



THE BLUE ECONOMY

NATIONAL, REGIONAL AND GLOBAL PERSPECTIVES

Edited by LEUT. John Nash and DR. Ben Herscovitch



NAVY VALUES

HONOUR HONESTY COURAGE INTEGRITY LOYALTY

The Blue Economy

National, Regional and Global Perspectives

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Sea Power Centre - Australia

The Sea Power Centre - Australia (SPC-A) is the research directorate of the Royal Australian Navy (RAN). As well as acting as the RAN's historical repository, SPC-A produces the key capstone documents of Australia's maritime doctrine, publishes original research on maritime security issues, and manages the academic dimensions of the RAN's international defence engagement.

SPC-A's mission is to:

- Promote understanding of sea power and its role in securing Australia's national interests;
- Contribute to defence diplomacy by engaging with regional navies;
- Develop maritime strategic concepts that feed into force structure decisions;
- Manage the development of RAN doctrine and facilitate its incorporation into Australian Defence Force joint doctrine; and
- Preserve, develop and promote the RAN's history

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Foreword

With the oceans and seas critical elements of the global economy, food and energy security, and livelihoods, the blue economy concept is rapidly gaining currency as an essential element of national security and prosperity. The rising popularity of the blue economy concept has in turn led to a deepening appreciation of the role of navies as key enablers of the blue economy.

In preparation for the Royal Australian Navy's (RAN) Sea Power Conference 2017, the Sea Power Centre - Australia (SPC-A), in conjunction with the Australian National Centre for Ocean Resources and Security, published *The blue economy in Australia*. This volume served as the thematic basis for two of the sessions at the Sea Power Conference 2017.

The paper presented here collects in edited form the presentations delivered at the two blue economy sessions of the Sea Power Conference 2017. These presentations were delivered by current and former senior naval officers from around the globe, including several chiefs of navy.

Each chapter of this paper provides a unique perspective on the blue economy. Although some chapters are focussed on a particular geographic region, such as in the Baltic Sea or the waters around Fiji, all chapters emphasise the global importance of the blue economy.

These chapters highlight the crucial role that navies play in enabling the blue economy. Navies secure the maritime domain and make possible the responsible stewardship of domestic and international waters. Navies assist with everything from environmental monitoring and protection to escorting merchant vessels and responding to piracy and terrorism.

Several chapters also touch on the contribution of naval shipbuilding to the blue economy. In this way, navies provide inputs to the blue economy as well as protecting it. This is an especially salient point in light of the Australian Government's Naval Shipbuilding Plan and historic recapitalisation of the RAN.

With the blue economy concept growing in importance, this volume serves as a valuable snapshot of global perspectives in this critical area. This volume will hopefully improve global understanding and foster both intellectual and practical cooperation on the blue economy. I commend this paper to you.

CAPT Sean Andrews, RAN
Sea Power Centre - Australia
September 2018

Abbreviations

APEC	Asia-Pacific Economic Cooperation
ASW	Anti-Submarine Warfare
CMF	Combined Maritime Forces
EEZ	Exclusive Economic Zone
EOD	Explosive Ordinance Disposal
IONS	Indian Ocean Naval Symposium
IORA	Indian Ocean Rim Association
IUU	Illegal, Unreported and Unregulated (Fishing)
MCM	Mine Countermeasures
RCN	Royal Canadian Navy
RIMPAC	Rim of the Pacific
RMP	Recognized Maritime Picture
RNZN	Royal New Zealand Navy
SAR	Search and Rescue
UNCLOS	United Nations Convention on the Law of the Sea

Notes on Contributors

Admiral R.K. Dhowan, PVSM, AVSM, YSM, IN (Retd), Chairman National Maritime Foundation, India and former Chief of Indian Navy



Admiral RK Dhowan (Retd) was commissioned in the Navy on 1 January 1975. He has held staff assignments at Naval Headquarters, including Deputy Director Naval Operations, Joint Director Naval Plans, Assistant Chief of the Naval Staff (Policy and Plans), and Deputy Chief of Naval Staff, Ministry of Defence (Navy).

The Admiral has commanded three frontline warships of the Western Fleet—the missile corvette *Khukri*, the guided missile destroyer *Ranjit*, and the guided missile destroyer *Delhi*. He also commanded the Eastern Fleet as Flag Officer Commanding Eastern Fleet. He has served as Indian Naval Advisor at the High Commission of India, London, the Chief Staff Officer (Operations) of the Western Naval Command (based at Mumbai), the Chief of Staff at Headquarters Eastern Naval Command (based at Visakhapatnam), and Commandant of the National Defence Academy.

The Admiral assumed charge as the Vice Chief of the Naval Staff in August 2011, and was promoted to Chief of the Naval Staff on 17 Apr 2014. He retired on 31 May 2016. On 25 Nov 2016, he took over as the fifth Chairman of the National Maritime Foundation (NMF) in New Delhi. He is an alumnus of the National Defence Academy, the Defence Services Staff College, and the Naval War College, Newport, Rhode Island.

Fleet Admiral Julio Leiva Molina, Commander in Chief of the Chilean Navy



Admiral Julio Leiva joined the “Arturo Prat” Naval Academy and graduated as a Midshipman in January 1980. He has served for over 14 years at sea, including destroyers *Portales*, *Williams*, and *Blanco Encalada*, the Fleet Tug *Janequeo*, and the Training Ship *Esmeralda*. His Command duties include Commanding Officer of LM *Teniente Uribe*, Commanding Officer of the Landing Ship *Rancagua*, and Commanding Officer of FF *Almirante Cochrane*.

He has served in numerous staff and shore positions, including Chief of Staff of the Fleet. As a Commodore he took command as Head of the Department of Strategic Command

and Control of the Joint Chiefs of Staff, Commander-in-Chief of the First Naval Zone, Commander General of the Naval Regiment of Valparaíso, and Naval Judge of the First Naval Zone. He was also Chief of National Defence during the Valparaíso bush fires emergency, reporting directly to the President. Other positions include Commander of Naval Operations and Director General of Navy Personnel. On 18 June 2017, he was appointed Commander in Chief of the Chilean Navy, and conferred the rank of Admiral.

Admiral Leiva has attended courses in Canada and the UK. He holds a Bachelor's degree in Naval Electronic Engineering from the Naval Polytechnic Academy, a Business Administration Diploma from the Catholic University of Valparaíso, and a Masters in Naval and Maritime Science from the Naval War College.

Rear Admiral Gilles Couturier, OMM, CD, Deputy Commander, Royal Canadian Navy



RADM Couturier joined the Navy in 1983 from Sept-îles, Québec. Highlights of Rear Admiral Couturier's operational tours include deploying on-board the US carrier *Abraham Lincoln* and the Commanding Officer of HMCS *Fredericton*. He was the Royal Canadian Navy lead for Maritime Security for the Vancouver 2010 Winter Olympics and the Maritime Component Commander for RIMPAC 2014.

RADM Couturier's senior appointments have included Executive Assistant to the Chief of Defence Staff, Deputy Director for Military to Military capacity building at US Central Command in Tampa, Florida, lead planner for the Canadian Armed Forces, and the Director General International Security Policy for National Defence.

Rear Admiral Jens Nykvist, Chief of Navy, Sweden (Marinchef)



Rear Admiral Jens Nykvist is a Submariner. He has worked in several positions on-board submarines and was the CO of the submarine HSwMS *Gotland* when it was stationed in San Diego, United States. RADM Nykvist was also in charge of the Swedish Contingent during HSwMS *Gotland's* second year in the United States, working with the US Third Fleet. He worked as the Chief of Staff at the Submarine Flotilla in the HQ as ACOS at the Joint Strategy and Operational Staff, and as head of Naval Operations at J3 Joint Strategy and Operational Staff.

Upon promotion to CAPT (N) he was made Commander 1st Submarine Flotilla. From April to September 2015, he was Chief of Staff in EU NAVFOR FHQ Operation *Atalanta* in the Somali Basin/Gulf of Aden. On 4 May 2016, he became Chief of Staff Royal Swedish Navy, and was promoted to Rear Admiral.

RADM Nykvist is a graduate of the Command College in Stockholm 2007-2009, and from 2012-2013 he was a student at the Naval Command College (NCC 2013), Newport, Rhode Island. He holds an MA in international Relations from Salve Regina University, Newport.

Admiral Christophe Prazuck, Chief of Staff of the Navy, France



Admiral Christophe Prazuck entered the Ecole Navale in September 1979. On leaving Fleet Training on-board the FS *JEANNE D'ARC*, he served in the Indian Ocean in the patrol ship FS *ALTAIR*, the amphibious ship FS *CHAMPLAIN*, and finally as Executive Officer of the patrol ship FS *EPEE*. He served in the Submarine Flotilla in FS *OUESSANT* and FS *DORIS*. He was Executive Officer of the command ship FS *VAR*, Operations Officer on the Anti-Submarine frigate FS *TOURVILLE*, and has Commanded FS *CHAMPLAIN* and the frigate *FLOREAL*.

Shore positions have included the Marine Nationale's communications office (SIRPA Marine) as deputy and as the Director. In 2004, he took charge of the media department of the defence communications office (DICOd), and in 2006 was appointed as the communications advisor to the French Chief of the Defence Staff (CEMA). His Flag Officer appointments include Flag Officer Commandos (ALFUSCO) and Director of Navy Military Personnel (DPMM). On 13 July 2016, he was promoted Admiral, and became Chief of the French Navy.

He holds a PhD in Physical Oceanography from the US Naval Postgraduate School in Monterey, California.

Captain Humphrey Tawake, Chief of Navy, Fiji



CAPT (N) Humphrey Tawake joined the Republic of Fiji Military Forces (RFMF) in 1990, and in August 1991 graduated from the Britannia Royal Naval College in the United Kingdom and joined the Officer ranks of the Fiji Navy. He progressed through the Officer appointments of the Fiji Navy, including senior appointments as Support Commander and Maritime Commander. He has attended numerous professional development courses in New Zealand, Australia, and the United Kingdom.

CAPT (N) Tawake has represented Fiji in international workshops and forums on maritime security, search and rescue, fisheries management control and surveillance, and international and regional security seminars. He has served on four peacekeeping missions in Multinational Force Observers (MFO) in Egypt 2001, UNMISSET Timor-Leste in 2004, UNAMI Iraq in 2008, and recently as the Chief Military Personal Officer (CMPO) with UNDOF Syria from June 2013 to August 2014. He was instrumental in the initial setup and operations of the Directorate of Peace Support Operations to support and administratively supervise RFMF peacekeeping missions. He is currently the Chairman of the RFMF Defence White Paper Team and Chief of Navy Fiji.

CAPT (N) Tawake is a graduate of the Malaysian Armed Forces Staff College and the National Defence University of Malaysia. He is also a graduate in National Security from the Galilee International Management Institute in Israel.

Captain Philip Polewara, Chief of Training, Papua New Guinea Defence Force



Captain Polewara has served in various capacities in Landing Craft Heavy (LCH) and in Fast Patrol Boats as a Navigating Officer and Executive Officer. His operational experiences include the command of various Naval Units from 1992 to 2002, including security operations during the Bougainville crisis. He also served as an exchange officer with the Royal Australian Navy in HMAS *Brunei* in 1989.

Captain Polewara is also a graduate of the United States Naval Staff College, the United States Joint Forces Staff College, and the United States Naval Command College. Captain Polewara also served as an International Fellow at the Naval War College after graduating in 2013.

His civilian achievements include a Bachelor's Degree in Business majoring in Public Policy from the University of Papua New Guinea, and a Master of Liberal Arts majoring in International Relations from Salve Regina University in Newport, Rhode Island.

Rear Admiral A.J.O. Martin, ONZN, RNZN, Chief of Navy, New Zealand



RADM Martin joined the RNZN in 1979 as a radar plotter. During his career he has served in RNZN, Royal Navy, and US Navy ships, fulfilling the functions of bridge watch keeper, maritime air traffic controller instructor, frigate navigator, warfare officer, and Commanding Officer of HMNZS *Te Kaha*. He has held a number of operational staff appointments and was involved in the preparation and deployment of naval units to the Arabian Gulf and Mururoa Atoll.

RADM Martin has served as deputy director for the 2014 Defence Assessment, the Assistant Chief Capability on the staff of the Chief of Defence Force, and the commander of the RNZN Fleet as Maritime Component Commander. RADM Martin took up the role of Chief of the Royal New Zealand Navy on 30 November 2015. He also sits on the boards of the Whole of Government Radio Network and the Customs Investment Board.

He is a graduate and fellow of the Centre for Defence and Strategic Studies (Canberra), and has a Master of Arts (Strategic Studies) and a Diploma in Business and Administration.

National ocean strategies and blue economies: An Indian perspective

Admiral R K Dhowan (Retd)

The blue economy refers to an issue that is primarily developmental and economic in nature, and the fact that it is the focus of many security professionals is testament to the inextricable linkages between maritime economic activities and maritime security as its primary enabler. The oceans have been the most vital lifeline for human existence on earth. Australia has accorded this issue a consistent place in its national strategy, and in India we have a glorious maritime heritage, and in recent years, there has been a firm belief within the highest levels of national leadership that the future trajectory of India's growth will be determined on the waters around her.

The blue planet Earth is dominated by the maritime domain, with over 70 per cent of its surface covered by water. Nearly 80 per cent of the world population lives within 200 nautical miles of the coast and about 90 per cent of the world's trade transits by sea. Oceans are central to life on Earth. They are rich in oil and minerals resources, they are suppliers of oxygen, absorbers of carbon dioxide, a virtual heat sink, rich in biodiversity, and have emerged as the global economic highways for the transit of trade. With depletion of resources on land, humankind has turned towards the oceans, with the misperception that the oceans are an endless resource base and an infinite heat-sink. However; nothing could be further away from reality. In the past decade we have witnessed indiscriminate pollution of the oceans and contamination of the natural marine habitat, resulting in the negative impact of climate change on the oceans. Studies have indicated that almost 80 per cent of the pollutants in the seas emanate from land and if the current rate of pollution continues, in a few decades we will have more plastic in the oceans than fish.

The blue economy and India

The concept of 'blue economy' has emerged as a recent paradigm and calls for the efficient utilisation of marine resources with minimum impact on the environment and thus ensuring sustained development of the oceans. India and Australia are both maritime nations with a natural outflow towards the sea, and the waters around the two countries have been the vortex of intense maritime activity over centuries. Peninsular India juts into the Indian Ocean and the country sits astride busy sea lines of communications, which transit across the Indian Ocean and over which 1 million ships transit every year carrying 66 per cent of the world's oil, 50 per cent of the world's container traffic and 33 per cent of the world's cargo traffic. Australia is, on the other hand, a three-ocean nation. The Pacific has for long been a vital influence on Australia, but there is no doubt that it is the Indian Ocean, and the larger Indo-Pacific region, that holds the

key to economic well-being in the 21st century. Oceans have understandably been an integral part of Australia's economic growth and indeed its social fabric.

India too has vast maritime interests, which have a vital relationship with the nation's economic growth. In recent years, under the leadership of Prime Minister Narendra Modi, there have been series of initiatives and developments in the maritime domain coupled with the transition from 'Look East' to the 'Act East' policy. India has a coastline of over 7,500 km, and an Exclusive Economic Zone (EEZ) of over 2 million sq. km. Apart from the length of the coastline, the importance of India's coastal regions is also accentuated by the fact that 20 per cent of India's population lives in coastal states, contributing 60 per cent of India's GDP. Approximately 95 per cent of India's trade by volume and 72 per cent by value transits through the sea, which accounts for nearly 50 per cent of India's GDP (2014). India's vast maritime interests are also enablers of the blue economy.

India has 12 major ports and over 200 minor and intermediate ports, with a current cargo handling capacity of 1.4 billion metric tonnes per annum (MMTPA) which is likely to increase to approximately 2,500 MMTPA over the next ten years. The Government of India has embarked on the ambitious 'Sagarmala Project' which is a port-led development initiative, based on four pillars of port modernization, connectivity, port-led industrialization, and coastal community development. Under this plan, more than 150 projects have been identified at an estimated infrastructure investment of US\$60-70 billion. The Sagarmala project envisages development of greenfield infrastructure and connectivity of the ports to the hinterland by road and rail networks and the development of inland waterways. Australia also intends to enhance its port infrastructure and this would provide an opportunity for development of greenfield port and maritime infrastructure.

India currently has 14,500km of navigable inland waterways and in the first phase the government is developing 4,500km as five major national waterways. Currently, 94 per cent of freight in India moves by road or rail and development of inland waterways will enhance transportation over water, which is cheaper (economically), faster and cleaner. The planned development of additional inland waterways presents a huge opportunity for investment and growth in India.

Shipbuilding

The mercantile marine and shipping industry is also envisaged to grow in the near future. India currently has a merchant ship fleet of approximately 1,200 ships flying the Indian flag, totalling nearly 25 million Gross Registered Tons (GRT). While over 90 per cent of India's trade by volume transits by sea, the share of Indian shipping in India's foreign external trade has declined from about 30 per cent in the 1980s to approximately 10 per cent today. To enable India's growing foreign trade to be carried on Indian hulls, the Indian Government is providing incentives for Indian registered shipping and initiating measures to increase the tonnage of 'Indian Controlled Shipping' by promoting the local shipbuilding industry. Already India has a vibrant

shipbuilding industry with 27 shipyards. The Government has initiated several steps to provide support to shipbuilding, as well as ship-repair and ship-recycling, with an aim to enhance India's global share in shipbuilding. Incentives for indigenous ship production include accord of special infrastructure status for shipbuilding industry and permitting 100 per cent FDI in the shipbuilding sector.

The warship building industry in India is firmly anchored on self-reliance and indigenization. The Indian Navy established its naval design directorate in 1964. India built its first indigenous naval warship, a patrol vessel INS *Ajay*, in 1961 at Garden Reach Shipyard in Kolkata. Over the past 50 years naval designers have designed ships and our indigenous shipyards have built them for the Indian Navy, resulting in a transformation from a 'buyer's navy' to a 'builders navy'. Today it is a matter of great pride that all 40 ships and submarines under construction are being built in Indian shipyards both public and private. These range from aircraft carriers to frigates, destroyers and submarines. It is our endeavour to progressively increase the indigenous content so that future warships and submarines are 100 per cent Made in India. Australia too has an extensive shipbuilding program and this provides an ideal opportunity for joint ventures in the shipbuilding industry.

Natural resources

The fishing industry is another sector which provides significant opportunities for growth. India has approximately 2.5 million fishing boats, with 4 million active fishermen and 14 million people as part of the wider fishing community. The annual marine fish landings in India are approximately 9.58 million tons which accounts for approximately 5.3 per cent of the world's production. The sector contributes around US\$5,511 million to India's foreign exchange earnings and has a potential to grow even further. However, this is only scratching the surface of the vast potential of the fishing industry in India, which is largely coastal in nature. Logistic and maintenance support are provided by local, small-scale enterprises and fishing boats operating in coastal waters, and this represents a huge industry. There exists a huge potential for growth in the fishing sector by undertaking deep sea fishing, increasing the size and numbers of the current fishing fleet and enhancing the support infrastructure for stowage, processing and transporting the catch. Deep sea fishing is another avenue where India and Australia could cooperate to harness the blue economy.

India has over 1,300 islands and islets, as part of the Andaman & Nicobar Islands in the Bay of Bengal, Lakshadweep Islands in the Arabian Sea and Islands off the west and east coast of India. The Government of India has prepared a comprehensive island development plan that takes into account aspects of security, economic sustenance, environmental preservation, social and cultural considerations. There is great potential to develop these islands for controlled eco-tourism. This sector of marine based tourism provides a host of opportunities between India and Australia for cruise tourism.

India's EEZ also provides offshore energy resources and there are oil and gas exploration areas off the west and east coast of India. India has also been allocated deep seabed mining areas in the central Indian Ocean. Both of these sectors are likely to witness significant growth in the coming years. Renewable ocean energy is another un-harnessed niche sector with immense scope for the future. This includes tidal and wave energy and ocean thermal energy conversion. It can therefore be seen that while there are many opportunities for harnessing the blue economy, the challenges lie in ensuring that these are greenfield projects, with a minimum impact on the environment.

Therefore, while India is focused on the economic development of its maritime interests it is also committed to traveling down the path of sustainable development. The United Nations General Assembly published a document in 2015 titled *'Transforming our world; the 2030 Agenda for Sustainable Development'* with 15 specific goals and 169 targets. Of these, Sustainable Development Goal (SDG) – 14, pertains to the conservation and sustainable use of oceans, seas and marine resources. Towards this, India has submitted its voluntary national review report to the UN in July 2017 on the implementation of Sustainable Development Goals. A clear agenda has been formulated for promoting the 'blue Revolution', while charting the way ahead for preventing pollution, an integrated plan for fishing, greenfield infrastructure projects, optimal utilization of resources with minimum impact on the environment and ensuring sustained development of the oceans.

Security and the Indian Ocean

The Indian Ocean has emerged as the global economic highway, rich in oil and mineral resources. It is the world's third largest body of water, spanning an area of 68.5 million sq. km and countries on the rim of the ocean comprise close to one third of humanity. The seas are no longer a benign medium and globalisation has resulted in increased vulnerability of the oceans. The threats and challenges in the maritime domain are as wide and varied as they come. Who could have imagined that in the 21st century we would once again be grappling with pirates or that the major threat in the maritime domain would be from asymmetric warfare and maritime terrorism? Other threats and challenges include: arms trafficking, drug trafficking, human trafficking, and poaching. Another challenge in the Indian Ocean Region is that nearly 70 per cent of all extreme climate events turn into natural disasters, and the navies and coast guards in the region have to be ready for rapid response in order to provide humanitarian assistance and disaster relief.

The instabilities and turbulence on land in some parts of the Indian Ocean have the potential to spill over into the maritime domain and the situation can best be described as 'fragile'. Consequently, over 120 warships from about 20 navies are always present in the Indian Ocean to safeguard their maritime interests. India has vast maritime interests and the responsibility for protecting these maritime interests falls squarely on the shoulders of white uniforms, as it is the responsibility of the Navy and the Coast Guard to ensure that maritime interests that have a vital relationship

with the nation's economic growth are allowed to develop unhindered at all times. The Indian Navy has emerged as a multidimensional networked force which is ready to take on challenges in the maritime domain, in the Indian Ocean and beyond.

Under the constabulary role, the Navy ensures coastal and offshore security in India's waters and in recent years has leveraged technology to enhance Maritime Domain Awareness, and ensure safety and security in the EEZ. In addition, the Indian Navy has been deployed in the Gulf of Aden for anti-piracy patrols since 2008 and has played a significant and effective role in combating piracy, in coordination with other navies of the world, and bringing the situation under some control. The Indian Navy also carries out patrols in the EEZ of some of our maritime neighbours in coordination with maritime forces of these countries.

Under its diplomatic role, the Indian Navy has expanded its operational footprint in the Indian Ocean and beyond to engage with other navies of the world, including the Royal Australian Navy, for interaction and exercises. The aim is to shape a favourable maritime environment and provide avenues for cooperation for mutual benefit. This engagement with other navies includes capacity building and capability enhancement initiatives and information exchange for comprehensive Maritime Domain Awareness.

In 2008, the Indian Navy launched a unique initiative, the Indian Ocean Naval Symposium (IONS), which is a construct to manage the maritime affairs of the countries of the Indian Ocean Region. Over the years IONS has emerged as an effective organisation with a membership of 22 navies and four observers. IONS has the potential to provide an effective template to promote cooperation in the maritime domain in the Indian Ocean region. The Indian Ocean Rim Association (IORA) is another organisation that provides an avenue for strengthening maritime cooperation between countries of the Indian Ocean region. Incidentally, 20 members of IORA are also members of IONS, and recent years have witnessed some synergy between IONS and IORA for promoting maritime cooperation. Australia has been the chair for both IORA and IONS and contributed significantly towards strengthening the maritime cooperation mechanism between the member nations.

With regards to governance and regulatory mechanisms at sea, the United Nations Convention on Law of the Seas (UNCLOS) 1982 provides a comprehensive legal regime for use of the oceans and its resources. While UNCLOS is specific with regards to rights of maritime states for utilisation of resources within the EEZ, there are certain ambiguities in the legislation for the Areas beyond National Jurisdiction (ABNJ). Approximately 64 per cent of the surface of the oceans and 95 per cent of its volume fall under the Areas beyond National Jurisdiction (ABNJ). The conservation and protection of biodiversity in these areas becomes a collective responsibility. It is a matter of concern that the High Seas, which cover almost 50 per cent of the Earth's surface, is one of the least protected areas on this planet, and there is no internationally legally binding treaty for the protection of marine habitat in the ABNJ.

These concerns and the lack of a legal framework were addressed by the UN General Assembly, and an ad-hoc informal working group was established in 2004. The first meeting of the working group to identify gaps in the international legal regime was held at New York in 2006. Since then, nine other meetings have been held, the last one being in New York in 2015. The working group has recommended developing an Internationally Legally Binding Instrument (ILBI). A draft text on ILBI under UNCLOS has been submitted to the UN General Assembly at the 72nd session to be held in September 2017. It is therefore at this point in time best described as work in progress. However, the current international effort for regulating the ABNJ needs to be entirely supported.

In order to further promote cooperation between navies of the world, the Indian Navy conducted the International Fleet Review at Vishakhapatnam on the East coast of India in 2016. Fifty navies of the world came together to strengthen bridges of friendship and there were nearly 100 ships at the review anchorage. The underlying theme of the Review was that we may be separated by geography, but we are certainly united through the oceans. During the International Fleet Review, the Prime Minister of India Narendra Modi outlined his vision for the Indian Ocean as SAGAR (meaning ocean), which stands for 'Security and Growth for All in the Region'. India later conducted the Maritime Summit at Mumbai in April 2016, where the Prime Minister articulated his maritime vision for the nation. India's recent initiatives in the maritime domain, including the quest for harnessing the blue economy, are pointers to indicate that India has once again turned towards the sea and is destined to emerge as a resurgent maritime nation.

The Indian Ocean has emerged as the world's centre of gravity in the maritime domain. Another unique feature of the Indian Ocean is that 80 per cent of the oil and trade that emanates from the Indian Ocean is extra-regional. This implies that if there are any impediments to the free flow of oil or trade it would have a detrimental impact not just on the economies of the region, but the global economy as well. Safety, security and stability on the waters of the Indian Ocean is therefore of paramount importance, and it is the collective responsibility of the navies and coast guards to ensure the security of the global commons. Networking among navies and global maritime partnerships are therefore emerging as the new order in the current century.

Conclusion

In conclusion, there are five major takeaways from this paper:

1. The United Nations document 'Transforming our World', the 2030 Agenda in general, and SDG-14 in particular provide a template for conservation of the oceans, seas and resources. There is therefore a need to outline a comprehensive perspective plan for sustainable development and growth in different avenues of the maritime sector.
2. As a maritime nation India has significant potential to harness the blue economy. Accordingly, India has charted the way ahead to steer towards optimal utilization of resources, with minimum impact on the environment and ensuring sustained development of the oceans.
3. India and Australia are two great maritime nations who have extended their hand across the Indian Ocean for cooperation. The current environment provides a window of opportunity to enhance maritime cooperation between India and Australia. We need to therefore formulate a comprehensive roadmap for maritime cooperation between the two countries to harness the blue economy.
4. The Indo-Pacific has emerged as a contiguous maritime space with common opportunities and challenges, and there is a need for greater maritime cooperation across the regional commons. It is recommended that there be greater interaction between the IONS and the Western Pacific Naval Symposium to address the common concerns and challenges in the maritime domain for greater synergy and cooperation across the Indo-Pacific region.
5. The oceans are the common heritage of the mankind and safety and security of the global commons is a collective responsibility. Therefore, the current international efforts towards strengthening of ocean governance, such as regulating the Areas Beyond National Jurisdiction, need to be actively supported.

The seas around us are gaining newfound importance as each day goes by due to their linkages with the blue economy, and I have no doubt that the current century is the century of the seas.

The Chilean National Oceanic Strategy and the Blue Economy

Fleet Admiral Julio Leiva Molina

Introduction

Covering more than 70 per cent of the earth's surface, the oceans contain the greatest biodiversity of our planet. In their immensity, they play a vital role on the earth's cycles and its eco-system balance. They provide an enormous potential wealth, which must be used in a sustainable way in order to avoid harming the marine environment. The activities carried out by humans over the centuries in the maritime and coastal environment have allowed for the expansion of our civilizations. This has been vital for commerce, and using natural resources for both subsistence and economic development. This favourable position is being threatened by a great number of different phenomena, such as: global warming along with its climatic effects; the marine pollution coming from different sources; habitat destruction, and the overexploitation of marine resources, amongst others.

Due to its geographic condition, dependency on the sea, and position within the South American continent, Chile is a maritime country. Chile has benefited from the sea but has also been affected by changes due to its misuse. These facts bring new challenges and obligations in terms of conservation, management and sustainable use of the oceans and their resources.

The development of Chile is based on an open economy and global free trade. Our economy reaches out to the world, which can only flourish in an environment of cooperation, stability, safety, and respect to the commitments we have made through international agreements. In this way, Chile exercises sovereignty and the control of our maritime jurisdiction, essential for our national development. With this perspective, and throughout its two hundred years of history, the Chilean Navy has significantly contributed to the process of integration, and consolidation of our nation and its territories. Currently, we are concentrating our efforts to the surveillance, conservation, and support of scientific research on maritime areas of interest, in order to ensure a safer and cleaner ocean and a better understanding of it. These demanding activities will significantly contribute to the blue economy.

The Navy's primary role

The Navy is a tangible expression of the Chilean State at sea. Mission areas include: contribution to the national defence; international cooperation; support to civilians during natural catastrophes; contribution to national development, and state activities, including safety of the population and oceanic interests. The Chilean Navy

operates in the Pacific Ocean as a blue-water navy. Its capabilities allow the navy to operate in a sustainable manner for the promotion of national interests. For these purposes, the navy has a balanced naval power and maritime service, with multiple capabilities. This means that the Chilean Navy can carry out the tasks requested for the fulfilment of such mission areas, granting safety, and safeguarding the nation's oceanic interests.

Previously in maritime history the risks from activities at sea were mainly related to search and rescue and marine pollution control, but that situation has changed. Today, due to globalization and both old and new multidimensional threats, many factors have arisen and potential offenders may try to exploit laws and international treaties. They may try to do so by committing illicit activities such as: IUU fishing, illegal dumping of waste in maritime areas, piracy, organized crime, and terrorism, amongst others. All those activities may generate damage to oceanic interests, to the sustainability of the marine ecosystems, and affect the overall national security of the state.

Chilean oceanic strategy

The sea offers value in many different ways. It is a source of natural resources and a way of communication to extend trade, allowing for the exchange of significant volumes of goods, and for fostering international politics and relationships. Chile, due to its geographic position, commercial interests, political will and strategic reality is an oceanic country, linked through the Pacific Ocean to the world. Due to current scenarios, Chile's participation in international maritime security initiatives is mandatory, as it is closely linked with peace and regional and global stability. As many of the listed threats may have a global impact, this means that Chile must take some level of responsibility. Chile can contribute to this according to its capabilities and resources. This level of effort is also required in the conservation of common goods and the commitment to the blue economy.

The aforementioned effort is based on international treaties, conventions and agreements of which Chile is a member. Chile respects international law and the protection and conservation of the marine environment, marine scientific research, shipping and maritime trade control, security, and safeguarding of human life at sea. Thus the main challenge for the Chilean Navy is to maintain a 'National Oceanic Strategy'. This strategy allows it to operate within the framework of international maritime security, work towards the strategic objective of sea control, the sustainable use of the sea and the neutralization of threats and global risks. All of this is aimed at achieving the desired security to the nation, the country's development, and international cooperation.

Chilean maritime and naval capabilities have been developed and balanced with a multipurpose mission in mind and to operate within the framework of sustainability requirements. In this challenge, one of the main tasks carried out by the Navy is surveillance, alertness, and response to incidents - Maritime Domain Awareness.

This is in accordance with Chile's commitment to the international agreements, performed through oceanic surveillance, fishing control and south pacific regional management operations, ranging from the coast to the high seas. These activities are carried out mainly by maritime patrol aircraft, electronic monitoring systems and Chilean made offshore patrol vessels, which are built in accordance with high environmental standards. At the same time, an operational program of oceanic control and surveillance has been established, focusing on the maritime spaces surrounding the oceanic islands. These areas include Easter Island, Desventuradas Islands, Juan Fernandez Archipelago, as well as the Maritime Protected Areas - one of the world's largest. Currently Chile has 463,000 square kilometres of Maritime Protected Areas, which represents 14 per cent of its EEZ. By the end of 2017 this figure we will increase to almost 1.6 million square kilometres, representing 46 per cent of Chile's EEZ.

Another relevant activity is the protection of the environment, especially through marine pollution control. This is carried out through the identification and control of the main sources of pollution and the monitoring of the different jurisdictional water bodies. Through oceanographic, fishing, and geologic investigation, the navy gains knowledge of new marine resources, while continuing to monitor existing concerns. These activities are mainly carried out using the oceanographic vessel *Cabo de Hornos*. This ship was also built in Chilean dockyards, in accordance with the highest scientific and environmental standards. In order to reach an adequate safety level, and to be able to neutralize threats, the navy performs maritime traffic control, inspection and control, safety of maritime transportation, maritime interdiction, and law enforcement operations and countering illegal actions through the deployment of maritime and naval units as well as aircraft. In order to carry out those operations, including with other navies, the navy has set the goal of reaching the highest training levels and interoperability standards. This is complemented with participation in multinational exercises of interest such as RIMPAC, PANAMAX, Antarctic Combined Naval Patrolling, UNITAS and many others.

Institutional challenges

The Chilean Government, facing the need to protect and preserve its oceanic interests and international commitments, has developed an Oceanic National Policy that will be published in the near future. This initiative is aimed at giving the country a comprehensive and multi-sectorial vision that will allow Chile to act in a coordinated way on oceanic matters. It represents a long-term perspective, reaching a balance between the economic, social, safety, environmental and sustainable development dimensions. This policy will generate new challenges to different parties, both public and private. The Chilean Navy is one of those parties. One example of a response is Maritime Doctrine (2009), a means of delivering clear procedures and rules within the Sustainable Development Objectives.

From the regional cooperation and security perspective, Chile must maintain adequate levels of ocean safety and sustainability. In this we face multiple global

threats in the areas of interests shared with other Pacific coastal states. All have the common challenge of developing a regional maritime strategy. Participating at meetings such as the Western Pacific Naval Symposium is important, and fora such as this may become a mechanism for coordinating and organizing multinational maritime operations within the frame of the Regional Security Cooperation.

From the blue economy perspective, all countries should undertake the challenges that strengthen human capital. Aiming to have highly qualified professionals contributes to productive activities linked to the usage of marine resources. It also increases the technological innovation rate on products and processes of enterprises linked to the usage of marine resources. It encourages a harmonic balance between the development of productive and innovative activities within these areas, and most importantly, it also fosters the care of the marine environment and ecosystems.

Conclusion

It is necessary for us to move forward and to look to the future with hope, bearing in mind sustainable development and the environmental care of marine areas. We must protect these areas and face that which threatens them. This has to be done with the strongest will, which will ensure that future generations inherit cleaner seas and safer oceans. In doing these things our countries will be leading nations in the Pacific basin, with concrete and plausible results that we can show to the rest of the world. Chile will show the way in which comprehensive management of protected areas and ocean monitoring should be carried out. This is the Chilean Navy's commitment to the blue economy.

The Blue Economy in Canada's Maritime Strategy

Rear Admiral Gilles Couturier

Introduction

According to the World Bank the 'blue economy' concept seeks to promote economic growth, social inclusion, and the preservation or improvement of livelihoods, while at the same time ensuring environmental sustainability of the oceans and coastal areas. An important challenge of the blue economy is thus to understand and better manage the many aspects of oceanic sustainability, ranging from sustainable fisheries to ecosystem health to pollution. Blue economic policies can be implemented across the spectrum of government agencies with interests or operations in the maritime realm. Naval forces have an important and emerging role to play in this regard by preventing activities - like IUU fishing or waste dumping - that could threaten the health of marine environments or otherwise degrade the sustainability of maritime resources.

Canada is a maritime nation

Canada is a maritime nation, due to its geography and its geopolitical position. Canada has the world's longest coastline at 243,000km. Bordering three separate oceans (Atlantic, Arctic and Pacific) much of this coastline is rugged, remote, and sparsely inhabited. Its ocean estate covers over 7 million square km, which represents 3.7 per cent of the planet's surface. 24 per cent of this ocean estate is in the Arctic.

Around half of all Canada's frontier oil reserves are found offshore. A significant portion of Canada's fossil fuels reserves are located in the Arctic, alongside other large mineral deposits, including gold and diamonds. Seaborne trade is key to Canada's prosperity. If marine activities only contribute marginally to Canada's GDP (2 per cent in 2009), the Canadian economy is highly dependent on sea trade. Despite sharing the world's longest land border, a fifth of trade between Canada and the US was seaborne in 2010. Canada also has 20 per cent of the world's total freshwater resources, 7 per cent of which are renewable.¹

1 Defined by The United Nations Economic Commission for Europe as: 'Renewable freshwater (surface and groundwater) resources are replenished by precipitation (less evapotranspiration) that ends up as runoff to rivers and recharge to aquifers (internal flow), and by surface waters and groundwater flowing in from neighbouring countries (inflow)'.

Canada and the blue economy

The need to balance industrial and economic development with the health of the natural environment is, in the Canadian context, a significant factor in motivating the government's ocean policies. The Government of Canada does not directly refer to the blue economy in official documents and policies. However, the main documents composing our national maritime policies are guided by the same principles defining the blue economy: promoting economic growth, social inclusion, and the improvement of livelihoods while ensuring the environmental sustainability of our oceans and coastal regions. Four key documents inform Canada's strategy towards the exploitation and the preservation of its marine environment:

Canada's Ocean Strategy (2003)

The *Strategy* is described as having been 'guided by the principles of sustainable development, the precautionary approach and integrated management,' which form the core of the blue economy. The Strategy proposes to unify efforts under the direction of Fisheries and Ocean Canada to manage the diverse interests in the marine environment – including between the federal, provincial, territorial, and aboriginal governments, while improving coordination to promote sustainable development and protect the natural environment.

The Ocean's Protection Plan (2016)

This *Plan* was largely the result of growing concerns related to the increased shipping traffic on the Pacific coast that was spurred by a growth in Canadian exports to Asia, particularly in terms of petroleum products. Overall, the *Plan* is about enhancing shipping oversight and tightening regulatory regimes, expanding aids to navigation, and augmenting the government's ability to respond to emergencies.

Leadmark 2050 (2016)

The Royal Canadian Navy's strategy for the next several decades outlines several ways in which the RCN contributes to maritime security domestically and the protection of Canada's ocean estate.

Canada's Defence Policy: Strong, Secure, Engaged (2017)

Canada's defence policy, *Strong, Secure, Engaged*, presents a strategic vision that reaffirms the Canadian Armed Forces' priority of protecting Canada and Canadians, including by defending our sovereignty and being ready to assist in times of natural disasters, other emergencies, and search and rescue. Among other initiatives to implement this vision, the *Policy* includes a number of initiatives to increase the Canadian Armed Forces' presence and ability to operate in the Arctic.

The Royal Canadian Navy's mission

The RCN's mission is to prepare combat-ready naval forces that support Canadian interests at home and abroad. This mission centres on three main principles. The RCN stands *Ready to help*: working with other government departments, capacity building alongside like-minded nations, search and rescue on the high seas, helping Canadians in time of need, and providing critical life-saving humanitarian assistance both at home and abroad. The RCN is *Ready to lead*: As an instrument of national power and government policy the RCN is a strategically agile, adaptive and innovative institution able to exercise national and international leadership in an increasingly complex and uncertain world. Finally, the RCN is *Ready to fight*: to fight and defend Canada, to fight alongside allies, to fight for Canadian values. Along the other elements of the Canadian Armed Forces, the RCN ensures that Canadian sovereignty is well defended. The RCN is also ready to assist other domestic agencies in times of natural disasters, emergencies, and search and rescue. Being strong at home implies steadfast defence of Canada, rapid disaster response, effective search and rescue, enhanced presence in the Arctic, and an innovative defence sector.

The Arctic and blue economy implications

The Arctic is a significant part of Canada's maritime considerations. Climate change presents both opportunities and challenges in the Arctic. A longer navigation season through the Northwest Passage leads to increased interest, especially with regards to natural resources and sea routes, increased access, and increased activity such as commercial and tourist activity. This also implies potential for economic development as well as an increased risk of environmental hazards, disasters, and other emergencies. As areas of the Arctic that were previously difficult to access become more accessible, the Government of Canada will continue to increase its ability to operate in those areas, and the Navy has an important role to play in that regard.

The RCN in the Arctic

Increased presence and domain awareness are crucial to ensure sovereignty, as well as sustainable economic and military activities in the Arctic. The RCN has an important role in the Arctic, with several different contributions to operations in the area. RCN operations in the Arctic also take into consideration the necessity to ensure regional environmental and economic sustainability.

Joint Task Force (North):

Based in Yellowknife (Yukon), Joint Task Force (North) provide the Canadian Joint Operations Command (CJOC) with a robust operational headquarter with the capability to effectively plan, command, support, and execute joint, integrated and combined expeditionary operations throughout the North. In collaboration with the rest of the CAF, other Canadian agencies, and local people, JTF (North) exercises sovereignty and contributes to safety, security and defence operations in the Canadian North.

Arctic/Offshore Patrol Vessels:

The AOPV represents a revolution for the RCN's Arctic capabilities. It will now be able to operate in up to first year ice without risk of damage to the ship. The ship is designed to provide support to operations ashore, as well as to support the operations of other government departments and organisations. It is equipped with 4 boats, an oversized flight deck, can embark a landing craft, and can carry up to six sea containers which can be off loaded with its autonomous 20 tonne crane. It even has separate vehicle bays for snowmobiles and off-road vehicles. In short, this vessel not only provides increased presence in Canada's north, but can also act as a bulwark for the Arctic blue Water economy. It is a floating, mobile base of operations that can provide temporary infrastructure to remote communities during times of crisis.

Despite the AOPV's impressive range, the endurance of the vessel is greatly diminished when encountering ice conditions. The naval facility at Nanisivik allows AOPV to avoid a 5-7 day detour to the next closest fuelling facility (Nuuk Greenland, over 1000nm away) and greatly extends the on-station time or presence of the Canadian Navy in Canada's Arctic Archipelago during the navigation season. It also prolongs the overall length of the navigation season by two weeks. Although a naval facility, Nanisivik will also be used by the Canadian Coast Guard to extend the range of operations for its fleet of icebreakers and research vessels.

RADARSAT – Polar Epsilon

The RCN, through CJOC, currently maintains situational awareness in the Arctic through a system-of-systems approach employing a combination of space-based sensors, aircraft, and augmented by reporting from personnel on the ground. The primary space sensor is RADARSAT II. POLAR EPSILON, a DND project completed in 2009, provided two new ground stations in British Columbia and Nova Scotia to allow for 24/7 exploitation of RADARSAT II data. Revisit rates and overall coverage will be enhanced with the implementation of the Radarsat Constellation Mission (RCM), a series of three additional satellites which will be launched in August 2018. Full operational capability is expected by early 2019.

Operation Nanook

OP NANOOK is the premier CAF Northern operation focusing on capability building, partnership development with other Canadian agencies, and Research and Development (R&D). Formerly a month-long exercise during the August-September timeframe, NANOOK is now the umbrella for most CAF Arctic activities throughout the year. This is due to increased requirement for CAF presence in the region in order to provide presence and demonstrate Government of Canada resolve to enforce Canadian sovereignty. Additionally, the presence promotes environmental stewardship, provides SAR services to the region, and allows for responses to environmental emergencies.

The last three instances for OP NANOOK have included a range of different scenarios. In 2017 JTFA led the maritime component for OP NANOOK year, with a focus on security operations along the Labrador coastline. The exercise consisted of a Vessel of Interest (VOI) event that occurred in conjunction with two NORAD early warning sites going offline. The maritime component of the 2016 exercise took place in the vicinity of Rankin Inlet and consisted of a VOI scenario and Whole of Government (WOG) response that was led by JTF(N). For 2015 the scenario focused primarily on a natural disaster near Yellowknife, in this case an earthquake. RCN participation was in the form of a dive team, with several small maritime security scenarios involved as well.

1st Canadian Ranger Patrol Group

The mission of the Canadian Rangers is to provide lightly equipped, self-sufficient, mobile forces in support CAF sovereignty and domestic operation tasks in Canada. They represent a crucial source of local knowledge, expertise and awareness for the CAF and the RCN. They often occupy key positions in local communities as chiefs and mayors, and set a positive example for the youth in those communities.

The Northern Guardian Innovation Initiative

Indigenous Guardians programs empower communities to manage ancestral lands according to traditional laws and values. Through its innovation program, the RCN will launch the Northern Guardians Innovation Initiative. The objective is to build capacity, technical competencies and positive relationships in the practice of responsible waste management and agriculture in austere environments with Northern communities that will be sustaining and supporting the RCN activities in the Arctic. Ultimately, guardians in selected northern coastal communities will be responsible for the management and the maintenance of operational sustainment hubs providing waste management and green energy containerized systems to be used by RCN's platforms and local communities.

The Green Fleet Initiative

Finally, the Green Fleet Initiative will see an assessment of green technology and operational solutions to optimize sustainable naval activities in the Arctic.

Conclusion

Canada is a maritime nation and its ocean estate shapes the Canadian national interest. The blue economy principles have guided the elaboration of Canada's marine and maritime policies, as well as its naval strategy. In the context of climate change and rising economic activities in Canada's north, the RCN contributes to the defence of Canadian sovereignty and helps shape development in the region, while preserving the environment and protecting the livelihood of indigenous coastal communities.

The Swedish Blue Economy in the Baltic and Beyond

Rear Admiral Jens Nykvist

Introduction

This paper will discuss the importance of the sea, or in this context the blue economy, and what Sweden is doing with respect to it. The region of primary focus here is the Nordic/Scandinavian region and in particular the Baltic Sea and it will be viewed through the lens of the Armed Forces, more specifically the Navy perspective. The importance of keeping the sea safe, keeping sea lines of communication open and protecting infrastructure in order to support the blue economy is vital. This is a very relevant subject with the developments seen in the world today and the more and more insecure environment we live in. To be able to handle this situation Sweden needs a navy and the Swedish Navy is a key enabler of the blue economy.

Sweden's maritime environment

Sweden has a coastline of 2400km and its strong geostrategic position attracts a large amount of interest in the region. The main task of the Swedish Navy is to protect Sweden's territorial waters and to do whatever necessary in order to build a threshold in order to deter an adversary. This is done by maintaining high readiness and a high quality of personnel and equipment. It is also done by working together with other partners, which will be covered in more detail below. The Navy engages in sea control operations, including sea surveillance and the protection of shipping, as well as protecting territorial waters and broad national interests. This is done 24 hours per day, 7 days a week – in other words every day of the year. The Navy maintains a high readiness and in general, good equipment. However an important factor that must not be overlooked is the human element: the sailors, soldiers and officers. Without their very professional attitude and skills, all the desired military equipment and material will be of no use.

The importance of the sea is immense. Approximately 90 per cent of Swedish trade goes by sea and maritime trade is vital for Sweden, as well as all nations surrounding the Baltic Sea. If it should stop, even for just a few days, it would have a large impact and put great strain on the community. Statistics from the Swedish Maritime Organization help illustrate this point. The number of passengers who visited Sweden and arrived by sea during 2016 was 12.8 million passengers (Sweden has a population of 10 million people). The number of ship arrivals to Swedish ports during 2016 amounted to 96,430. During the same period, 164 million tons of goods were transported. This is a lot for a nation with a population of 10 million people. This is also one of the reasons why you need a navy – to ensure that this lifeline works.

The region

Development in the Baltic Sea has seen an increase in both civilian and especially military activities, such as military exercises. It seems as if there has not in modern times been more military ships in the Baltic Sea than there were in September 2017. The region constitutes key terrain to reach areas in the Barents Region and the Baltic Sea. The west region is the gateway to the Baltic Sea and this chokepoint is vital. There is a lot of sea and air traffic that is vital for all nations in the Baltic Sea, as well as infrastructure such as cables and pipelines, and the area is used extensively by the fishing industry. Altogether, these factors increase the importance of the region.

The way Russia is pushing development in the region leads to increased uncertainty and it is vital to be able to handle this uncertainty. Sweden needs to be aware of what is going on and to know what is out there. This means that in a congested area like the Baltic Sea one needs to know all ship movements. A RMP (Recognized Maritime Picture) is thus a vital enabler of the blue economy.

The environment

It is important to define what makes the Baltic environment unique, as the environment that the navy and amphibious forces operate in. It is necessary to have the requisite knowledge, skills and equipment to be able to operate in this challenging environment.

An important environmental challenge is operating in shallow water. When operating in confined and shallow waters, like the Baltic Sea with an average depth of 65 meters, the threat level increases. There are many doctrines and much has been written on tactics and how to operate in the blue water environment - the oceans - but when looking at the extreme littoral areas like the Baltic Sea it gets harder to find a doctrine. This is an area where Sweden has established doctrine, having operated in these waters for almost 500 years.

There are several different threats to consider in the Baltic Sea. First is the submarine threat. The Baltic Sea is the perfect environment for a submarine of the right size. There is also an increased mine threat, particularly acute in the shallow waters of the Baltic Sea. There are still around 50,000 mines in the Baltic Sea leftover from the First and Second World Wars. Mine clearance is thus naturally one of the things that the Swedish Navy works on regularly. For example, the Navy discovered 50 mines from an old Russian mine line from the First World War just outside the Swedish archipelago in an operation conducted in September 2016, and another 30 were destroyed in September 2017.

The second threat is from distance - the ability to project power from the shore towards the sea due to short distances in the region. Reaction time is very limited and fighter jets and missiles will have an effect within minutes. The final threat is from the high traffic density. There are approximately 2,500 ship movements every minute in the Baltic Sea. A consideration of high importance for all nations in the region is the

importance of the sea to Russian trade, due to the fact that approximately 40 per cent of Russia's imports and exports travel through the Baltic Sea. In total this represents 15 per cent of the world's maritime traffic in a very narrow area. Add civilian aircraft to the calculations and you have a cluttered and congested area of operations.

The littoral environment

The above issues are not the only problems operating in an environment like the Baltic Sea. Sweden has a series of complex archipelagos that require good knowledge and skills to operate in. The water conditions include different layers of fresh and salt water, and differences in water temperature that can range from 20 degrees Celsius on the surface to 4 degrees Celsius on the bottom. This has a large effect on sound profiles and makes it hard to find submarines, which makes them good conditions to hide a submarine. It is still tricky for the submarine to operate in this shallow environment; however this is a skill Sweden has developed over the last 114 years. Further to this, the Baltic Sea is also muddy with organic material and poor visibility that makes it even harder to find anything hidden in the mud or even close to the surface. The Baltic Sea is sometimes called the submariner's paradise and the submarine-chasers hell and it is also the perfect ocean for the use of mines, as mentioned above.

Due to the high volume of traffic in the Baltic and the short distances to the shore there are also a lot of emitters and signals in the air, creating a cluttered electronic environment that makes it harder to find a ship or other object of interest, both when engaged in signals intelligence or for warning of an incoming missile. To operate in this environment requires equipment designed for these conditions and in particular for Anti-Submarine Warfare (ASW). For example, ships require a significant range of frequencies for sonars in order to find anything in this environment. The equipment used for the blue water environment, for instance range of frequencies, might not be optimized for the conditions the Baltic Sea so it is important to have the knowledge what kind of equipment and capabilities are required. In response to this unique operating environment the Swedish Navy's ship design, equipment and tactics have been designed specifically to address the above problems. The Swedish Navy has operated in the Baltic Sea its surrounds for several hundred years and in fact will celebrate 500 years in 2022.

Sweden has developed the technology and the tactics to operate in this harsh environment and have done so with good domestic cooperation between the armed forces, the Swedish Defense Material Administration, FMV, and the research institute for defense and security, FOI. Importantly, industry like SAAB and Bofors has contributed to equipment and tactics that can be used in both this environment and other areas. There is great knowledge in Sweden and this must be used in the best way and with the limited means of the present. Sweden's long history of neutrality has forced it to develop tanks, fighters, ships, submarines, sensors, weapons and all other required equipment. This has given Sweden unique skills and equipment but this in itself is insufficient - cooperation and partners are vital.

Navy tasks

There are many tasks for the Navy to handle; everything from search and rescue through to high end warfare. Most of the tasks are in what we call the ‘Gray Zone’ and are where the Navy operates much of the time. It is vital to be present and show commitment in order to build the threshold and also to be able to really know what is out there. Who is your enemy or your friend? Who is not following the normal pattern? The knowledge of the local area is vital and the recognized picture is of the highest importance. Even when approaching a high level on the scale towards war it is still necessary for the sea lines of communications to be open, because as stated before they are vital for all nations around the Baltic Sea.

Exercises and operations

One way of increasing security and stability and thus making it possible for goods to arrive on time is the conduct of maritime exercises. Sweden participates in a huge variety of exercises including national exercises and international exercises. These exercises all have a different primary focus but with one overall goal to get better and even more effective – to increase the understanding of the area and to build the threshold.

Two examples help highlight this. The first exercise is *Northern Coasts* (NOCO). This is a NATO exercise that is conducted annually in the Baltic Sea. In 2017 Sweden had the planning responsibility and NOCO included more than 50 ships, EOD teams, logistic contingents etc. from 16 nations. In total approximately 6000 men and women were involved, with the objective to train and develop the ability to conduct integrated marine operations that increase the ability to jointly handle crises and create stability and security within the area. This is a good example of how to work together building interoperability and increase security and stability in the Baltic region.

The second exercise is *Aurora 17*, a national exercise and the largest exercise conducted in Sweden since 1993, involving all parts of the military and many agencies from the civilian side as well. In total 19,000 people from the armed forces were involved, with the mission to build stronger defenses and increase the capability to face an attack on Sweden. It also contributed to the development of Sweden’s total defense capabilities, involving around 40 different agencies. In order to have as comprehensive an exercise as possible – and at the same time exercise Sweden’s defense capability against a larger, sophisticated opponent – other countries were also invited to participate in *Aurora 17*.

International operations

The Swedish Navy also operates in other parts of the world to increase security and stability and help enable the blue economy. The Navy operates with other navy personnel in the Central African Republic, Mali, Operation Atalanta together with the

Netherlands, as well as having forces ready to deploy to any region should the need arise. In other words the Navy needs to be able to work in all conditions from ice to deserts. It is necessary to be able to work with other nations in order to protect, for instance, shipping in areas such as Somalia and the Gulf of Aden. Incidents far away from home will have an impact on the trade back home. It is important to keep sea lines of communication open.

Cooperation

Another way to protect the blue economy is cooperation. Cooperation is not only on the domestic front. It is necessary to have good cooperation with other nations and be able to create the best picture of the Baltic Sea and the events taking place there. Good cooperation is of high importance and this is also something Sweden maintains with other nations. The cooperation with all our neighbors in the Baltic Sea is generally very good.

Information sharing

It is necessary for the nations of the Baltic Sea region to cooperate in order to meet a changed and unpredictable situation. An example of cooperation is the possibility of information sharing with regard to ships in the area. The best way of establishing a Recognized Maritime Picture in the region is through cooperation. In the Baltic Sea there is a cooperative measure called SUCBAS. This is a cooperative engagement between nine nations - all of the Baltic nations except Russia, but including the United Kingdom.

On a larger scale, Sweden participates in MARSUR. This allows for the sharing of information with other participating nations from the Mediterranean all the way up to the Baltic Sea. There is also cooperation with Finland and one part of that cooperation is known as SUCFIS - Sea Surveillance Cooperation Sweden and Finland. This means that Sweden and Finland share their respective surface pictures in order to create the best overall surface picture.

Baltic Ordnance Safety Board (BOSB)

Yet another example of cooperation to secure the blue economy is BOSB - Baltic Ordnance Safety Board. It is a multi-nation Mine Counter Measure and EOD cooperative venture that was established 2007. As mentioned earlier, there are a lot of mines and unexploded ordnance still in the Baltic leftover from the two World Wars, with approximately 50,000 mines remaining. BOSB sees cooperation between Estonia, Finland, Denmark, Latvia, Lithuania, Poland, Sweden and Germany, with the aims of promoting the international exchange of information concerning disposal of historical ordnance as well as focusing multinational MCM operations and exercises against prioritized areas.

Swedish-Finnish Task Group

As mentioned previously, cooperation with Finland on the political and military level has high priority and this is very much a focus in the Swedish Navy. The implementation of the Finnish-Swedish (FISE) Naval cooperation is planned for Initial Operational Capability (IOC) in 2017 and for a Swedish-Finnish Task Group and FOC in 2023. Once IOC is declared (expected end of 2017) Sweden will have a bilateral Naval Task Group with capability to conduct basic sea control operations, focusing on sea surveillance and the protection of shipping. This cooperation will lead to better use of resources and increased cost-efficiency in naval matters, as well as maintaining and further developing interoperability and operational capabilities between the two navies. All of these various exercises, operations, and joint cooperative endeavors are the tools for the Navy to enable the blue economy.

Mobility, flexibility, stealth and cooperation

Looking into the future, perhaps the area of most noteworthy importance is the underwater domain. The sea has never been transparent and it seems unlikely that it will become so anytime in the next 25 years. Therefore, the continued development of both equipment to penetrate the sea and equipment to protect ships and crews while still being able to operate in a stealthy way is of great importance. This is also the reason why at the political level Sweden has put the underwater domain as a national strategic interest, along with the JAS Gripen fighters. This means that there is large and long term political support in these specific areas.

Currently there are political decisions to be made for two new submarine projects. The first is the A26, which construction has commenced on at Saab Kockums shipyard in Karlskrona. Second is the mid-life modification program on two Gotland class submarines, which will see them upgraded to be like new submarines. New equipment and new capabilities will be installed, for instance a diving lock and an optronic mast. This means that there will be no penetrating masts on the Gotland class submarine or the A26, and so the combat information central onboard can be placed wherever you want it. In this case it will be installed in the bow of the submarine instead of amidships, increasing flexibility. The work on the Gotland class submarine will provide important steps towards the next generation of submarines, the A26. These steps are also one way to risk-mitigate construction of the A26.

A big trend in development is that towards even more sensitive and complex sensors with multiple functions such as magnetic, acoustic and electric, especially as used in mines. This further pushes the need for better technology to protect ships and crews from these evolving threats as well as enabling units to operate undetected in stealth mode. Stealth is very important, especially since the Swedish Navy doesn't have a great numbers of ships. The ability to operate unseen and undetected increases the deterrence factor, since an adversary will not know when or what to expect, thus creating uncertainty for an opponent. This is true in both the underwater domain and with surface ships. Finally, there is the proliferation of unmanned types of

platforms that are very hard to detect and are operating in all dimensions: air, sea, and subsurface. This will have an impact on platform design, tactics and how to avoid being detected while using these systems to your own advantage.

Conclusion

The environment that the Swedish Navy operates in is unique and will require constant development of equipment and skills for this environment, but this does not mean that the Navy will be unable to operate anywhere else in the world. The Swedish Navy is always training for the worst-case scenario - armed conflict. By doing so, the Navy will also be able to handle other threats and events, everything from search and rescue missions up to and including armed conflict. If the Navy can handle the threats and challenges of the Baltic Sea, it will be able to do this in other areas. Of course other aspects like endurance will have an impact, but the Navy's knowledge and equipment works internationally. The Swedish Navy can contribute in the international environment, as has been proven several times such as UNIFIL outside Lebanon, Operation Atalanta at the horn of Africa, and when HMS Gotland, a submarine, deployed to San Diego and the Pacific Ocean, operating with the US Navy for a period of two years.

Effectiveness comes from having flexible and robust equipment, ships and the continuous development of tactics. This requires good cooperation between the Swedish Armed Forces, the procurement department - FMV - the research center - FOI - and defence industry, as well as friends and partners from other nations. The Navy must also be an attractive employer because without good and professional personnel, there will be no Navy. Flexibility is one of the keys to building and maintaining a deterrent. The Navy needs to remain agile and adjust everything from tactics to procurement.

France's Blue Economy

Admiral Christophe Prazuck

Introduction

France is a global maritime power, responsible for the world's second largest EEZ. This paper will not be able to paint a detailed portrait of the entire French maritime industry, but will be able to examine the various dealings of the French navy with the marine industry, oil and gas industry, fisheries, maritime tourism, and marine environmental issues. In doing this, it will argue that the naval part of the maritime world does more than contribute to establishing a safe and secure environment for the other parts to operate in. This is an important part, but navies themselves are also an important contributor to other aspects: shipbuilding, innovation and even a significant part of GDP.

Protection of commerce

Navies are inextricably linked with commerce, be it to attack it or to defend it. From Raleigh to Mahan, every sensible person would agree that protecting sea lines of communications is every bit as vital today, in our globalised economies, as it was to protect convoys during World Wars I and II. However, that task is now easier said than done. Since World War II merchant traffic has increased twenty-fold, while escort ships in Western countries have reduced eight-fold.

Protection of littoral populations

Roughly 60 per cent of humanity lives less than 60km away from the sea and this number is expected to increase in the next few decades. This population needs protection - protection from terrorist attacks (remembering that the Mumbai attackers came from the sea), protection from natural disasters (ships are still hard at it in the Caribbean after hurricanes Irma and Maria), protection from collisions at sea; they happen in the strait of Malacca (60,000 ships/year in transit); but also in the Dover straits (85,000 ships/year in transit), with traffic coordination and SAR responsibilities by the neighbouring countries.

Protection of maritime tourism

Nineteen million per year - that's the number of passengers travelling to and from France by sea - approximately two-thirds the number of passengers travelling via Paris Orly airport. These passengers need to be protected: attacks against a ferry boat

or a cruise liner have happened in the past and can happen again. Imagine the disaster, with thousands of tourists locked up in a big ship in the middle of high seas, with little or no armed response. In recent years France has accelerated the development of a comprehensive organisation to screen and filter passengers, provide basic armed response on board and prepare for a full-on counter-terrorist response at sea should an incident occur. This organisation involves the Navy – and of course several other administrations – under the same umbrella: the ‘Prefet Maritime’, maritime prefect.

Protection of the environment

According to Article 56 of UNCLOS, in the exclusive economic zone the coastal State has jurisdiction with regard to the protection and preservation of the marine environment. The same wording is used at Article 192 in more general terms, applicable to the high seas: ‘States have the obligation to protect and preserve the marine environment.’ This is a duty on the state. With sovereign rights come obligations, and France takes those very seriously. There are naval air squadrons based in the mainland and overseas tasked with detecting and tracking marine pollution, anti-pollution kits are deployable on most warships, and there are specialist assessment teams. When the Navy does fisheries patrols in some of the most delicate ecosystems in the world, such as the Kerguelen islands or the Mozambique channel – for which France is responsible – it is done not only for the protein (although it’s important), it is done for the preservation and protection of the environment.

Shipbuilding

Despite the size of France’s EEZ, more often than not France cannot afford to keep several specialised yards running building only warships. So France diversifies as much as possible: for instance, Naval Group builds warships but also develops TIDAL turbines. The Navy has ordered some minor vessels from predominantly (smaller) civilian yards, which mostly build trawlers and supply ships.

Innovation

Of course naval shipbuilding cross-pollinizes other areas of the industry. No need to mention the relationship between ballistic missiles and space launchers. The now-omnipresent GPS used in cars and smartphones everyday started life as a navigational aid for American submarines. One of the main challenges as head of the French navy is keeping ships up-to-date over 30-40 years when civilian innovation (processors, operating systems, software) now far outpace naval shipbuilding cycles. Cyber security, big-data analysis, artificial intelligence are all areas being worked on.

Naval bases and the local economy

This is not a trivial dimension of the blue economy: sailors and their families form a substantial part of Brest and Toulon's population. They own or rent property there, spend their wages there, school their children there, vote there. Their money is essential for the local and regional economies. Over a couple of centuries things happen this way: you build a naval base from scratch. Then come crews and families, companies, workers, and over time they build and create a prosperous town. Two centuries later the town asks you to leave in order to develop the town for tourism, industry and services.

All this requires a specific organisation. France cannot afford to have separate navy, coast guard, fishery protection, counter-pollution and other such organisations. The solution is to unify all these requirements under the same hat, worn by a 3-Star Admiral, who is also the commander-in-chief for the entire regional fleet (of which there are three: Channel and North Sea, Atlantic, Mediterranean). This is the *Prefet Maritime*. Customs, police, specialised agencies, the navy all contribute to the same mission under this unified command. This is efficient, both financially and operationally: a helicopter sharpshooter may train for counternarcotic tasks and use his skills against pirates; the inter-administration's command and control chain may run a major earthquake exercise one year and apply this training to a real life major pollution situation. There are of course other kinds of organisations around the world, but the fundamental difference from France's perspective is the legal tradition, which grants more extended legal powers to naval officers, both in operations (COs, flight commanders etc.) and ashore (admirals and senior supply officers).

Conclusion

Returning to UNCLOS, nations have an obligation to cooperate on all aspects of maritime security. The original drafters used the word '*should*', which carries a lot of legal weight. This is true in the most benign environment and in riskier tasks. A topic mentioned earlier in the paper was the evolution of the 'escorted to escorting' ratio over the last 70 years. Navies simply cannot escort all merchant shipping like they used to anymore. The Somali pirate crisis in 2008-2013 is a good case in point: Europe, NATO, the US-led CMF, Russia, China, Japan, and Iran all joined forces to secure a 'corridor' within the Gulf of Aden. The flipside of the coin is of course that some contributing navies never really left. It's call the '*Hermit Crab*' syndrome and we're back to square one, with the all-time link between merchant navy and military navy, between prosperity and security.

Fiji and the Blue Economy

Captain Humphrey Tawake

Introduction

This paper will briefly highlight Fiji's blue economy and the key enablers to a stable maritime security environment that allows a blue economy like Fiji's to flourish. In Fiji's context a sustainable blue ocean economy is an integral part of the Pacific. As children of the ocean of the Pacific, no one is more knowledgeable about the oceans and their management than us. Development must proceed with ocean sustainability as a central concern - with a focus on intergenerational equity and enhancing the natural capital of oceans for future generations. No matter how one defines our culture and our livelihood, it has always been based on the historical links to the oceans, and how the oceans have provided those in the Pacific with a lifeline to our livelihood, and more so, an integral part of our national security.

Fiji maritime boundaries

Fiji under the Law of the Sea Convention is an archipelagic state and maritime nation with a sea area of approximately 1.3 million square kilometers and a land area of approximately 18 thousand square kilometers. This demonstrates Fiji's reliance on the sea for its economy and livelihood. The ratio of land to sea, at 1:70, is significant and justifies economic issues for Fiji in relation to the oceans. The vision of Fiji's first Prime Minister, Ratu Sir Kamisese Mara, after the ratification of the Law of the Sea required an enforcement body to monitor and protect Fiji's maritime interest including fisheries and its economic benefits. The result was the formation of the Republic of Fiji Navy in 1975 to assist in the conservation and preservation of Fiji's marine resources and its associated interest.

Environment and the blue economy

Providing an environment for Fiji's blue economy is important and challenging with UN Sustainable Development Goal (SDG) 14. Fiji's vision for a sustainable blue economy has links directly to UN SDGs, for example SDG 13 (climate change), SDG 5 (gender equality), and SDG 8 (decent work and economic growth). Climate action and ocean action are critically vital and Fiji will continue to ensure both remain at the top of its national agenda. Fiji will provide support in its international commitments as regional champions in these respective areas as Co-Chair of the recent United Nations Ocean Summit held in New York in June 2017, and as President and Chair COP 23 in Bonn Germany in November 2017.

Climate change and sea level rise were not considered in the original drafting of the United Nations Convention on the Law of the Sea (UNCLOS), and work is ongoing and should be strengthened to understand the possible legal threat posed by sea level rise to maritime boundaries and baselines, especially when considering Pacific Island countries. Providing the infrastructure, technology, finance, supporting mechanisms to coastal communities in tourism and fisheries is a priority area for the Fijian Government in supporting this sector. This is in addition to improving and harmonizing legislation to support Fiji's blue economy.

Sustainable tourism and fisheries require appropriate commitment from government to create incentives for investment, share and promote best practices and support community based tourism and fisheries. It is an ongoing exercise showcasing successful private sector case studies to support increased awareness of sustainable practices among stakeholders. A national network of sustainable tourism and fishery operators will be the first step in realizing a platform for knowledge exchange with an improved environment for Fiji's blue economy.

Key ocean industries

Fiji's 2016 blue economy revenue was valued at Fiji\$2.4 billion dollars, which represents two-thirds of Fiji's annual revenue. A large portion of this is through tourism and marine recreation valued at Fiji\$1.8 billion dollars, much of which is thanks to Australian and New Zealand tourist dollars. The balance of Fiji's blue economy in fisheries is Fiji\$300 million dollars, and subsistence and community fisheries are valued at Fiji\$100 million dollars. Thus a significant portion of Fiji's blue economy remains in its tourism sector and the potential to improve other ocean related blue economy sectors.

Innovation in the blue economy

Marine renewable energy has the potential to be cost-competitive with traditional energy sources. Some of the key constraints include financial capital, local feasibility assessments and institutional capacity to develop renewable energy projects. No operational projects currently exist in the region or Fiji; however, feasibility assessments are being undertaken. The extraction of deep sea minerals (DSM) has been recognized as a potential economic opportunity and several countries have issued exploration licenses to mining companies. Papua New Guinea is the only country in the region to have granted exploitation licenses, with the aim of being operational in the first quarter of 2019. DSM remains controversial with divergent views on its potential environmental and social impacts. The technology remains expensive and untested and there is significant scientific uncertainty relating to how vulnerable the environments are and how widespread the impacts will be for Fiji and the region. There is currently limited evidence to suggest DSM will create local employment benefits. More research is needed to better understand the deep-sea

environments, the species and habitats that will be impacted, and the nature of those impacts to ocean states like Fiji.

Key drivers of Fiji's blue economy

A key driver supporting Fiji's blue economy is its oceans governance regime, in collaboration with its Defence partners. The six month deployment of HMNZS *Hawea* to Fiji for fisheries surveillance and border protection has deterred potential IUU fishing threats to Fiji's marine resources. The regional Maritime Security Program under the auspices of the Australian Government Defence Cooperation Program has provided added maritime security in the Pacific. This includes for Fiji the Pacific Patrol Boat Program, going back to its inception in the late 1980s, as well as the air surveillance component. Fiji has just completed its National Security Strategy and it is encouraging to note that most of the strategy outcomes are maritime based and linked directly towards supporting Fiji's blue economy.

Capacity development and research are fundamental in transforming business as usual, and in driving innovation and development. Diversity of skills, people and multidisciplinary approaches are needed to implement sustainable blue economies like in Fiji. This goes beyond only marine scientists and earth systems scientists, and includes social scientists, economists, finance managers, policy analysts, information brokers, educators and cross-disciplinary generalists. Capacity development happens in many places and across many institutions in Fiji. Government, drawing on national needs, has set priorities for tertiary and vocational educational institutions using existing institutional planning and governance mechanisms to build capacity in driving the blue economy

Most research on islands is not conducted from a Pacific perspective. Research is needed that looks at islands the way they are viewed by Islanders. Data can be collected from existing processes such as tourism, fisheries and shipping operations as well as local communities. Working with and building on local and community knowledge in appropriate ways is an opportunity and a challenge. Ocean literacy requires not only an understanding of the economic importance of the oceans, but the communication of this and the use of science to make policy relevant and inform related decisions. The oceans and the rest of the earth's systems interact in a complex manner and earth system science is needed to ensure we understand these interactions, including the impacts of climate change. Education must start at primary school level.

Maritime security enabler to Fiji's blue economy

The South West Pacific maritime space is huge, and associated activities have increased significantly due to an increased volume of both commercial and economic activities. Fiji is not immune from these due to its geographical location as a regional hub. Subsequently, a stable maritime security environment is crucial in supporting the national economies of large ocean states like Fiji. Management of illegal activities

and maritime crime, piracy, IUU fishing, human trafficking, drug trafficking all require consistent methods of surveillance activities by capable maritime assets. Maritime Domain Awareness and information sharing through collaborative means to mitigate illegal activities is vital and helps provides for a stable maritime security environment for Fiji's tourism and fisheries sector. In addition, safe sea trade routes and navigation channels with updated hydrographic and oceanographic data provide confidence to tourism and marine industry sectors both nationally and internationally.

Challenges

The enhancement of infrastructure and capacity in order to sustain Fiji's blue economy is of critical importance to continue to allow Fiji's economy to improve and grow. Of great priority is the continuous Government support with regards to essential support services in everything from modern sea ports and airports, to the roads and bridges that link the infrastructure required for Fiji's blue economy. Enabling and maintaining an effective Oceans Governance regime in Fiji is challenged by the large surrounding oceans. The main ways in which this is done is through legislation and effective maritime security surveillance and enforcement platforms. Added to this is the need to provide a capable rapid response capability in supporting its international search and rescue obligations with noting increased tourism activity in yachts and cruise liners. Furthermore, collaborative strategies, especially information management fusion of Fiji's maritime domain, are needed to tackle issues such as IUU fishing. Fiji, like other ocean states in the Pacific, is challenged by the effect of climate change and sea level rise on coastal communities. Approximately 80 per cent of Fiji's population consists of coastal communities that rely on the oceans for their livelihood. The effect of sea level rise now affects Fiji's maritime boundaries both domestically and with its maritime neighbors and their respective borders. The challenge also remains that the Law of the Sea, which Fiji and the region championed in its infant stages three decades ago, is fast becoming irrelevant in the current and future complex, dynamic and evolving maritime landscape. National capacity to further develop blue economy innovations for small economies like Fiji is also a challenge. Despite explorations by research institutions to support deep sea mining for potential commercial viability, it remains unproven technology and has not been pursued further because of the untested technology and the legislative and funding obstacles needed to support such ventures.

Conclusion

Fiji, like any other large ocean state in the Pacific Ocean, is reliant on the oceans for its survival, especially through its blue economy and supporting strategies. Fiji's culture over many generations has always been ocean based. What is critical for Fiji now as a maritime nation is providing effective legislation, professional capacity, surveillance collaboration, enhanced technology, best practices and capable maritime surveillance capability as enablers that will provide a stable maritime environment for Fiji's blue economy to flourish.

Development and Ocean Health: A Papua New Guinean Perspective

Captain (N) Philip Polewara

Introduction

Papua New Guinea's economic relationship with the ocean is once again evolving in important ways. The ocean's contribution to the nation's wealth is very important, as a setting for global trade and commerce, and as a significant source of food, energy and mineral wealth. This century, it is likely to become an economic force. The drivers are many and varied, but have their origins in the growing familiarity with the ocean environment. These include: new technologies that make it feasible and economically viable to tap ocean resources; longer-term growth and demographic trends; the search for food security and alternative sources of minerals and energy; and seaborne trade and rapid coastal urbanization, among others.

Blue economy definition

The term blue economy or 'blue Growth' has surged into common policy usage all over the world. For some, blue economy means the use of the sea and its resources for sustainable economic development. For others, it refers to any economic activity in the maritime sector, whether sustainable or not. Despite increasing high-level adoption of the blue economy as a concept and as a goal of policy-making and investment, there is still no widely accepted definition of the term. In Papua New Guinea the blue economy is referred to as 'blue Revolution,' a term coined by the Government as a strategy to restore the ailing national economy in the late 1990s. To avoid confusion and accord domain relevance 'Ocean Economy' is now the preferred term.

A new focal point

The ocean is becoming a new focal point in the discourse on growth and sustainable development, both at the national and regional levels. The quest for sustainable development is very elusive. The idea of the 'blue economy' or 'blue revolution' has become synonymous with the 'greening' of the ocean economy, and is the framework by which the government, NGOs and other stakeholders refer to a more sustainable ocean economy – one where there is a better alignment between economic growth and health of the ocean.

National economic force of this century

The economic contribution of the ocean is significant to the national economy, but remains undervalued. Stimulating growth in the ocean economy is comparatively straightforward; but it is not always clear what a sustainable national ocean economy should look like, and under what conditions it is most likely to develop. Measuring the ocean economy gives PNG a first order understanding of the economic importance of the seas. The upcoming National Medium Term Development Strategic Plan examines the way in which the country is framing the development of the oceans resources, those within the exclusive economic zone (EEZ), and the extent to which the blue strategies offer the vision of a sustainable blue economy.

Ocean economies, both large and small, are looking to the seas to bolster their slowing land based economies. Papua New Guinea is no different; we are looking to the sea to recover our ailing national economy. We have successfully done it in the past, and we are moving in that direction in ‘unlocking new value from the ocean.’

Development of ocean resources

A strategic focus on the development of the national ocean resources is an important driver and enabler of the national economy. PNG is looking to the sea to bolster slowing growth in the terrestrial economy, discover new opportunities for investment and employment, and to build competitive advantage in emerging industries such as deep seabed mining and marine biotechnology. New strategic ocean development plans and policies, sometimes referred to as ‘blue plans and policies’, are being worked on to stimulate growth in and around the 14 coastal provinces.

PNG for the first time has commissioned a number of strategic blue projects:

- The first ever K\$1 billion off-shore drilling project for oil & gas just north of Australia commenced September 2017, and will come into production in 2020;
- The production facility for the first sea-bed mine - Solwara 1 - is under construction in Fujian Dockyard, China, and will come into production in early 2019. As a project, PNG is not yet sure of its future impact on the ocean;
- Large marine parks and extra fish canneries are under construction in the northern part of the country. PNG’s intention is to increase fish production to 1,000 metric tons by the end of 2017, aiming to be the tuna capital of the world.
- Another marine park for petroleum & gas related activities is going through final stages of approval and design in the southern part of the country;
- Significant investment and construction of port facilities started five years ago and is continuing, in particular Lae and Port Moresby, the country’s major ports;
- The water fronts of the capital city Port Moresby are being reconfigured to accommodate tourism and recreational facilities for the upcoming APEC and beyond.

Should these public policy ambitions prove successful at enabling investment, the scale, size and type of economic activity in the sea will be of an entirely new order for Papua New Guinea.

Industrialization of the ocean

A new wave of ‘industrialization’ of the ocean and coasts is underway, the scale of which is only now becoming apparent. National trends point to accelerating economic activity in and around the sea, against a backdrop of growing population, growing consumption, and the need for new sources of food, energy and minerals for commerce.

Ocean-related economy is experiencing a surge in investment in coastal infrastructure, industry and tourism as more people move from the Highlands Region and villages to coastal towns and cities. At the same time, the risk to coastal populations of rising sea levels and storm surges as a result of climate change will drive a new wave of civil engineering and defensive infrastructure development.

Human activities and ocean health

Human activities nationally, regionally and globally are driving the decline in the ocean’s health. The urgency of the ocean health is becoming more prominent in the global policy discourse now than in the past. For the first time the ocean was on the G7 agenda, in Germany in June 2015.

Papua New Guinea is also very concerned with the ocean’s health. In an effort to manage growing competition, and the impact industrialization and development will have on our ocean systems, the national government is deepening the laws, regulations, policies, institutions and planning tools to govern and manage the EEZ in an integrated manner. The mandate for this policy approach is derived directly from the fourth goal of the National Constitution and its Directive Principles, which states that:

Papua New Guinea’s natural resources and environment should be conserved and used for all and should be replenished for the benefit of ourselves and prosperity of the environment and its sacred, scenic and historical qualities for future generations.

International agreements also influence this Policy. As a signatory to the United Nations Convention on Biodiversity (CBD), PNG has committed by 2020 to establish a ‘comprehensive, effectively managed and ecologically-representative national system of protected areas’, including specific targets of coverage of land and sea by protected areas. It has become apparent that Yellowfin and Bigeye tuna are now considered close to full exploitation levels. This may affect any future expansion of both our purse-seine and long-line fisheries. It may also result in restrictions on Fish Aggregate Devices or FAD fishing.

Surveillance and enforcement

Papua New Guinea's EEZ covers an area of 4.23 million square km of sea, the third biggest in the Pacific Island countries, and holds the largest tuna stocks in the world. As such, surveillance and policing are major challenges. PNG would like to thank Australia, New Zealand, the United States, Forum Fishing Agency, and France for supporting Papua New Guinea in her surveillance and policing efforts. Thanks are also owed to the Commonwealth Secretariat for the effort and resources put in to draw up PNG's first Ocean Policy. The vast EEZ of PNG requires assurance of adequate financial resources and technology to provide effective surveillance and monitoring. It also requires effective interagency and international cooperation so that surveillance resources are pooled and coordinated.

Conclusion

The ocean remains one of the least-developed areas in the country. This is about to change, with the ocean increasingly being viewed as an underexplored and potentially lucrative opportunity for wealth creation. Given the damage to ocean ecosystems from existing human activities, the rush to unlocking new value from the ocean and the related risk of accelerating ocean degradation has led some to respond with calls to curtail, or even ban new activities. But there may be an alternative path through the development of a 'blue economy', where economic expansion can take place in alignment with responsible and sustainable management of ocean ecosystems.

Irrespective of where we live on this earth, we will always remain connected by the oceans. Therefore, it is in our common interest to protect this common heritage. The seas are our future.

The Blue Economy and New Zealand

Rear Admiral A.J.O. Martin

Introduction

The Pacific is more than the planet's dominant body of water, it is also part of a global communications system upon which mankind has lived, travelled, traded, competed for, explored, despoiled, delighted in, played in, and fought in and on. When seen from above, the Pacific is an unblinking eye of blue that stares out into space. It is that blue that is a key desirable attribute of any new planet we might settle on in the future. It is the very force of life itself.

Arthur C Clarke suggested that to call Earth 'Earth' was to ignore the sea and instead our planet should be called Ocean. Like many people he was a visitor to Australia and in the 1950s wrote about his travels there. His book *The Coast of Coral* - now part of a trilogy called the blue Planet - catalogued the beauty and wonder of the Great Barrier Reef. His book, like many others, underscored the value of the reef and the fascination with its beauty that led to the development of a number of industries (tourism, diving, fishing, hotels and boating) that rely on the reef. Unfortunately, it can be argued that his observations are somewhat dated, with his beloved reef damaged by careless tourists, bleached by increased sea water acidity, some fishing methods, and pollution.

The way we look at our oceans is changing, for the better. There is a growing emphasis on national jurisdiction and exploitation of new areas of resource, while we are also recognising the growing threats to the ocean, such as pollution, habitat loss, over fishing and the effects of climate change. And while countries claim geographic areas of the ocean, we also acknowledge that it is a world-wide interdependent eco system that in many ways resists the boundaries we try and place on it and where impacts are felt across the globe, often far from the place of origin.

The blue economy is a modern term for a well-known reality, which recognises increasing awareness of the economy of the ocean. As mariners we know the sea is important, but we haven't always looked at it as a whole. Like the ocean itself, the blue economy has a myriad of complementary, yet sometimes mutually exclusive facets including climate change, resource extraction, fisheries, energy generation, transportation, international legal frameworks and so on. It can deliver on multiple objectives - manoeuvre and access, economic development, growth, social equity, improvements in well-being and livelihoods and protection and restoration of the ocean's natural capital. The Australian National Centre for Ocean Resources and Security (ANCORS) describes the blue economy as a new forward looking, inclusive

approach to thinking about our oceans, which attempts to marry the notion of ocean-based development with environmental stewardship and protection.²

Blue economy

When thinking of the blue economy, it is hard not to think of the global communications that supports international trade. For centuries, ships have been the fastest, cheapest and safest way to transport goods over long distances. Markets flourished where seafaring traders could conduct their business in comparative safety, attracting more merchants, entrepreneurs, and labour. This remains true today, with the greatest concentrations of the world's population and industries located in the coastal zones around port logistic hubs.

States that protect their trade routes and guarantee freedom of access to trading partners not only gain significant economic advantage but also establish collaborative relationships with other states in other fields. The overwhelming economic success of the mutual exchange of goods traded by sea gave rise to trading companies and governments acting to guarantee security and access to the maritime domain for all. Today, cooperation and integration with the navies of other states to collaboratively enforce international rules and maritime law is of benefit to the economies and security of all trading nations.

New Zealand's development has been underpinned by that freedom of movement on the seas – starting from the arrival of our peoples in waka and later sailing vessels. New Zealand has the 5th largest EEZ in the world, and its oceanic estate teems with riches that are under increasing pressure, competition and yet also present great opportunity. The RNZN operates in support of national interests, from Antarctica to South East Asia and beyond. While we tend to look out at the world, it is also important to recognise New Zealand's role as a regional partner – where national interests absolutely intersect with other nations in the South Pacific and where the blue economy of the region is key to national security. It can be easy to forget that the RNZN is the second largest Navy in the South Pacific.

New Zealand relies on exports to transport the various items we grown for markets thousands of miles away and these exports are transported primarily by sea. Likewise, New Zealand imports various tools needed to keep industries going – along with the consumer goods that make up everyday life. One international commentator has noted that New Zealand is like an animal with its circulatory system outside its body. As such, the maintenance of that external circulatory system – the global transportation system, the arteries of our trade – and the protection of our maritime resources are among New Zealand's primary national security objectives. We have a critical interest in the trade routes which cross the globe, including those which don't come to New Zealand but still impact us. Over 60 per cent of our trade goes through

2 (Editor's note) ANCORS – Australian National Centre for Ocean Resources and Security – is a Centre within the University of Wollongong specialising in maritime issues.

the South China Sea, so we have a vested interest in that region's security, along with the other arterial routes thousands of miles from our physical location. It is those seas and oceans that also define New Zealand as a large maritime nation.

New Zealand's blue economy also extends far to the south, where the colour of the economy turns white as New Zealand's economic interests include the continent of Antarctica. Currently, support to the National Antarctic Programmes contributes up to NZ\$432m and 7,000 jobs to the New Zealand economy, so it is in our economic interests to ensure that the collaborative nature of development continues. In the future, we will see increased scientific exploration, fishing, and tourism, as the amount of human activity in the region increases. New Zealand's interest with Antarctica has driven Naval and Air operations and driven capability procurement decisions. This brings the need to ensure relevant international agreements are observed; for example the Antarctic Treaty and Convention on the Conservation of Antarctic Living Marine Resources (CCALMR). The RNZN is already engaged in regular fisheries enforcement and search and rescue operations below 60 degrees south latitude, and the new ice strengthened vessels coming into the Navy will enhance its ability to operate in the Southern Ocean and Ross Sea.

Navy contribution

The contribution the RNZN makes to the blue economy is in creating stability through the support of the rules-based global framework and ensuring the stability that enables economic growth for New Zealand and its South Pacific neighbours. This is done as part of the broad 'whole-of-government' approach to security, whereby all government agencies work together to protect and advance New Zealand's security interests, and where the Defence Force (including Navy) is an enabler for civilian agencies to achieve their ends for New Zealand's overall benefit.

New Zealand's oceans policy was created in 2008 and demonstrates that New Zealand is motivated to steward the basis of the blue economy. The marine environment is comprised of interrelated and interdependent components, managed by individual government departments. It is the environment upon which the blue economy is based; it's a dynamic system that changes both naturally and from the impact of human activity. The physical dimensions interact with each other but they also interact with the air and land. Activities on the land such as water runoff, sedimentation from agricultural land and waste disposal impacts on the quality of water in coastal and estuarine areas and the overall health of the marine system. The coordination of government agencies to steward and manage the approach to sustainable oceans is a key attribute of New Zealand's oceans policy and a foundation of its blue economy.

The population of New Zealand is becoming aware of its reliance on the seas and the increasing opportunity from the surrounding seas - and they expect the RNZN to not only defend the nation's interests at sea but also defend or steward the very seas themselves. While in the past we have been users and abusers of our waters, we cannot expect to retain a social licence to operate without being regarded as a mature

and responsible maritime guardian of our nation and the seas around New Zealand and the oceans of the world. The Navy must be seen as part of the solution. Gone are the days of ditching 'gash' (garbage) over the side – the RNZN needs to run a Navy which is responsible and which acts as a role model for best practises. We invest significant amounts in ensuring our hull coatings do not detrimentally affect the surrounding water, and we must avoid transporting invasive pests on ship's hulls or in bilges. As the RNZN purchases and builds new ships, there needs to be a demand for the use of recyclable commodities and an approach to look at enhancing the use of renewable energy sources, as well as responsibly disposing of our, such things as munitions.

As a Navy, the RNZN contributes to more than the security of the blue economy. It also trains highly skilled personnel, and every time there is an uptick in the economy, we find out how much they are valued by industry. There are opportunities to work jointly with industry in general, and the high-tech sector in particular, to contribute to the wealth of New Zealand, rather than just consume it. When we consider the value of the Navy, we need to recognise our greater contribution to the national enterprise. While efforts to enable trade provide a quantifiable value by comparing the cost of maritime security to the value of trade, this is not the whole story.

Conclusion

Collectively, navies are a global enterprise of maritime stewards who have as a common value a respect and a love of the sea. We are users of this truly global communications system and we all contribute to the development of security, stability and economic growth. The blue economy is not one particular part of any economy. Like the ocean itself, it has many facets depending on the way you look at it. The blue economy as concerns the RNZN should be viewed through the lens of the contribution it makes to generating security and wealth for New Zealand, and working with South Pacific partners to do the same. The RNZN aims to be a world class Navy for a large maritime nation. As that large maritime nation, New Zealand must nurture, support and protect the elements that make up its blue economy and support others to do the same for theirs.



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