, while preserving and restoring the nation's environmental health.

The relevance of key words in the definition is appended below:

- Sustainable–earth's resources should be preserved for future generations.
- Development–must lead to economic wellbeing of people.
- Aquatic–fresh water activities.
- Marine–sea water activities.
- Equity–socially inclusive growth.
- Preservation–preserving the current resources.
- Restoration–the state of the environment before the uncontrolled exploitation took place needs to be restored.

Enablers of Blue Economy

For any meaningful policy to emerge on Blue Economy, the contributions made by its constituent elements need to be identified and measured. Being a novel concept, Blue Economy has been analysed by governments, international organisations and business entities, but it does not necessarily mean the same to all. The ambiguity primarily stems for the lack of a uniform definition. A study of the respective concepts was undertaken through the analysis of their handbooks, papers, books and reports published, which further facilitated in culling out the enablers of Blue Economy. In this regard the documents published by Federation of Indian Chamber of Commerce (FICCI), RIS, National Maritime Foundation (NMF) and EIU have been analysed below.

FICCI–In April 2017, FICCI published a Knowledge Paper titled *Blue Economy Vision 2025–Harnessing Business Potential for India Inc and International Partners* to commence business-driven discourse to meet the future challenges to Blue Economy. The Paper tries to make a convincing argument that the current estimated asset value of the oceans is US$ 24 trillion, with an annual value addition of US$ 2.5 trillion.[63] The use of the oceans has diversified from a classic medium of transport to being a wellspring for resources. The economic richness of

the oceans is represented by the variety of living resources (fish and marine vegetation which provide human protein and feed for other species), material goods (hydrocarbons, minerals, sand and gravel), services (shipping, ports, shipbuilding, fishing, tourism), and renewable energy (wind, wave, tidal, thermal and biomass). They act as a catalyst for the development of a number of industries, both on land and at sea.[64] The maiden Maritime India Summit 2016 in Mumbai witnessed investment commitments of nearly INR 83,000 crore (US$ 13 billion) in the shipping, ports and allied sectors. The government plans to invest INR 12 lakh crore over the next ten years to develop 27 industrial clusters based on the Blue Economy.[65]

As can be ascertained from the available documents, FICCI too has restricted its scope of the Blue Economy to the ocean and ocean-related economy and excluded the inland water economies altogether. It has used a novel approach to classify the ocean economies based on jurisdiction of territorial waters, EEZ, continental shelf and deep seas and has concisely identified the gaps in the extant legal framework. Issues of safety, security, insurance, delineation, timeframes etc also have been highlighted. However, FICCI's articulation is purely from a commercial perspective with some efforts on prevention of unrestricted fishing, and cursory mention of environmental accountability. Whilst enablers of Blue Economy have been identified, the methodology and policy requirements on pursuing these businesses in a sustainable manner (social equity and environmental preservation) have been given a short shrift.

NMF–The National Maritime Foundation had chosen the theme of its annual Maritime Power conference 2017 as *The Blue Economy: Concept, Constituents and Developments.* The proceedings of the seminar were subsequently published as a book under the same title. The title once again resurrects the conflict between constituents and enablers. The enablers sited in the book are fisheries, marine energy, marine leisure, deep sea mining and security. The chapter on Maritime Administration provides

additional insight into who the stakeholders are. However, a comprehensive list of enablers of the Blue Economy is difficult to compile from this book. Despite these infirmities, the book provides a comprehensive insight into the wide canvass and complexities of executing the Blue Economy in India.

RIS–While RIS has acknowledged that Blue Economy should include all the economies involved with water, it has chosen to follow the majority narrative on restricting the elements (read enablers) to ocean-related activities. The concept of the Blue Economy is, thus, still subject to multiple interpretations due to the coverage of activities, geographical locations and sectors. An indicative list of sectors and the activities drawn up by RIS are illustrated in Table 1.[66]

Gunter Pauli had envisaged the concept of Blue Economy, as tapping all the above potentials through natural utilisation of resources through innovation and with minimal government investment.

EIU–The EIU in its briefing paper to the World Ocean Summit 2015, titled *The Blue Economy – Growth, Opportunities and Sustainable Ocean Economy,* has provided the most comprehensive view of components (read enablers) of Blue Economy as in Table 2.[67]

Nature of Industry– Table 2 has classified the enablers of Blue Economy (horizontally) into four broad categories—harvesting, extraction, commerce and ocean (include inland water bodies) health. Each of these would require a different set of policies and enforcement mechanism for sustainable development due to the nature of the industry. Harvesting industries primarily relate to fishery and aquatic plants. For this to become sustainable, the emphasis would have to be on controlled exploitation in order to facilitate complete rejuvenation and conservation. Whilst extraction industry relates to non-replenishable industries like deep-sea mining and fossil fuel, the commerce industry concerns transport, trade, tourism and recreation. Both these sectors need

Table 1– Taxonomy of Blue Economy - Sector and Activities

Sectors	Activities
Fishing	Capture fishery, Aquaculture, seafood processing export
Marine Biotechnology	Pharmaceuticals, chemicals, seaweed harvesting, seaweed products, marine derived bio-products
Minerals	Oil and gas, deep-sea mining (exploration of rare earth metals and hydrocarbons)
Marine Renewable Energy	Offshore wind energy production, wave energy production, tidal energy production
Marine manufacturing	Boat manufacturing, sail making, net manufacturing, boat and ship repair, marine instrumentation, aquaculture technology, water construction, marine industrial engineering
Shipping, Ports and maritime logistics	Ship building and repairing, ship owners and operators, shipping agents and brokers, ship management, liner and port agents, port companies, ship suppliers, container shipping services, stevedores, roll-on roll-off operators, custom clearance, freight forwarders, safety and training
Marine tourism and leisure	Sea angling from boats, sea angling from the shore, sailing at sea, boating at sea, water skiing, jet skiing, surfing, sail boarding, sea kayaking, scuba diving, swimming in the sea, bird watching in coastal areas, whale/dolphin watching, visiting coastal natural reserves, trips to the beaches, seaside and islands, seaside eateries and seafood restaurants
Marine construction	Marine construction and engineering
Marine Commerce	Marine financial services, marine legal services, marine insurance, ship finance & related services, charterers, media & publishing
Marine Information Communication Technology (ICT)	Marine engineering consultancy, meteorological consultancy, environmental consultancy, hydro-survey consultancy, project management consultancy, ICT solutions, geo-informatics services, yacht design, submarine telecom
Education and Research	Education and training, R&D

Table 2. Enablers of Blue Economy

Type of activity	Ocean service	Established industries	Emerging industries	New industries	Drivers of future growth
Harvesting of living resources	Seafood Marine bio-technology	Fisheries	Sustainable fisheries Aquaculture Pharmaceuticals, chemicals	Multi-species aquaculture	Food security Demand for protein R&D in health-care and industry
Extraction of non-living resource, generation of new resources	Minerals Energy Fresh water	Seabed mining Oil and gas	Deep seabed mining Renewables Desalination		Demand for minerals Demand for alternative energy sources
Commerce and trade in and around the ocean	Transport and trade Tourism and recreation	Shipping Port infrastructure and services Tourism Coastal development	Eco-tourism		Growth in sea-borne trade International regulations Growth of global tourism Coastal urbanisation Domestic regulations
Response to ocean health challenges	Ocean monitoring and surveillance Carbon sequestration Coastal protection Waste disposal		Technology and R&D Blue carbon (i.e. coastal vegetated habitats) Habitat protection, restoration	Assimilation of nutrients, solid waste	R&D in ocean technologies Growth in coastal and ocean protection and conservation activities

safety and pollution avoidance for ensuring sustainability. Detailed measures of sustainability are discussed in the subsequent chapters.

State of Maturity – In Table 2, the enablers have been also classified (vertically) based on the maturity of the industries—

established, emerging and new. Since established industries have already resulted in over-exploitation of water bodies, policies will require to be devised for **restoration** of the environment in most cases. In contrast, the emerging and new industries are still at their nascent stages of development in most countries and will have to be implemented from the beginning with stringent policies for environmental **preservation**.

Having examined multitude studies carried out on the Blue Economy, this paper considers Table 2 as a comprehensive tabulation of enablers of Blue Economy that encompasses all the ideas and concepts in other studies.

Comparison with Brown and Green Economies

According to United Nations Environment Programme (UNEP), Green Economy is a system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks and ecological scarcities. The six major sectors of Green Economy are renewable energy, building, transportation, water management, waste management and natural resource management.[68] The concept of 'Green Economy' was popularised by Rio + 20 UN summit in 2012. However, it was challenged by SIDS which had meager land resources. In response to this, the first Blue Economy summit was held in January 2014 at Abu Dhabi. Blue Economy appeared in Indian Ocean Rim Associations' (IORA) discourse during the IORA Economic Declaration in October 2014.[69]

The difference between Blue and Green economies is that the Blue Economy permits response to 'basic needs' with what we have. As such, it stands for a new way of designing business: using the resources available in cascading systems, where the waste (output) of one product becomes the input to create a new cash flow.[70] Brown Economy is an exploitative economy with no regard for environmental considerations.

Table 3 – Different Colours of the Economy

	Brown	Green	Blue
End Goal	Max economic growth	Balance economic, environmental and social growth	De-couple socio-economic development from environmental degradation
Scope	All	Land based	Focus on SIDS/ coastal states
Resources used	Very high/ free	Less (3Rs – Reduce, Recycle & Reuse)	Ocean based/ local
Waste generation	High pollution	Low	Zero
Environmental degradation	High (Oceans are waste dumps)	Waste discharge within the carrying capacity of the ecosystem	Nil
Value of ecosystem services	Not included in national accounting system	Principle of 'polluters pay'	Incorporate into economic activities
Status	Failed: deeply ingrained	Limited success: high cost/ subsidy	To be judged: technological innovation

Source: *The Blue Economy* – Dr Kapil Narula, (NMF)

Dr Kapil Narula's differentiation between the **Brown** and **Green** from the **Blue** Economy is tabulated here.[71]

The maritime industry world over is poised for profound transition in the 21st century. The traditional preeminence of fishing, oil & gas exploration and shipping is being supplemented by new economic avenues in the maritime domains. This is primarily attributed to the insatiable demands of the burgeoning world population, rising living standards,

dwindling terrestrial resources and pioneering technologies. Whilst traditional maritime industries continue to appreciate their capacities at a brisk pace, newer technologies like marine biotechnology, offshore wind, cruise tourism, tidal and wave energy, aquaculture and sea bed mining are attracting considerable interest. Consequently, long-term potential for employment and economic growth in the maritime sector appears promising.

Surge in economic ventures worldwide comes with attendant risks to the ocean and river ecosystems. Once considered inexhaustible source of food and eternal sink of human waste, the oceans and rivers have now become vulnerable to over-exploitation, rising temperatures, pollution and loss of biodiversity. Unsustainable use of oceans and rivers threatens the very wellbeing of mankind in the long run. Against this backdrop, sustainable development require a more nuanced and responsible approach. As a result, numerous international organisations, nations, social agencies, research centers and Non-Government Organisations (NGOs) have come forward to devise novel ways to support the endeavour called Blue Economy, which has emerged as another soubriquet for maritime development. Despite the awareness, Blue Economy policies are primarily focused on economic growth and sustainability is often a lower priority. Thus the policies need to be re-framed to realise the triple objectives of growth, equity and conservation of river and ocean ecosystems, which will be explored in the next chapter.

CHAPTER 4

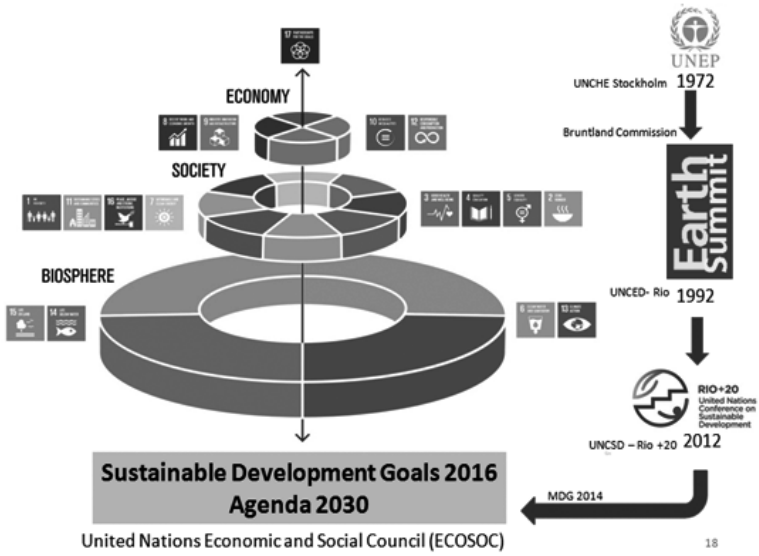
Policy Relevance of Blue Economy for India

STANLEY JOHNSON, A British politician and an author, recalls that the first United Nations Conference on Human Environment (UNCHE) held in Stockholm, Sweden, in June 1972 was truly memorable. On the Saturday before its opening, Maurice Strong, the Conference's Secretary-General, led a bicycle parade along the canals and waterways of Stockholm's historic center. In his book *Where on Earth are We Going?* Strong recalls that a young man broke through the crowd and pushed an old, beat-up bicycle at him, yelling loudly: 'If you really believe in what you are saying, you should get off your new bicycle and take this old recycled one!' Strong turned and shouted back: 'Young man. Not only do I believe in recycling. I am personally made entirely of recycled materials!' This remark was apparently sufficient to pause his challenger and the bicycle parade resumed.[72] This anecdote was meant not only to convey the humble beginning but also the strong resolve of the pioneers

of world environment agenda way back in 1972 under the aegis of UNEP. Even then, Maurice Strong had insisted upon action orientation with definitive targets and timelines.

In order to take stock of progress made in the past decade since 1972, the UNEP set up the Brundtland Commission in 1983. Norwegian Prime Minister Gro Harlem Brundtland is credited with having captured the essence of 'sustainable development' which was first adopted by the UN in 1987. The Brundtland Commission provided an intergenerational concept of sustainable development and defined it as *'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'* which was adopted at the 1992 UN Conference on Environment & Development (UNCED) in Rio de Janeiro, also called the Earth Summit.[73] So the word 'development' was added to environment in the UNCED, also called Agenda 21. This is also the first time that sustainable development was introduced in official documents. In December 1992 the UN Commission on Sustainable Development (UNCSD) was established. The meaning of the word sustainable was first coined by the Commission's Secretary General Jim MacNeill by synthesising the two words, 'environment' and 'development'.[74] In 2002 a world summit was held on sustainable development.[75]

The United Nations Conference on Sustainable Development or Rio+20 took place in Rio de Janeiro, Brazil in June 2012, where member states decided to launch a process to develop a set of Sustainable Developmental Goals (SDGs). They also agreed to establish a high-level political forum (HLPF) for sustainable development. The Rio+20 eventually evolved into the SDG 2016 and was known as Agenda 30, specifying a 15-year implementation time plan up to 2030.[76] The SDGs are being steered under the aegis of UN's Economic and Social Council (ECOSOC). A snapshot of the evolution of SDGs is depicted below.



Sustainable Development Goals

According to FICCI's Blue Economy Vision 2025, Blue Economy is an integral element of Sustainable Development Goals (SDGs).[77] Kapil Narula writes that the notion of Blue Economy and the SDGs are aligned and mutually reinforcing.[78] There is wide acceptance that in order to implement the Blue Economy effectively, the SDGs will have to become its foundation. This Paper is of the view that SDGs can serve as a guiding methodology for governments to implement, calibrate and prioritise national programmes on Blue Economy. In order to comprehend the effectiveness of government policies from the perspective of Blue Economy, one has to examine the implementation methodology of SDGs by the UN and the Government of India.

Implementation and Review of SDGs

Agenda 2030 comprises 17 SDGs and 169 related targets for implementation that came into effect from 1 January 2016 and will be valid for a period of 15 years, till 2030. Agenda 2030 not

only preserves the sovereign rights of the States but also respects international law. The Agenda outlines the goals and targets to be achieved and corresponding indicators for measurement. Agenda 2030 is also being steered by the Economic and Social Council (ECOSOC) under UN aegis.[79] Individual governments are responsible for rendering reviews to the HLPF voluntarily.

The Voluntary National Reviews (VNRs) enables a government to review its own performance and communicate the national initiatives implemented to the UN. In 2016, 22 countries conducted VNRs and presented their reports to the HLPF. In 2017 the number nearly doubled to 43, indicating the effectiveness of the VNR system. India submitted its VNR in July 2017. About 48 countries are expected to submit their VNRs in 2018.[80] The VNRs of other countries are also available on the UN website and can be freely referred to, in order to let a country calibrate its own national schemes.

The Goals

The 17 Goals identified under Agenda 2030 are:[81]

Goal 1 – End poverty in all its forms everywhere.

Goal 2 – End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Goal 3 – Ensure healthy lives and promote well-being for all at all ages.

Goal 4 – Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Goal 5 – Achieve gender equality and empower all women and girls.

Goal 6 – Ensure availability and sustainable management of water and sanitation for all.

Goal 7 – Ensure access to affordable, reliable, sustainable and modern energy for all.

Goal 8 – Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Goal 9 – Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.
Goal 10 – Reduce inequality within and among countries.
Goal 11 – Make cities and human settlements inclusive, safe, resilient and sustainable.
Goal 12 – Ensure sustainable consumption and production patterns.
Goal 13 – Take urgent action to combat climate change and its impacts.
Goal 14 – Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
Goal 15 – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
Goal 16 – Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
Goal 17 – Strengthen the means of implementation and revitalise the global partnership for sustainable development.

Indian Initiatives towards SDGs

India has been proactive in implementing the Sustainable Development Goals (SDGs). The slogan *Sabka Saath Sabka Vikas*, which translates as 'Collective Effort and Inclusive Growth' has been the Prime Minister's clarion call for India's national development agenda. To ensure expeditious penetration of the SDGs, the Government of India released a draft Three-Year Action Agenda covering the years 2017-18 to 2019-20 on 23 April 2017.[82]

The status on implementation of the SDGs by the Government of India can be accessed from the VNR document. Some of the noteworthy national initiatives are the Pradhan Mantri Jan Dhan Yojana (PMJDY) which is the world's largest financial inclusion programme. By leveraging PMJDY, Aadhaar (biometric identity system) and mobile telephony, the government has disbursed a cumulative amount of INR—RS 1.62 trillion (USD 25 billion) to 329 million beneficiaries through Direct Benefit Transfers.[83] State governments too have been playing a significant role in advancing the national development agenda. Feedbacks on Swachh Bharat Abhiyan (Clean India Movement) and Skill Development have been incorporated real time to calibrate national policies.

The National Institution for Transforming India (NITI Aayog), chaired by the Prime Minister, is responsible for overseeing the implementation of the SDGs. NITI Aayog has mapped the goals and targets to various nodal ministries through its Target Mapping plan. Draft national indicators for tracking the SDGs were placed in the public domain by the Ministry of Statistics and Programme Implementation (MoSPI) for comments from all stakeholders on 8 March 2017.[84] India's Voluntary National Review July 2017, compiled by the NITI Aayog, was India's first VNR and comprised 7 out of 17 goals, viz. 1, 2, 3, 5, 9, 14 and 17.[85] The detailed Target Mapping on implementation of SDGs by the Government of India (GoI) as on August 2017 is placed in Annexure 3.[86]

Blue Economy Goals

For long, oceans, rivers and seas have been viewed by governments primarily as environmental issues, mostly neglecting their intrinsic economic and social dimensions. The linked economies have largely grown for years as isolated ecosystems with little governmental participation and without due concern for sustainability. SDG 14 relates to, 'Conserve and sustainably use the oceans, seas and marine resources for sustainable development', with its 10 targets as part of Agenda 2030. The ten targets of Goal 14 include ocean pollution, marine and coastal ecosystem, ocean acidification, regulation on fishing, conservation of marine area, fishery subsidies, SIDS economy, science and marine technology, artisanal fishing and implementation of international laws for sustainable use of the oceans. Goal 14 is primarily focused on ocean economy and does not include all components of maritime or aquatic economy of coastal States. Most studies and think tanks have confined the relevance of the Blue Economy only to Goal 14 (oceans and seas), which is myopic and has been discussed in the previous chapter. Relevance of Blue Economy can be found in multitude of SDGs. This paper too considers Goal 14 (oceans and seas) as one of the primary components of the Blue Economy as all its 10 targets are relevant to the Blue Economy. In countries such as India, numerous land-based and riparian industries such as aquaculture, fishing, inland waterways, tourism, boat manufacturing, sail making, net manufacturing, boat and ship repair, marine instrumentation, aquaculture technology etc have the potential to contribute to the country's Blue Economy. There is, therefore, a need to take a holistic view of the Blue Economy and implement the SDGs in all its manifestations.

The SDGs cover a wide range of social and environmental issues. Not all 17 goals are directly or indirectly connected to the Blue Economy. The International Institute of Sustainable Development (IISD) has provided the first clue on the constituent goals of the Blue Economy viz. 2,13,14,15 and 17.[87]

FICCI has considered multiple goals, with Goal 14 (oceans and seas) as the primary goal and has connected 12 other SDGs to Goal 14 (oceans and seas) as supplementary goals. These goals are SDG 1 (poverty), SDG 2 (food security), SDG 6 (water and sanitation), SDG 7 (energy), SDG 8 (economic growth), SDG 9 (infrastructure), SDG 10 (reduction of inequality), SDG 11 (cities and human settlements), SDG 12 (sustainable consumption and production), SDG 13 (on climate change), SDG 15 (biodiversity), and SDG 17 (means of implementation and partnerships).[88] Similarly, Narula has identified 15 out of 17 SDGs (barring Goals 4 and 5) that are relevant to the Blue Economy.[89] Hence, there appears to be a large variance in literature on the number of SDGs that are related to Blue Economy. Interestingly, both, Narula and FICCI, have considered Goal 6 which relate to water and sanitation and pertains to conservation of inland waters as an element of the Blue Economy.

The ambiguity on the number of goals that relate to the Blue Economy can be resolved only when viewed from the perspective of corresponding targets promulgated by the UN. Unfortunately, none of the literature has referred or consulted the corresponding targets, without which policy direction will not be feasible.

Blue Economy in the Indian Context

While SDG 14 postulates sustainable use of the ocean, sea and marine resources, it does not encapsulate all elements of a Blue Economy. Consequent to analysis of the SDGs (17 goals, corresponding 169 targets and concomitant indicators), this paper has earmarked 14 goals and 33 targets that match with Blue Economy, which conforms closely to Narula's postulation. The SDGs excluded are SDG 16 (peace, justice and strong institutions), SDG 3 (Good health and wellbeing) and SDG 5 (Gender equality). The justification for the variance can be found in Table 4. On an average each goal has 10 targets (169/17).

But not all targets of the identified 14 goals relate to the Blue Economy. Post analysis, this paper came to the conclusion that in India's context, the SDGs that can be linked to the Blue Economy are SDG 1 (on poverty), SDG 2 (on food security), SDG 4 (education), SDG 6 (water and sanitation), SDG 7 (on energy), SDG 8 (on economic growth), SDG 9 (on infrastructure), SDG 10 (on reduction of inequality), SDG 11 (on cities and human settlements), SDG 12 (on sustainable consumption and production), SDG 13 (on climate change), SDG 14 (on oceans and marine resources), SDG 15 (on biodiversity), and SDG 17 (means of implementation and partnerships). These goals and targets are intertwined to each other and also linked to economic, social and environmental aspects of sustainable development. The paper infers that Goal 14 is a sub-set of the Blue Economy, which in turn is a sub-set of the SDGs, as represented by a Venn diagram.

Initiatives by Government of India for Implementing Blue Economy

The 17 SDGs along with 169 targets came into effect under the aegis of the UN on 1 January 2016[90] and the SDG indicators were promulgated in June 2016.[91] The Government of India has appointed the NITI Aayog to implement these goals. Accordingly, the NITI Aayog submitted a status report on implementation in the form of a Voluntary National Review (VNR) to the UN in July 2017.[92] However, VNR is a work in progress and requires constant monitoring. To facilitate implementation in August 2017, the NITI Aayog has published a Draft Target Mapping plan for Nodal Ministries, Centrally Sponsored Schemes (CSSs) and related interventions for each of the targets of the SDGs.[93] The study of the SDG targets and

the VNRs reveal that phenomenal progress has been made by the government on goals 1,2,3,5,9,14 and 17 and there are considerable linkages of the CSSs across multiple goals.

However, *when the VNR is read in conjunction with the Target Mapping plan, it emerges that there is need for further calibration in order to provide greater focus to India's Blue Economy.* This is especially relevant to India due to its continental mindset (as a residue of the colonial hangover) and resistance to transformational change (due to entrenched belief systems and traditional practices). Accordingly, the SDG Targets need to emphasise the various aspects of Blue Economy. Alternately, these Targets may be incorporated under a separate chapter on the Blue Economy. For the purpose of implementation, the 'SDG targets' should be considered as a policy framework. The recommended emphasis required for 'SDG Targets' are tabulated below (Table 1).

Table 1 – Policy Relevance of Blue Economy to India

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
1	End poverty National Social Assistance Programme (NSMA)	1.4….Ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including micro finance to poor and vulnerable	Tenancy law to be changed like in Andhra Pradesh – International Crop Research Institute for Semi Arid Tropics (ICRISAT) for farm sector Registered aquaculture farms. Fishery ponds, river banks and coasts to have legally recognised documentation, Kisan Credit Cards to fishermen Support to cruise tourism, boat building, maritime construction etc that can employ unskilled or semi-skilled labour

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
2	Food security (NMSA/ National Mission on Agriculture Extension and Technology (NMAET)	2.3 ….. Double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment	Support for improving value of the product, diversification, market access and increase productivity Technology and Financial support to fisheries and aquaculture including ornamental fishery due to fledging market in India and abroad Plans for Farmer Producer Organisation (FPO) schemes Do away with old Act on Agriculture Produce Market Committee (APMC) and give farmers direct access to market and whole sellers Emphasis on electronic National Agriculture Market (eNAM)

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
4	Education National Education Mission (NEM)	4.4 Substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	Information, Communication and Technology (ICT), education and vocational skill Departments and Centres. Eg, Conjoined Rice and Fish farming for long standing rice crops, (like in Arunachal Pradesh Secondary Agriculture) Vocational education to generate employment skill in schools and colleges in support of marine and supporting industries Need for Centres for Excellence for marine industry Inclusion of marine science in the School curriculum and introduction of fables similar to Gunter Pauli's as part of SWAYAM Improve awareness of Legislators and District Collectors
6	Management of Water Ministry of water resources, Development and Ganga Rejuvenation (MoWR& RD&GR)	6.3 Improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	Extend *Swachh Bharat Abhiyan* to rivers, lakes, territorial waters and EEZ and nominate nodal agencies. Hire international rating agency to commence individual State rating on economic, environmental and social performance *Namami Gange* –Rejuvenation of all rivers including Ganges

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	PMKSY – *Har Khet ko Pani*. In Andhra Pradesh water availability for primary producers – agri, husb, fishery is being monitored by Chief Minister on regular basis (Director ICRISAT) Inter-linking of rivers to boost river dependent economy
		6.6 Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	Ordinance for captive water waste treatment at industrial outlets and secondary treatment centrally prior discharge into sea, river streams, aquifers or lakes Environment Impact Assessment (EIA)/Environment Management Plan (EMP) reports to be sought from industries and municipal corporations Collaboration with private and foreign firms for measuring, modelling and forecasting health of water Tax incentive to industries and introducing relevant innovations by ZERI or other such agencies[94] Integrated fish farming – reservoir, rivers, deltas, coasts. Establish Eco Zones free from fishing both in rivers and coasts

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
7	Energy	7.2 Increase substantially the share of renewable energy in the global energy mix	Invest on Research and development offshore energy Implementation of National Offshore Wind Energy policy
8	Economic Growth & Employment PM Employment Generation Program (PMEPG)	8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value-added and labour-intensive sector	Include Shipbuilding, marine construction, marine manufacturing, marine commerce in plans Government to budget for research and marine infrastructure. Raise funds (Cess etc) or attract Foreign Direct Investment (FDI) with Transfer of Technology (ToT) Encourage innovations[95] to trigger entrepreneurship Network companies, investors and users (through Expos and Trade fares) Integrated development and management of fisheries
		8.9 Devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products	Promote rural, riverine and coastal tourism by educating rural folks and providing financial assistance Build brand reputation by developing heritage infrastructure for tourism SE Asian model proposed by United Nations World Tourism Organisation (UNWTO) may be adopted

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
9	Infrastructure & Industry	9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access	Shipbuilding to be identified as a key strategic sector Infrastructure to enhance passenger and freight volume in coastal and inland waterways Feasibility studies need to be undertaken for IWT in perennial waterways to ascertain commercial viability and efficacy for decongestion Capacity enhancement of private and public, ferries, quays, ports and shipyards and ship repair Enhance capacities of Single Buoy Mooring (SBM), Very Large Crude Carriers (VLCC) Liquid Natural Gas (LNG) carrier handling ports for oil and gas Dredging off fishing harbours/fish landing centres Development of post-harvest infrastructure; Ice plants, cold Storages and ice plants cum cold storages Ecosystem approach simultaneously addressing engineering, ecology, economics and governance for port development Conform to Green Port development norms American Association of Port Authority (AAPA) 2007, UNEP 2011, European Sea Port Organisation (ESPO) 2012 Right of First Refusal (RoFR) for Indian shipbuilders Link Sagarmala Project with Mahatma Gandhi National Rural Employment Guarantee Act (MGNAREGA), Rashtriya Krishi Vikas Yojana (RKVY) and National Rural Livelihoods Mission (NRLM) and Neel Kranti

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		9.2 Promote inclusive and sustainable industrialization and significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries	Promote shipbuilding, and marine manufacturing through JVs with developed countries like Japan and S Korea Form shipbuilding clusters along with supporting ancillary industries Invest in shipbuilding industry for increasing Indian bottom ships and skilled and unskilled jobs
10	Equality	10.1 Progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average	Empower and assist coastal and riparian poor with skills and employment MGNREGA to be implemented for Farm ponds for fishery. Implement National Scheme of Welfare of Fishermen
11	Housing	11.2 Provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	Development of inland waterways by States in addition to CSS, including boat ambulances. Develop smart cities on river banks and coasts as sustainable cities

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
12	Sustainable Consumption	12.2 Achieve the sustainable management and efficient use of natural resources	Regulations and enforcement on sustainable harvesting, extraction and preservation. Avoidance of wastage and overfishing. Shift to deep sea fishing
		12.4 Achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	Treatment of water waste at captive primary industrial sources and centrally prior merger into sea, river streams, aquifers or lakes. Education in school syllabi. Awareness on chemical and waste impact on ocean/ river resources Technology and innovations[96] for chemical and waste management
		12.5 Substantially reduce waste generation through prevention, reduction, recycling and reuse	Coastal and Sea dumping of waste to be arrested through regulations Shipbuilding through refurbishment of old ships to reduce scrape waste

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	Enforcement mechanism to be instituted in oil and gas, port led development, shipbuilding, ship-breaking and tourism companies. Petrobras, Brazil model on sustainable development is a case in point
		12b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products	Collaboration with private and foreign firms for measuring, modelling and forecasting health of water and environment
13	Climate Change	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	Institute integrated mitigation, adaptation, impact reduction and early warning
14	Ocean Neel Kranti Management (NKM)/ National Coastal Zone Management Plan (NCZMP)	14.1 prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	Reduction of eutrophication and marine plastic density Treatment of water waste at captive primary industrial sources and centrally prior merger into sea, river streams, aquifers or lakes Extend to Territorial seas and EEZ Implement Safety, Health and Environment (SHE) policy for Ship breaking

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		14.2 Sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	Encourage deep sea and oceanic fishing. Including capacity building and training in marine fishing and allied activities Encouragement of mariculture in open seas. Legislation, regulation and enforcement Management and enforcement of best practices in cruise tourism
		14.3 Minimise and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	Marine scientific/ statistical ocean data to be corroborated with coastal and upstream data and available for public use Cooperation with other countries technologies on mapping, monitoring and mitigation Commission suitable marine research vessels and crafts for sea and riverine data

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		14.4 Effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	Awareness about ocean/ river ecosystem and fishing techniques Implement Fish Aggregating Devices (FAD) and Marine Spatial Planning (MSP) Regional cooperation for enforcement against Illegal, Unreported and Unregulated (IUU)
		14.5 Conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	Promulgate Marine Protected Zones (MPZ) in rivers lakes and coastal areas

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		14.6 Prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation	Remove subsidies on fishing that leads to over exploitation and wastage Explore subsidy for poor fishermen in localized areas only

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		14a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries	Marine scientific/ statistical data held with government agencies to be made available to public for use Collaboration with foreign countries on research, ToT (Transfer of Technology), data collation and analysis
		14b Provide access for small-scale artisanal fishers to marine resources and markets	Institutionalize FPO and networking between market, industry and fishermen (eg - Agri Market online)

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		14c Enhance the conservation and sustainable use of oceans and their resources by implementing international law, as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of 'The future we want'	Implementation of United Nations Convention on Laws of the Seas (UNCLOS) in the EEZ

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
15	Bio diversity	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	Waste management and treatment of water before discharge into rivers and sea Policies on charging of groundwater Dredging of rivers Biomass monitoring stations along rivers and coasts and institute real time corrections by District/ States responsible.
		15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	States to be made accountable for sustainable development.

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
17	Global Partnership	17.6 Technology Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations Level, and through a global technology facilitation mechanism	Pursue Blue Economy policies in IORA, Bay of Bengal Initiative for Multi Sectoral Technical and Economic Cooperation (BIMSTEC), South Asian Association on Regional Cooperation (SAARC) and other regional forums for better ocean governance[97]

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		17.9 Capacity-building Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation	Capacity building of own and maritime neighbours as Net Security Provider and Safety and Growth for All in the Region (SAGAR)

SDG	Goal	Targets (Policy directions)	Proposals for Emphasis
		17.8 Data, monitoring and accountability Enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts	Build infrastructure and frameworks for Maritime Domain Awareness (MDA) to counter nontraditional threats in the Indian Ocean Region(IOR) Integrate with international institutions for data sharing and analysis on ocean mapping for Blue Economy

The conflict between development and environment will always exist. The way ahead for realising the potentials of Blue Economy in a sustainable manner will require innovations like the 100 innovations proposed by Gunter Pauli. An ideal philosophy for project implementation would be one which is steered by the Center and rowed by the States. However, in India, due to conflicts in constitutional jurisdiction between the State and the Centre, it may not be possible to implement all Centre Sponsored Schemes (CSSs) as they are. Under such circumstances knowledge

management becomes an important driver for educating the States and stakeholders so that they understand the goals. Community involvement is also essential and should become the fulcrum of growth and development. The Junior Eco-Task Force set up by the Chief Minister of Uttarakhand is a case in point on community involvement and generating awareness involving young students.

While technologies for undertaking sustainable development may be available, involving industries and startups for scaling up their productions is an aspect that will have to be supported by the concerned governments through easy loans, expeditious clearances and single window systems. Spreading awareness, generating quality statistics, creation of Centers of Excellence etc are some of the measures that need immediate implementation. Whilst there are many different models to choose from, for implementing the Blue Economy, the models that can be customised to the local situation and are amenable to changes need to be adopted. Reviews of implementation of the Blue Economy can be productive only if it is done scientifically and backed by quality statistics. Therefore, data collection and quality is of utmost importance. Multiple departments of the government, working in their respective silos of interest, often leads to wasteful competition. Besides, downstream effect of government schemes also needs to be monitored post implementation. This needs inter-department coordination, flexibility for change, good data, governance and *Whole of Part Approach*.

Chapter 5

Convergence between Blue Economy & Maritime Power

ACCORDING TO THE Nobel Prize winner economist-historian Douglas North, most countries are 'limited access societies' that promote policies that cut off easy access to markets and institutions for everyone. These limitations include difficult access to capital that people need to start businesses and education systems where quality is directly linked to affordability. As a result we see existing elites consolidate their hold on power and wealth, and it becomes very difficult for people to breakout of the income class they are born in. For an economy to shift into an 'open access' economy, the need is of competition and markets, which ensures that neither political nor economic power is permanent or inherited. Such an environment also ensures social stability, as it creates a sense of fairness and belief that every one has a chance to change his income and status.[98] Consequently, Nilekani says that 'when it comes to developmental goals, greatest advances come not form

discoveries, but from how we apply them to reduce inequality and create access. Ignoring it is not just bad policy, but it carries high political risks'.[99] The Government of India's MGNREGA programme, Fasal Bima Yojana, Ujala, Ujjwala etc, despite their weaknesses, have brought some level of social security to the countryside. The National Pension Scheme (NPS) has also given hope to both, the organised and the unorganised sector. Thus, fairness is fundamental to long-term reforms.

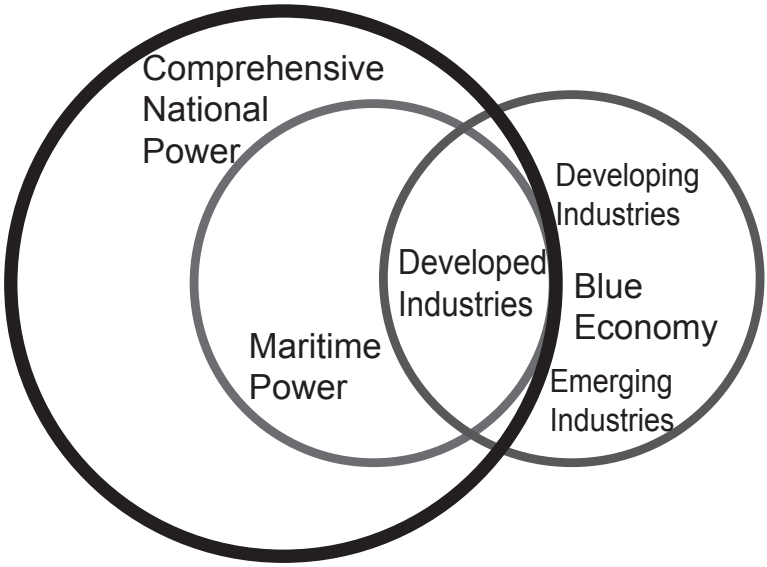
Above all, democracy is crucial for sustainable development. Many complain about India's slow growth under democracy and suggest that an authoritarian leader will be more effective. Their angst is intensified by the quality of public debate and ubiquitous corruption. But an authoritarian system is always subject to tyranny and abuse like Robert Mugawe's or Deng Xiaoping's. It also creates errors that cannot be easily corrected, as is seen in China's response to its environment crisis and its one-child policy. A democratic system like that of India, despite its own infirmities, is its own cure.

Businesses today have to face stringent domestic and global environmental regulations in addition to demonstrating socially ethical practices. Sustainable development does not just mean economic longevity of a company, but also environmental and social feasibility. According to *Proceedings of the Maritime-Port Technology and Development Conference (MTEC) 2017, Singapore* there is a need for more holistic, pluralistic and participatory approaches in order to survive in a highly interconnected, complex, turbulent environment. A paradigm shift is required in India's approach to large-scale developments, whereby the emphasis is on achieving her objectives in an ecosystem and societal context.[100] Thus, measurement of an Indian company's success must involve the triple bottomline of environmental, financial and social performance.

Linking Blue Economy to Maritime Power

As discussed in Chapter 2, Maritime Power is a subset of

Comprehensive National Power. Deng had said, 'In measuring a country's national power, one must look at it comprehensively and from all sides'. The Chinese define CNP as, 'comprehensive capability of a country to pursue its strategic objectives by taking the necessary actions internationally', or its mobilisation and utilisation of strategic resources of a country, to realise national objectives.[101] Economy is one of the components of a country's CNP and according to Brig Rahul K Bhosle, (Occasional Paper published by VIF in March 2016) a standard measurement of a nation's economic strength is its Gross Domestic Product (GDP). Gregory F Treverton, Seth G Jones in a Research and Development (RAND) report too have used GDP as one of the metrics for national power.[102] Therefore, it would be safe to assume that those elements that contribute to the GDP also contribute to the CNP of the country. In other words, those nascent or developing industries that do not as yet contribute to the GDP, cannot contribute to the country's CNP. This implies that in the maritime domain too, only industries contributing to the GDP need to be considered as enablers of Maritime



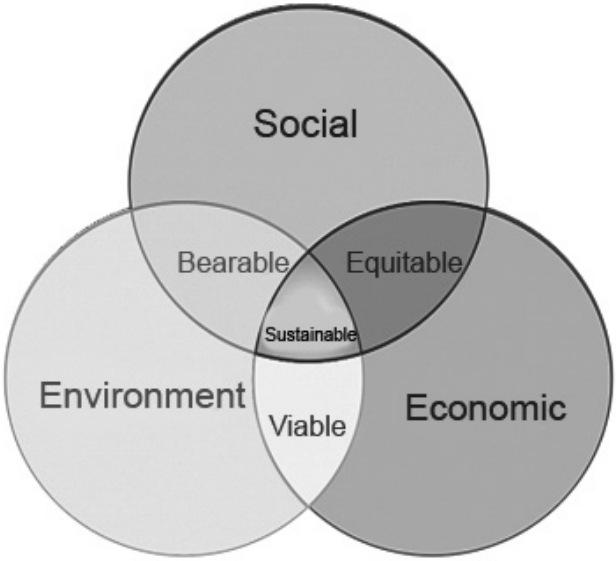
Power. The other developing and emerging industries in India can be discounted from the equation of Maritime Power for the time being till they mature and assume the critical mass.

The enablers of Blue Economy were discussed in Chapter 3. It comprises all the maritime industries—developed, developing and emerging. However, those maritime industries that are developed or contribute to the stategic objective of a country chould be considered as elements of CNP. In other words, these would also be the enablers of Maritime Power. This in no way discounts the other elements of Maritime Power as discussed in Chapter 2. Thus, recalling Table 2 of Chapter 3, the economic enablers of Maritime Power would be—fisheries, seabed mining, oil and gas, shipping (transportation and shipbuilding), port and port-led services and tourism.

Inclusive Growth

According to the World Economic Forum (WEF) *Report on Inclusive Growth and Development 2017*, the ultimate objective of national economic performance should be broad-based and one that ensures sustained progress in living standards. A robust inclusive-growth strategy is both pro-labour and pro-business that has a stronger focus on institution building. The primary focus of these institutions should be uniform disbursement of national economy in terms of household income, opportunities, economic security and quality of life.[103]

The World Bank's landmark 1993 study, *The East Asian Miracle*, has examined how eight economies in East Asia succeeded in achieving a remarkable record of 'high growth while ensuring equity' between 1960 and 1990. This has been possible because in these countries, the fundamentals of macro-economy and micro-economy were sound in addition to private investments, banking integrity; skill- based primary and secondary education, tariff control, infusion of new technologies etc. But the fundamental policies do not tell the entire story. In most cases, systematic government policy interventions were



made to foster sustainable and inclusive developments.[104]

To establish their legitimacy and win the support of the society at large, East Asian governments had to establish the principle of *shared growth*. To implement the strategy, first the business leaders were convinced about the policies and persuaded to share the benefits of growth with the middle class and the poor. Then the middle class and the poor had to be shown the benefits of these policies.[105] Similar approaches will have to be adopted to spur inclusive growth in India.

Often GDP has been considered as the only parameter for development. This not only leads to desultory growth, but carries high political risk. Hence sustainable development has to go beyond GDP to include environment and social equity in mainstream economics, as illustrated by the tripod in the figure.

India has an immense potential to grow in almost all sectors of maritime industry and has to grow in these sectors to realise its status as a Maritime Power. However, this growth cannot

be simply development centric, as has been demonstrated by rapid environmental degradation and widening social chasm. All growth in India has to be sustainable. This study explores how principles of Blue Economy can be imbibed in the development of maritime industries in order to transform India into a sustainable Maritime Power.

Since there are a multitude of companies involved in each industry, implementation of the SDGs will be equally diverse. For example, the SDGs of oil transportation will be different from oil extraction. A United Nations Development Program (UNDP) & World Bank (WB) report states that integrated companies, which work on all aspects of the chain from upstream to downstream, will have direct impacts on a broader range of SDGs. In addition, service companies may have potential impact on a number of the SDGs, based on the type and location of services they provide to the industry.[106] Each industry will have to identify the relevant SDGs, engage with the stakeholders, especially the government and identify overlapping developmental priorities for understanding the company's role in supporting the SDGs.[107] This paper examines each enabler of Maritime Power in terms of impact on the environment and social inclusion. Pursuit of developments related to Maritime Power can be sustained indefinitely, only if the industries integrate SDGs into their core business. Therefore, SDGs have to be adopted not only for government monitoring and enforcement, but also into business practices.

Fisheries

In the Union budget for FY 2017-18, the Department of Animal Husbandry, Dairying and Fisheries was allocated Rs 2,371 crore. Out of this, the Fisheries Institute has been allocated Rs 139.40 crore, a 42 per cent increase from the FY 2016-17. Blue Revolution, which comprises marine fisheries and inland fisheries, was allocated Rs 400.73 crore, an increase of 2 per cent from the last FY.[108] The fishing sector employs 15

million people in India and ranks second (6.3 per cent) in the world fish produce (Rs 1 lakh crore in 2015-16), second only to China.[109]

The Department has prepared a National Fisheries Action Plan 2020 (NFAP) for increasing fish production and productivity which includes all the sources of fish including tanks, wetlands, brackish water, cold water, lakes, reservoirs, rivers and canals. At the level of States and Union Territories, governments are required to prepare State Action Plans (SAPs) for effecting the Blue Revolution (Neel Kranti). By end 2016, the government claims to have developed around 26.869 hectares area for aquaculture which has benefited 63,372 fishermen. In addition, under the fishermen's welfare schemes assistance was provided for construction of 9,603 houses, 5 million fishermen were insured and 20,705 were trained.[110] Realising the potential of ornamental fish in the domestic and international markets, the Department has allocated Rs 61.89 crore for launching pilot schemes in 8 States.[111] India's fish-produce has been the fastest growing export market (14.8 per cent) in the world between 2004 and 2014. Despite the remarkable statistics of the Indian fishing industry above, India lags by many miles behind China, which is a world leader with a market share of 18 per cent (2014) in overall fish production and 62 per cent (2014) in aquaculture.[112]

Social Inclusion in Fishery: In the past, the agriculture (including fishery) sector in India has been relatively untouched by structural reforms that lifted incomes in other parts of the country. Low farm productivity meant that governments tried to improve the condition of farmers through pricing policies and support prices which has led to inflation. A collapse in food prices hurts the farmer's incomes. According to Ramesh Chand of NITI Aayog, the real income growth in agriculture has come down to 1.36 per cent over the past five years. In this backdrop, pushing up farm prices will destabilise the country's macro economy. This is why the focus has to shift to

macro reforms. The single most important factor for doubling the income of marginal farmers is by increasing productivity. This requires public investment by government in fisheries, like availability of seeding, refrigeration, roads, transportation, markets etc. However, successive governments have resorted to subsidies rather than enhancing infrastructure.

According to the recently concluded Ashok Dayal Committee report on doubling the Indian farmer's income, the solution lies in a four pronged approach—land, access to markets, increase in productivity and diversification to high yield crops.[113] During an interview to *WION* and *Times Now* on 22 Jan 2018, before he left for Davos, the Prime Minister said that there was a need to assist farmers to improve the value of his produce through material enhancement of finished produce, marketing and packaging to increase farmer income. In the budget presented on 31 January 2018, agriculture including the fishery sector, has been provided a momentous boost. 'Kisan Credit Card' to fishers will also facilitate fishers to have better cash flow and improve credibility and thus improve business growth in addition to empowerment and assisting coastal and riparian poor with skills and employment. MGNREGA can be used for constructing fisheries ponds. Implementation of the National Scheme on Welfare of Fishermen will ensure better inclusion. Emphasis is required on SDG Targets – 1.4, 2.3 and 10.1 as discussed in Table 1 of Chapter 4.

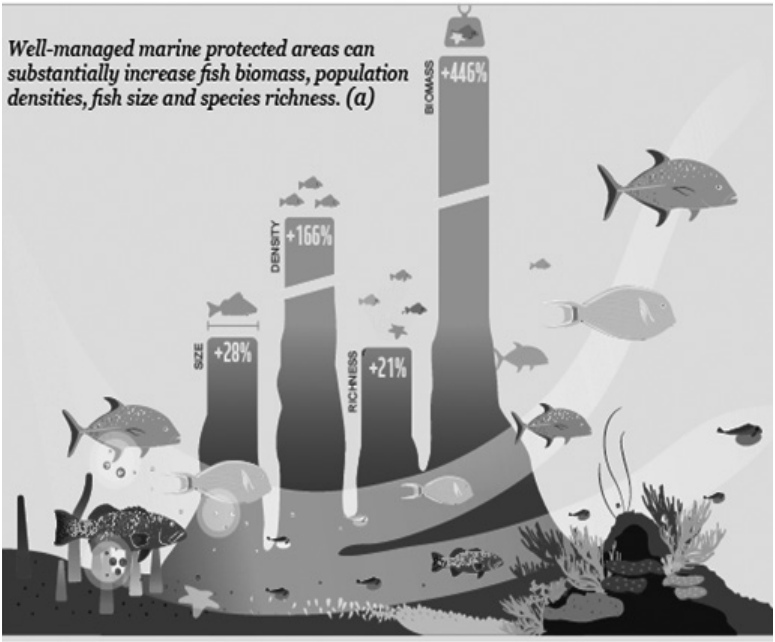
Increasing Productivity in Fishing Industry: Government support to individual fishers with respect to technology, education, insurance, welfare, loans etc is just not adequate to increase productivity. It requires an ecosystem approach that includes all the stakeholders, viz. fishers, markets, industries etc. The Andhra Pradesh government has adopted a Farmers Producers Organisation (FPO) strategy called *Raithu Kosam* in all primary sectors of agriculture, including fishing.[114] Various steps have been announced for farmer-producer organisations (FPOs) in the 2018 Union budget. Having strong FPOs will

make it easy for the input companies to sell their products to farmers. It will also facilitate the food processing companies to buy what the FPOs produce. This paper recommends that all States are urged to adopt a similar strategy. In addition, Rs 10,000 crore has been announced for fisheries and aquaculture infrastructure in the 2018-19 budget. In under-developed States like Odisha, the aquaculture farms are located in remote locations. This fund can help develop proper roads and provide electricity to fishers, which will help reach the perishable produce to markets quickly.[115]

The Government of India has framed a model agricultural land lease law and drafted a model contract farming law 2018 to mitigate the problems of absentee landowners without fear of losing title. The Ashok Dayal Committee has noted that a farmer's share in market price is as low as 15-40 per cent, and the Agriculture Produce Market Committees (APMCs) have thus far perpetuated monopolistic intermediaries. The government has introduced a model APMC 2017 that is intended to replace the current APMC Act and allow a single market within a State, freeing farmers to trade at private wholesale markets and allowing them to sell produce directly to the bulk buyers, and by promoting trading on electronic national agriculture market (eNAM).[116] These initiatives need to be extended to the fishery sector as well. Emphasis is required on SDG Targets 1.4, 2.3, 8.2, 9.1, 14.2, 14.3, 14.4 and 14a as discussed in Table 1 of Chapter 4

Environment Conservation in Fishery: Fishing is a harvesting industry which can have huge environmental impact if pursued unsustainably.

Overfishing, unregulated and unrestricted fishing, can not only reduce fish biomass but also population density, size and richness of species. It also destroys the marine habitat including corals, sea grass and aquatic plants. These environmental degradation can be checked by switching to deep sea fishing, establishing Marine Protected Areas (MPAs), Marine Spatial



Source: WWF report 2015

Planning (MSP), Fish Aggregating Devices (FADs), enhancing education and training etc. The Prime Minister has launched a project at Ramanathapuram to promote deep sea fishing by handing over a work order to five fishermen for construction of Tuna long-liners with gill nets. According to this project vision, 2000 deep sea fishing boats, costing Rs 1600 crore, will replace trawlers in three years.[117] Emphasis is required on SDG Targets 12.2, 14.2, 14.4, 14.5, 14.6, 14a, 14b and 15.5 as discussed in Table 1 of Chapter 4.

Seabed Mining

India's first under sea mineral nodule sample was collected from the Arabian Sea by the research vessel Gaveshani on 26 January 1981, under a deep sea mining programme initiated by the Council of Scientific & Industrial Research (*CSIR*) through the National Institute of Oceanography (NIO).[118]

Thereafter, in 1987 India was allocated an area of 150,000 sq km in the Central Indian Ocean Basin (CIOB) for development activities by the International Seabed Authority of the UN. Based on these development activities, India has obtained the rights to explore for the next five years an area of over 75,000 sq km, rich with about 100 million tons of strategic metals such as Copper, Nickel, Cobalt besides Manganese and Iron.[119] Extraction of metals from the seabed is still not economically viable. China has been allotted a field by International Seabed Authority (ISA) in the Southwest Indian Ocean ridge till November 2026. This signifies an increasing Chinese footprint in the Indian Ocean. Both for economic and strategic reason, India should continue to consider this as an enabler of Maritime Power. It will be easier to implement sustainable development in new and emerging maritime industries through introduction of best practices on environmental and social inclusion, even before they attain the critical mass.

Offshore Oil and Gas

India has been the fastest growing economy in the past few years. A growing economy will have increased demands for oil and gas. However, a positive sign is that demand for petroleum products has tapered from double digit growth in 2015-16 to a growth of 4.9 per cent during 2016-17.[120] Due to limited availability of domestic oil and gas, the country is forced to import over 75 per cent of its need. The crude oil and natural gas production during the year 2016-17 was at 36.009 Million Metric Tonnes (MMT) (a decrease of 2.53 per cent from the previous year) and 31.897 Billion Cubic Meters (BCM) respectively (a reduction of 1.09 per cent from the preceding year). India has conducted 4.91 lakh geological surveys of 540 wells for oil and gas up to 31 March 2017. Out of the total crude oil reserves of 604.10 MMT, 279.86 MMT (46 per cent) are offshore. With regard to gas, out of the total reserves of 1289.81 BCM, 810.10 BCM (62 per cent) are offshore.[121] To reform the domestic production

sector, the government has launched several initiatives, including exploration of deep water and ultra-deep water oil fields.

Economic Initiatives for Growth: Since the entire import of oil and gas arrives via the seas, the maritime dimension is intricately linked to India's energy security, which includes shipping, single buoy mooring (SBM), refineries, gas and oil pipelines and berthing ports. Crude oil is imported either via very large crude containers (VLCCs) or through Suez Max vessels. Direct unloading of crude from VLCCs has significant advantages, including economies of scale, lower demurrage, lower port handling charges and relatively decongested berths. Of the seven port clusters in India handling imported crude, five have SBM facilities, essential for direct unloading from VLCCs. Neither Mumbai nor Chennai port clusters can handle direct VLCC unloading due to absence of SBMs. SBM at Chennai can ensure that 70 per cent of the oil is received from VLCCs, resulting in cost reduction by $3 per barrel and annual cost saving of $ 20 mn. Chennai receives 11 MMPTA out of 189 MMPTA imported[122] crude. Refining capacities are set to grow to approximately 55 MMTPA in the next 10 years[123] to support the economic growth of the country. This will require the capacities of the maritime dimensions of energy security such as the SBM, ports and services, shipping etc to be enhanced concurrently with the creation of additional refining capacity. Emphasis is required on SDG Targets–7.2 and 9.1 as discussed in Table 1 of Chapter 4.

Social Inclusion through Oil and Gas: The oil and gas industry has considerable impact on sustainable development. The industry contributes to social inclusion by generating direct and indirect jobs including in the areas of shipping, exploration, extraction, maintenance industry, port handling, refineries, distribution, vending etc. A petrol vendor at a fueling station is a direct beneficiary of the oil and gas sector. On the other hand the Offshore Supply Vessel (OSVs), ferries and helicopters transporting men and material back and forth from oil rigs are

secondary beneficiaries of the sector. In addition, the industry contributes to substantial tax collections that ploughs back into the system through government- sponsored development projects and services for the community at large. The sector employs medium to highly skilled jobs, demand for which will continue to grow along with the growth in oil and gas sector. Adequate training facilities will have to be created to cater for skilled manpower for this sector. Emphasis is required on SDG Target 4.4 as discussed in Table 1 of Chapter 4.

Environmental aspects of Oil and Gas: The challenges to environment sustainability are most acute in the oil and gas industry due to its environmental footprint on biodiversity, climate change and community.[124] SDG 12 deals with responsible consumption and production. According to the SDG target 12.4, environmentally-sound management of chemicals and wastes throughout their life cycle is required to be achieved by 2020. This is aimed at significantly reducing their release to air, water or soil in order to minimise their adverse impacts on human health and the environment. This cannot be achieved by the government alone.

By 2030, the waste generation is required to be substantially reduced through prevention, reduction, recycling and reuse as per SDG target 12.5. Government should pass resolutions and bring about laws on the issue by 2020 and industries should be encouraged to adopt these regulations by 2025 in accordance with SDG target 12.6. Different implications and rules will apply for companies conducting different operations, such as conventional versus unconventional drilling, or drilling onshore versus offshore. For example, offshore drilling will understandably increase the importance of SDG14, which advocates sustainable use of oceans, seas and marine resources.[125] In addition, by 2020 protocols for sustainable management and protection of marine and coastal ecosystems due to oil and gas exploration have to be put in place, in order to avoid adverse impact by strengthening their resilience and taking action for their restoration, in accordance with SDG

target 14.2. Emphasis is required on SDGs 12.5, 12.6 and 14.2 of Table 1 of Chapter 4.

Case Study on Social and Environmental Initiatives: Petrobras – Brazil

The Brazilian multinational Petrobras launched its 'Petrobras Social and Environmental Program' in November 2013, aiming to contribute to sustainable development and to promote social and environmental initiatives that generate results for both society and the company. The programme integrates social and environmental dimensions and has seven action lines: Inclusive and Sustainable Production, Education, Rights of Children and Adolescents, Sport, Biodiversity and Social Diversity, Forests and Climate, and Water. The programme addresses crosscutting issues, including gender and racial equity, people with disabilities, indigenous peoples and traditional communities. Petrobras evaluates and measures the programme results by assessing the number of beneficiaries, the number of job opportunities created by the project's activities, the extent of recovered and protected areas with ecological importance, the number of species studied and protected, and technical and scientific publications.

Petrobras stimulates and assesses the partnerships established. Since 2007, the programme has benefitted around six million people, generated over 20,000 job opportunities, restored and protected about 700,000 hectares of forest or degraded areas, and contributed to the conservation of more than 700 species of fauna.[126] The Petrobras model could be adopted by large companies in India to initiate sustainable development. The Petrobras model demonstrates that social and environmental initiatives can be implemented along with development in the oil and gas sector.

Coastal and River Cruise Tourism

Cruise tourism has been one of the most lucrative

industries worldwide. Due to low market penetration, it has the largest potential of growth. The overall passenger berth capacity worldwide in 2016 was 496,653 on 310 ships, which itself indicates the miniscule size of the market and the opportunities for growth. North America is the leader in this sector. The total footprint of the entire Indian Ocean (including India) has been as low as 1 per cent of the world capacity, which can be contested even by Hawaii. Since its inception, this industry has been constrained by unavailability of ships (supply) and not passengers (demand).[127]

India's coastal stretch, pristine islands, innumerable rivers and backwater, historical monuments, heritage and natural resources, has immense growth potential for cruise tourism. The industry has been growing at a steady pace since 2009. In 2016-17 alone, foreign cruise vessels made 158 calls at ports in Mumbai, Cochin, Goa, New Mangalore and Chennai. To boost cruise tourism, the GoI had appointed an international consultant Bermello & Ajamil (B&A) in October 2016 to prepare a Road Map on cruise tourism. Based on the report, government has undertaken some proactive measures; as many as 12 *Swadesh Darshan* circuits have been identified;[128] cruise shipping policy implemented;[129] MoU signed with Bangladesh to promote coastal/protocol routes;[130] drafted a Plan for Development of Cruise Tourism[131] and unveiled a Road Map and Standard Operating Procedures (SOPs) for cruise tourism.[132] Cruise tourism does not require high skills but is labour intensive, with immense potential and the GoI is already seized of the matter. However, for cruise tourism to succeed, State governments have to integrate their plans with the Centre's plans. Besides, there is a need to concentrate on Indian customers due to its large and captive market.

Sustainable development for Cruise Tourism: The UNWTO (World Tourism Organisation) has carried out a

study with the Asia-Pacific Tourism Exchange Center (APTEC) on strategies and best practices for sustainable ocean cruise development in South-East Asia.[133] According to the WTO report, sustainable tourism is about protecting the unique natural and cultural heritage offered by a destination. It is of utmost importance to manage growth and preserve the natural and cultural heritage assets of a destination and to sustain tourism's long-term economic vitality.

The three pillars of sustainable tourism in accordance with WTO are:[134]

- Environmentally friendly practices.
- Support for protection of cultural and natural heritage.
- Tangible economic and social benefits to local people in host destinations.

The eight strategies proposed by UNWTO for SE Asia are as follows:[135]

Strategy 1: Approach regional cruise tourism development by focusing efforts on controlling demand, rather than stimulating it. This may not be applicable for India due the requirement of growing the industry. However, over-visited areas will still have to be identified and addressed.

Strategy 2: Assess the sustainable development needs across the entire value chain and visitor experience:

Tactic 2.1: Map the cruise tourism value chain;

Tactic 2.2: Assess visitor flow impacts beyond port reception;

Tactic 2.3: Assess sustainable destination management capacity; and

Tactic 2.4: Conduct destination waste assessments.

Strategy 3: Quantify the value of natural and cultural heritage conservation to cruise tourism:

Tactic 3.1: Identify and assess shore excursion possibilities;

Tactic 3.2: Conduct visitor-carrying capacity studies at heritage sites;

Tactic 3.3: Increase scientific study and monitoring of coral reefs;
Tactic 3.4: Identify dispersal and containment opportunities for attractions.

Strategy 4: Optimise the value of the destination's natural and cultural heritage through appropriate pricing models:
Tactic 4.1: Quantify adequate fees for cruise reception;
Tactic 4.2: Identify cruise passenger revenue linkages to heritage conservation;
Tactic 4.3: Build site manager technical capacity for yield management;
Tactic 4.4: Develop demand-based fee models for receiving cruise ships.

Strategy 5: Position responsible tourism as an innovative pillar of the region's cruise tourism promotion:
Tactic 5.1: Build awareness of responsible tourism for cruise passengers;
Tactic 5.2: Develop concepts of experience fees and heritage crowd funding;
Tactic 5.3: Embed conservation initiatives into itinerary promotion;
Tactic 5.4: Provide access for local communities to experience their heritage;
Tactic 5.5: Seek inclusive linkages for cruise ship crew.

Strategy 6: Stimulate innovation and regional interest in improving sustainable tourism:
Tactic 6.1: Spread best practice guides across value chain;
Tactic 6.2: Create awareness campaigns for local stakeholder's role;
Tactic 6.3: Illustrate examples to spread innovation and innovative spirit;
Tactic 6.4: Increase sustainable tourism training mechanisms;

Tactic 6.5: Create cross-functional teams for cruise tourism management.

Strategy 7: Integrate sustainable cruise tourism components into data collection, monitoring and performance measurement:

Tactic 7.1: Improve cruise tourism statistical data collection;
Tactic 7.2: Monitor visitation levels at key sites;
Tactic 7.3: Conduct routine visitor expenditure and motivation studies;
Tactic 7.4: Establish environmental data monitoring systems.

Strategy 8: Create a regional network for data-driven collaboration in sustainable cruise tourism:

Tactic 8.1: Initiate cross-border collaboration for benchmarking;
Tactic 8.2: Create knowledge-sharing environments;
Tactic 8.3: Evaluate comparative offering of destination experiences;
Tactic 8.4: Engage multiple cruise line players;
Tactic 8.5: Increase involvement in industry initiatives and dialogue.

The SE Asian strategies will have to be replicated after customisation for Indian conditions. These will not only ensure growth of the sector, but also improve opportunities for employment and preserve the environment. Emphasis is required on SDG Targets 1.4, 8.9, 12.6, 12b and 14.2 as discussed in Table 1 of Chapter 4.

Ports and Port led Development

Countries with long coastline have successfully used their ports and related industries to boost economic development. Port-led industries can be classified under energy, material and manufacturing. Some of the success stories include refineries

Comparison of India, China, US on a few port-related KPIs

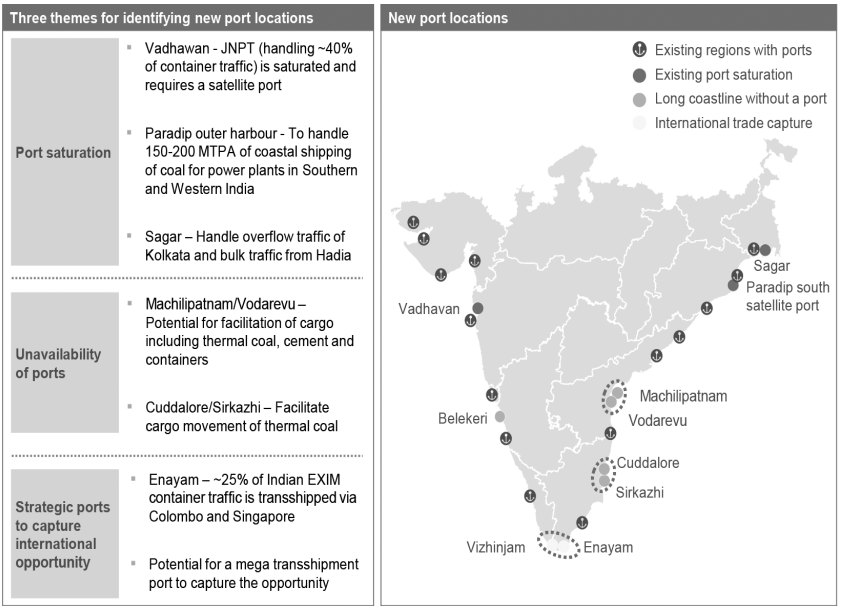
	India	China	US
Port capacity stock *(% of GDP)*	1	3	10
Number of shipyards[2]	7	70	45
Number of ports in global top 20	0	9	2
Container traffic *(mn TEU)*	11	185	44
Average annual growth in container traffic[1] *(mn TEU)*	0.5	10	0.4
Contribution of waterways in domestic transportation[3]	<1%	24%	6%
Average turn-around time *(Days)*	4.5	1	1.2

and petrochemicals of Rotterdam, the steel cluster of Pohang and electronic cluster of Shenzhen. Rotterdam is Europe's largest port located at the mouth of river Rhine. Multiple chemical companies, oil refineries, power plants dot the Rotterdam port cluster. The impact of Rotterdam port has been significant. It directly or indirectly employs over 1,307,000 people and contributes to 3 per cent of Netherland's GDP. The Hamburg-Le Harvey (HLH) range comprises 11 European ports and contributes significantly to EU's economy. Of the top 20 Free Trade Zones of the world, 14 are either port-based or port proximate.[136] Cluster based development of industries that are port-led makes the industry competitive and has immense potential for growth. India has 13 coastal States and union territories, 7,500 km of coastline and 14,500km of potential waterways, in addition to being centrally located astride the busiest sea lanes in the world. A modern maritime logistics sector with efficient port infrastructure could harbinger India's economic growth. Historically, Indian trade has suffered due to inefficiencies in connectivity with hinterland and poor logistic chain including at the ports. The current turnaround time of Indian ports is 2 to 2.5 times that of the world standards.

To revamp the port and logistic chain, the Government of India has embarked on an ambitious project of Sagarmala under the National Perspective Plan (NPP) in April 2016. Sagarmala promises to cut logistic costs by INR 35,000-45,000 crore, boost exports by USD 110 bn and create direct and indirect jobs for over 10 million. Project Sagarmala envisions port-led development under four broad categories – port modernisation, port connectivity, industrialisation and coastal community development. More than 40 ports are planned for upgrade along with building of 6-8 new ports. More than 80 port and industrial connectivity projects including coastal and inland waterway and 7 dry ports are expected. As many as 14 CEZs and 12 energy and material industries are envisaged. Sagarmala also includes skill development of people and development of islands. In all, there are 150 projects under Sagarmala at a cost of INR 4 lakh crore.[137] It is an ambitious 10-year plan already under implementation by the government in 10 clusters which also includes the national waterway systems.

Development of new ports is based on the themes of decongestion of existing ports, equitable spread along the coast and strategic locations due to proximity of international SLOCs. A representation on development of new ports is depicted below.

Sustainable Development of Ports: Sustainable port development will require integrated and adaptive planning that includes all stakeholders and can cope with future uncertainties. The design should incorporate an ecosystem approach simultaneously addressing engineering, ecology, economics and governance. The ongoing integrated port development of Ghana, funded by Nederlandes Organisatievoor Weteshappelijik Onderzoek (NWO) as a pilot project, could serve as an example for Sagarmala on sustainable development. Port development projects can have cascading effect on environment, economics and social issues of not just the port but adjacent areas that are linked to the logistic chain. A port



Development of new ports (Source: Sagarmala)

development requires reclamation of land that could disturb the ecosystem and displace urban population. The increased volume of vessel traffic also causes air, noise and water pollution and traffic congestion in the neighbourhood.

Traditionally, policy makers are averse to environmental and social considerations and consider them as hindrance to development. But integrated approach adopted by NWO-WOTRO development. WOTRO is a department of NWO responsible scientific development and poverty reduction. To achieve such development international standards like AAPA, IAPH, ESPO, OECD, PIANC, EPA, UNEP, UNCSD, USACE, WWF[138] could be adopted. An Indian standard may also be evolved and put in place for enforcement to remove inconsistencies. Even banks and credit agencies need to conform to sustainability standards for financing port development. Emphasis is needed on SDG Targets 9.1 and 12.6 of Table 1 of Chapter 4.

Inland Waterways and Coastal Shipping

Inland Waterways Transport (IWT) and coastal shipping can lower cargo costs by 60-80 per cent than rail or road. A case in point is the issue of coal transportation to the power plants in Karnataka and Andhra Pradesh from the Mahanadi coal field by rail. A saving of over INR 10,000 crore can be made if the coal is transported through the Rail-Sea-Rail (RSR) route.[139] Despite India having 12 major and 200 minor ports, currently the total share of coastal shipping in the transportation sector is merely 6.5 per cent as compared to 30 per cent and 57 per cent by rail and road respectively.[140] In China, the IWT-coastal share of transportation is 24 per cent. There exists immense potential for India in coastal-IWT shipping and this can improve connectivity and reduce logistic costs.

Waterways development: The requisite institutional mechanism for improving IWT already exists by the way of Inland Waterways Authority of India (IWAI), set up in October 1986 for regulating and development of inland waterways. Government of India has declared 111 waterways as National Waterways (NWs) through the National Waterways Act, 2016. In addition, an Inland Water Transit and Trade Protocol between India and Bangladesh permits the use of 5 inland waterway routes for commerce between the two countries. The protocol will last till 2020 with the provision of automatic renewal.[141] In addition, a MoU exists for uses of Mongla and Chittagong ports for multi-modal transport. With Myanmar, similar multimodal MoU exists for the Kaladan project.

INR 5000 crore have been earmarked under the Sagarmala project for developing 4 major routes out of 111 National waterways which includes NWs 1, 2, 4 and 5.[142] These four NWs, when completed (by 2025) will make significant contribution to India's connectivity. The current coastal shipping inventory comprises just 135 cargo ships of average 3000 DWT, 15 container ships of average 1800 TEU and some passenger vessels for ferrying passengers on few select

routes.[143] The government has identified 37 key measures[144] to revamp the coastal shipping sector. Inaccessible areas in riverine and marshy land will need State sponsored or private investments for establishing reliable waterways, including boat ambulances. Since the railways and roads have been successful in India, investments in IWT have been measured. Worldwide experience, however, suggests that strategic investments in IWT in viable locations can make transportation competitive. Emphasis is needed on SDG Targets 9.1 and 11.2 as discussed in Table 1 of Chapter 4.

Sustainable Inland waterways: Water is a scarce resource that has to be shared for drinking, irrigation, construction, industries and other activities. Besides, dams provide barriers to the waterways. Given these constraints, waterways transportation receives the last priority. Notwithstanding the known impediments, IWT needs to be encouraged in areas where this mode of transportation is viable. The primary reason for exploring and implementing this option is inherent in its characteristics of low fuel usage, low emission, ability to carry bulk cargoes and reducing congestion. Emphasis is needed on SDG Target 9.1 of Table 1 of Chapter 4.

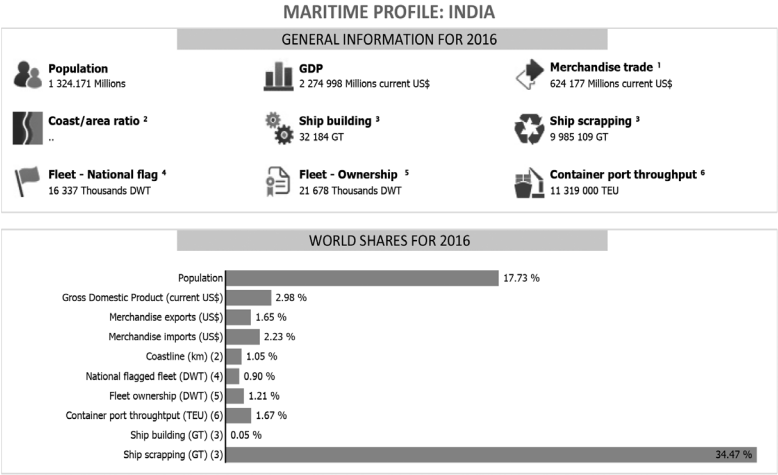
Ship Breaking

India ranks first in ship-breaking and has 34.5 per cent of the world market share according to United Nations Conference on Trade and Development (UNCTAD) (2016).[145] In order to regulate ship breaking in India, the Government of India had enacted a Ship Breaking Code in 2013.[146] Whilst India is a leader in this industry, the process of ship breaking is hazardous to humans, other living creatures, plant, micro-organism, property and the environment. Ship breaking is required to be conducted in accordance with the country's Safety, Health and Environment (SHE) policy. The negative impact of ship breaking is immense if the SHE policy is not enforced in the ship-breaking yards. However, neither the VNR (17

July), nor the Target Mapping (17 Aug) promulgated by the NITI Aayog mentions ship breaking as an area of emphasis towards achieving the Sustainable Development Goals. Ship breaking is an area that probably needs greatest focus from the perspective of India's Blue Economy. Emphasis is required on SDG Targets 12.6 and 14.1 as discussed in Table 1 of Chapter 4.

Shipbuilding

The weakest link in India's maritime aspirations is the shipbuilding sector. As much as 95 per cent of the country's trade by volume (68 per cent in terms of value) is moved by sea. India has a total of 1299 ships comprising of 11.24 Million Gross Tons (MGT) as on 31 October 2016. Out of the total tonnage, 900 vessels of about 1.52 MGT are engaged in coastal trade and remaining 399 vessels are plying in overseas trade. Despite the growth in tonnage, the percentage of cargo carried by Indian flag ships has reduced from 40.7 per cent in 1987-88 to 7.45 per cent of total EXIM trade in 2014-15.[147] Shipping not only plays an important role in the transport sector of a country's economy, but also generates employment and triggers ancillary industries which a country of India's size can ill afford to neglect.



In Jan 2011, the Ministry of Shipping had released the *Maritime Agenda* 2010-2020, according to which the shipping capacity of the country was to be increased to 5 per cent of the world capacity by 2020.[148] Despite the exalted vision, India continued to slip in ranking to 17th position (2016) in the world, according to UNCTAD (2016) statistics. The percentage of Indian-bottom shipping is only 0.09 per cent (16,337, thousand DWT) and ship building capacity is 0.05 per cent (32,184 GT) of the world.[149] The poor maritime profile of India is seen in the graphic.

In comparison to 25,000 GRT of India in 2015, the EU had completed shipbuilding orders worth 1,492,000 GRT and the Chinese completed an order of 10,856,000 GRT. European shipyards have secured new contracts to the tune of 11.6 bn $, ie. 61 per cent of the global market shares in Jan 2016. South Korea bagged 1.8 bn $, China 4.1 bn $ and Japan 1.1 bn $. In terms of number of vessels, the global order book in January 2016 stood at 5,642 vessels and 101MGT. New orders accounted for 420 ships in total (57 in Europe, 114 in China, 101 in Japan and just 37 in South Korea).[150] India has a long way to catch up. This clearly highlights the size of the market and the potentials that India can harness.

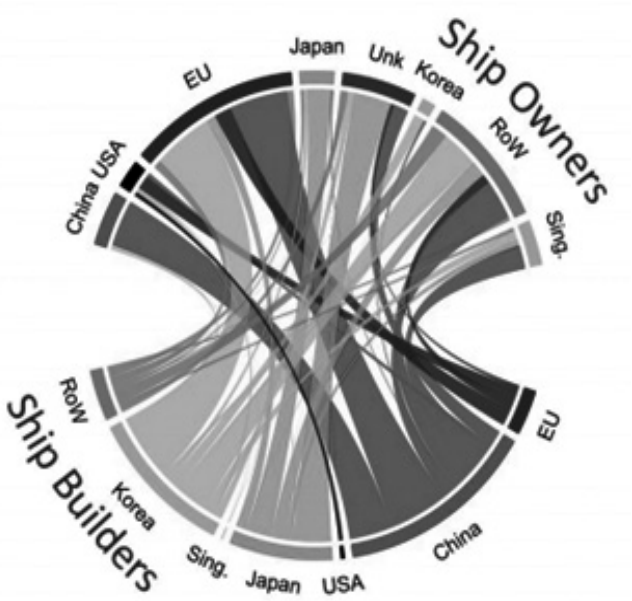
Impetus by Government to Shipbuilding in India: There are about 19 Private Sector Shipyards in India and 8 Public Sector Shipyards. In 2015, the Ministry of Shipping had approved certain incentives to promote domestic shipbuilding industry which include:

- Financial assistance to domestic shipyards for any vessel built.
- Relaxation of eligibility criteria for procurements or repair of vessels done by government departments or agencies including PSUs for government purpose or for their own purpose to grant Right of First Refusal (RoFR) to domestic shipyards.
- The government has addressed the problem of inverted duty structure in ship manufacturing. Inputs used in ship

manufacturing and repair have been exempted from Customs and Central Excise Duties with effect from the 24th of November 2015.

- The Cochin Shipyard Limited (CSL) has been accorded approval for Initial Public Offer (IPO), the proceeds of which will be used to set up a new Dry Dock in Cochin Shipyard and International Ship Repair Facility at Cochin Port.[151]
- To bring down the cost of construction of barges, river sea vessels (RSVs) and port and harbour crafts and to meet demand for steel by ship and barge builders, the Government has, on 9 February 2015, decided that re-rolled steel obtained from re-cycling yards/ship breaking units would be certified for use in construction of these vessels.[152]

Challenges in Shipbuilding: Despite the various measures instituted by the government, India's shipbuilding and ship-repair industry has not taken off. For India to succeed in shipbuilding/ship repair, four broad gaps that have to be bridged are manufacturing gap, technology gap, resources gap



and skill development gap.[153] Indigenous and half-hearted solutions to shipbuilding will not be able to address these gaps, nor will it be able to transform India into a Maritime Power. The gaps identified above are prevalent in almost all heavy manufacturing industries of India. A manifestation of this is visible in India's defence imports too, which mostly depends on foreign industries for its sustenance. Japan, S Korea and China have invested heavily in shipbuilding as it not only integrates all industrials capacities, but also becomes the catalyst for multitude of ancillary industries and spurs a country's growth.

India cannot become an economic power unless it becomes a Maritime Power. All the schemes of the government including Skill India and Make in India can be subsumed into shipbuilding, with the potential to leapfrog its heavy duty manufacturing with added spinoffs to almost all industries. Shipbuilding industry can not only provide the mission to the government's maritime vision, but also has the potential for becoming a key strategy in the government's MAKE IN INDIA policy. At this juncture, it would be appropriate to study the Chinese shipbuilding model which is still anchored on low skill sectors like bulk cargo and oil carriers, plagued with labour inefficiencies and yet has captured 33.47 per cent of the world shipbuilding market.

A snapshot on Development of China's Shipbuilding: China has identified shipbuilding as a key strategic sector. The Chinese shipbuilding industry has followed a pattern similar to that of the Japanese and Korean shipbuilding industries of the 1950s and 1960s. China took full advantage of its low labour cost and large domestic demand to build its industrial foundations. New shipyards were built and a massive investment was made in R&D. India too has the similar advantages of low cost labour and domestic demand which should be leveraged.

Medium and Long Term Plan – Shipbuilding industry in China has transformed from defense to a commercial enterprise since 1982 and it has been expanding considerably

with China's accelerated economic growth. The three main types of shipbuilding industry for exporting are: more than 78 per cent from State Owned Enterprises (SOEs), over 16 per cent comes from joint ventures, and 5 per cent is contributed by the small private-owned enterprises. The SOEs, as the key players, refer to the two massive state-owned conglomerates: the China State Shipbuilding Corporation (CSSC) that handles shipbuilding activities in the east and the south of China, and the China Shipbuilding Industry Corporation (CSIC) that deals with those in the north and the west of the country. CSSC and CSIC are directly under the supervision of the central government. They both have a high degree of investment and capital-management autonomy from the state, and are allowed to involve in direct competition for both domestic government contracts and international orders. With their mega-size production and technology capacity, these two conglomerates dominate China's shipbuilding market.[154]

Lessons from China's Shipbuilding Model – Indian shipyards are primarily defence oriented. These would have to be provided autonomy to compete in the international and national market. The shipyards need to be freed from the control of the Secretary, Defence Production, Ministry of Defence (MoD) and replaced with corporate structures. Shipbuilding needs high initial cost, a major share of which have to be borne by the government. Two or three large conglomerates of shipyards may be formed on the East and West coast, which will give them greater leverage to handle international fluctuations and take on mega projects. Clusters of ancillary industries have to be built around these conglomerates. Private companies will have to be encouraged to form joint ventures with foreign shipbuilding enterprises, like the Japanese, Singaporean and Korean yards, which help transfer technology, engineering skills and production know-how.

Setting up shipbuilding industry is an imperative for India to realise her rightful place as an economic power. Shipbuilding

promises to generate employment for the burgeoning population, enhance technological thresholds of the country and transform India into a manufacturing economy. It also has the potential of alleviating the nation's dependence on foreign ships to import high-tech equipment. To begin with, India may have to set up large shipyards and produce low skill ships like cargo/ general/ oil carriers.

Sustainable Shipbuilding: There is little awareness of the environmental impact of shipbuilding industry. There is also a need for the concerned shipyards to be transparent in operations, to enable assessment of the environmental impact of shipbuilding and ship-repair. The risk to environment is even greater due to the invisibility of toxic pollutants and hazardous material that wash off into rivers and seas through storm drains. Activities in shipbuilding that have high and direct environmental impact include:[155]

i) Metal working activities, including thermal metal cutting, welding and grinding;

ii) Surface treatment operations, including abrasive blasting, coating and painting;

iii) Ship maintenance and repair activities, such as bilge and tank cleaning; and

iv) Noise.

So far, innovations in respect of sustainable shipbuilding have been slow. Most of these are related to low emission and energy efficiency.

Collaboration with OECD countries will be required for R&D in environmental sustainability in this sector. Shipbuilding sector has immense potential for job creation for both skilled and unskilled labour. It can not only absorb the low wage or unemployed but also employ highly educated youth passing out with B.Tech degrees each year. Emphasis is needed on SDG Targets 4.4, 8.2, 9.1, 9.2, 12.5 and 12.6 in Table 1 of Chapter 4. Shipbuilding industry needs to be accorded the status of infrastructure to infuse entrepreneurship.

Chapter 6

Recommendations

AT THE OUTSET this paper sought to resolve the ambiguities in comprehending the oft used phrase 'Maritime Power'. It has been established that constituents are those permanent attributes which make a country easier or harder to be at sea. On the other hand enablers of Maritime Power are the potentials. Thus, long coastline is a constituent and the fishing industry that spawns along the coast is an enabler.

The paper then discusses the varied interpretations of Blue Economy, especially its preponderant bias towards the sea, under the aegis of initiatives steered by the Small Island Developing States (SIDS). In the Indian context such an outlook would be myopic due an equally large water capital inland. This answers the first research question - *What does Blue Economy mean to India?* In addition, Blue Economy also seeks to integrate social equity and environmental protection with economic development. This paper has suggested the working

definition for Blue Economy as:

> *Blue Economy is sustainable development of aquatic and marine-based economic activities that leads to economic growth and social equity, while preserving and restoring the environmental health.*

Agenda 2030 has become the foundation for sustainable development world over. The Indian government too has identified Centrally Sponsored Schemes (CSSs) to steer all the 17 goals and 169 targets. It is these targets that provide the framework for policy implementation. There has been considerable literature on Blue Economy in India and abroad for the past two years. Despite many seminars and debates on the issue, very few policy implications have emerged. This could be attributed to the inability of marrying the recommendations proposed by think-tanks and conferences to SDG targets. This paper has identified 33 out of 169 targets that can be moored to India's Blue Economy for policy implementation and emphasis. Amplifications on these targets answer the second research question - *Is there a relationship between sustainable development and Blue Economy and what is the policy relevance of Blue Economy in the Indian context*? It also provides a novel framework for policy makers to pursue Blue Economy (Table 1 in Chapter 4).

During the course of the research, the study discovered convergence between Blue Economy and Maritime Power. To comprehend the relationship between the two, these concepts were approached from the perspective of Comprehensive National Power (CNP). This led to localising eight industries where they both coalesce, namely: shipbuilding, ship breaking, cruise tourism, inland waterways, seabed mining, port led developments, fishing and oil and gas. This, along with Chapter 2, answers the third research question–What *is Maritime Power and is there a relationship between Blue Economy and Maritime Power?*

For any economic development to be sustainable, it has to be socially inclusive and environmentally viable. Thus, India's growth as a Maritime Power has to be sustainable. The paper has discussed various initiatives already commenced by the government to steer the above eight industries and then explained how each of these can be made sustainable, primarily to demonstrates that Maritime Power can be achieved through Blue Economy. Policy reference of these recommendations in Chapter 5 can also be traced to the 33 targets explained in Table 1 of Chapter 4. Thus the final research question stands answered - *Can pursuit of Blue Economy transform India into a Maritime Power?*

China has already realised most of the elements of Maritime Power and is now on its way to create a strong navy to protect her maritime interests. India on the other hand is a Naval Power of sorts but lags behind in all other disciplines of Maritime Power. Thus, China's Naval Power is sustainable and India's is not. India is naturally endowed with most constituents of Maritime Power, yet lags behind in realising its full potential. This in some ways could be attributed to lack of central coordination on maritime affairs in the government. This study, therefore, concludes that a **suitable maritime team with maritime skills needs to be appointed to the NITI Aayog** for providing comprehensive policy direction in order to transform India into a Maritime Power.

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Annexure

Case 80: Cargo by Airship
Case 81: Franchising Public Toilets
Case 82: Edible Forests
Case 83: Upcycling versus Recycling
Case 84: The Magic of Beer
Case 85: Fishing Sailboat
Case 86: From Reforestation to Hangers
Case 87: Plastics from Pollution
Case 88: USB-Power from Fire Wood
Case 89: Crab Shells to Clean Mine Water
Case 90: Health beyond Medicine
Case 91: The Super-Formula and Super-Antennas
Case 92: Batteries from Wood
Case 93: From Weed to Work
Case 94: Birth Control without Pills
Case 95: Rabbits and Fuel New
Case 96: The Magic of Hot Chili New
Case 97: Urban Farming New
Case 98: A Future for Buckwheat in the Himalayas New
Case 99: Ionic Engines for Space Travel

Each innovation in the business models is inspired by science, especially the use of the laws of physics, and will be summarised on zeri.org website and distributed around the world in partnership with

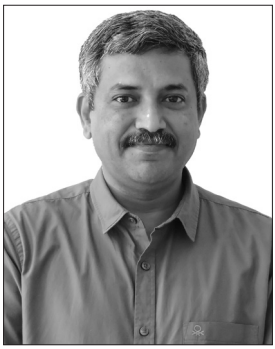
The Blue Economy is a Report to the Club of Rome and was realised in cooperation with UNEP.

Abbreviations

AAPA	American Association of Port Authority
APMC	Agriculture Produce Market Committee
BCD	Border Control Department (China)
BCM	Billion Cubic Meters
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
CMP	China Maritime Surveillance
CNP	Comprehensive National Power
CSL	Cochin Shipyard Limited
CSS	Centre Sponsored Scheme
CSSC	China State Shipbuilding Corporation
CSIC	China Shipbuilding Industry Corporation
eNAM	electronic National Agriculture Market
EIA	Environmental Impact Assessment
EMP	Environment Management Plan
EPA	Environment Protection Agency, US
EPI	Environmental Performance Index

ESPO	European Sea Port Organisation
FAD	Fish Aggregating Devices
FICCI	Federation of Indian Chambers of Commerce and Industry
FLEC	Fisheries Law Enforcement Command (China)
FPO	Farmers Producers Organisation
FY	Financial Year
GAC	General Administration of Customs (China)
HLPF	High Level Political Forum
IAPA	International Association for Ports and Harbours
ICRISAT	International Crop Research Institute for Semi-Arid Tropics
IOR	Indian Ocean Region
IPO	Initial Public Offer
IUU	Illegal Unreported and Unregulated fishing
IWT	Inland Water Transport
LNG	Liquid Natural Gas
MDA	Maritime Domain Awareness
MMT	Million Metric Tonnes
MMTPA	Million Metric Tonnes per Annum
MPA	Marine Protected Area
MSP	Marine Spatial Planning
MoSPI	Ministry of Statistics and Programme Implementation
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NCZMP	National Coastal Zone Management Plan
NFAP	National Fisheries Acton Plan
NITI	National Institution for Transformation of India
NKM	Neel Krantee Management
NMDP	National Maritime Development Project
NPS	National Pension Scheme
NW	National Waterways
NWO	Nederlandse Organisatie voor Wetenschappelijk Onderzoek

OECD	Organisation of Economic Corporation and Development
PIANC	Permanent International Association of Navigation Congresses
PIO	People of Indian Origin
PLAN	Peoples Liberation Army (Navy)
PMJDY	Prime Minister's Jan Dhan Yojana
RSR	Rail-Sea-Rail
RSV	River Sea Vessels
RoFR	Right of First Refusal
SAARC	South Asian Association on Regional Cooperation
SAGAR	Safety and Growth for all in the Region
SAP	State Action Plan
SBM	Single Buoy Mooring
SDG	Sustainable Development Goals
SIDS	Small Island Developing States
SOA	State Oceanic Administration (China)
SOE	State Owned Enterprises
UN	United Nations
UNCLOS	United Nations Convention on Laws of the Seas
UNCSD	United Nations Commission on Sustainable Development
UNCTAD	UN Conference on Trade and Development
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNU	United Nations University
UNWTO	UN World Tourism Organisation
USACE	Unite States Army Corps of Engineers
VLCC	Very Large Crude Carrier
VNR	Voluntary National Review
WB	World Bank
WWF	World Wide Fund for nature
ZERI	Zero Emissions Research and Initiatives



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The control of the seas washing the Indian shores have shaped her history throughout the ages.The key argument of this monograph is that Maritime Power can be enhanced through the development of the Blue Economy and the two should be linked. The author points out that of the 169 targets of sustainable developmental goals, 33 pertain to Blue Economy. Underlining the linkage between Blue Economy and maritime power, he recommends that the government should focus on the development of eight key industrial sectors, namely: shipbuilding, ship breaking, cruise tourism, inland waterways, seabed mining, port-led development, fishing and oil and gas.

The monograph points out that while India is a naval power of some reckoning, it lags behind in other attributes of Maritime Power. It recommends that in order to prepare a blueprint of a comprehensive policy, which will help transform India into a genuine Maritime Power, the NITI Aayog should appoint a maritime adviser with sufficient knowledge of maritime domain and skills.

Somen Banerjee is a naval officer and specialises in anti-submarine warfare. He is currently researching on maritime policy initiatives as a Senior Fellow at the Vivekananda International Foundation. He has been involved in Indian naval plans and procurement and is a commentator on maritime issues, especially with respect to security and governance of the Indian Ocean.

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