



REPORT OF

NMF-KAS SYMPOSIUM ON

“CLIMATE-CHANGE-INDUCED THREATS TO CRITICAL MARITIME INFRASTRUCTURE: NATIONAL AND REGIONAL PERSPECTIVES”

04 OCTOBER 2022

NEW DELHI

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PROGRAMME
04 OCTOBER 2022

Time (IST)	Topic	Speaker/Presenter
0830-0900 (30 min)	Registration and Login	
OPENING SESSION		
0900-0905 (05 min)	Introduction to the Programme	Emcee - Ms Divya Rai Programme Executive National Maritime Foundation
0905-0910 (05 min)	Opening Remarks by NMF	Vice Admiral Pradeep Chauhan, AVSM & Bar, VSM, IN (Retd) Director-General National Maritime Foundation
0910-0915 (05 min)	Opening Remarks by KAS	Mr Pankaj Madan Deputy Head - India Office Konrad-Adenauer-Stiftung
0915-0930 (15 min)	Keynote Address	Mr Krishna S Vatsa Member, National Disaster Management Authority, India
0930-0935 (05 min)	Release of NMF Report on “ <i>Assessing Climate Change Risks-to and Resilience-of India’s Seaport Infrastructure and Operations</i> ”	Mr Krishna S Vatsa Member, National Disaster Management Authority, India
PROFESSIONAL SESSION I:		
QUANTIFYING CURRENT AND PROJECTED CLIMATE CHANGE IMPACTS ON CRITICAL MARITIME INFRASTRUCTURE		
0940-0950 (10 min)	Opening Remarks by Moderator	Vice Admiral Pradeep Chauhan, AVSM & Bar, VSM, IN (Retd) Director-General National Maritime Foundation
0950-1005 (15 min)	Climate-Change-Induced Security Threats to India’s Offshore Infrastructure	Commodore Sudhir Singh Officer In-Charge, Offshore Defence Advisory Group (ODAG) Cell, New Delhi
1005-1020 (15 min)	Emerging Climate Risks to Naval Infrastructure and Operations and their Implications for National and Regional Security	Cdr Pawanjit Singh Cdr-DNOM – Directorate of Naval Oceanography and Meteorology (DNOM), Indian Navy
1020-1035 (15 min)	Climate Change Impacts on India’s Seaport Infrastructure and Operations: Case Study of Mumbai Port and Paradip Port	Dr Pushp Bajaj Research Fellow and Head of the Blue Economy and Climate Change Cluster National Maritime Foundation
1035-1050 (15 min)	Climate Change Threats to Coastal Urban Infrastructure in Bangladesh	Prof Md Mustafa Saroar (Virtual) Professor, Department of Urban & Regional Planning Khulna University of Engineering & Technology, Bangladesh

1050-1105 (15 min)	Q&A	
1105-1125 (20 min)	TEA BREAK (at NMF Library)	
PROFESSIONAL SESSION II:		
BUILDING CLIMATE RESILIENCE INTO NATIONAL AND REGIONAL MARITIME INFRASTRUCTURE		
1130-1140 (10 min)	Opening Remarks by Moderator	Dr Ranit Chatterjee (Virtual) Co-founder, Resilience Innovation and Knowledge Academy (RIKA), India Visiting Associate Professor, Keio University, Japan
1140-1155 (15 min)	Global Best Practices towards Enhancing Climate Resilience of Seaports	Ms Regina Asariotis (Virtual) Chief, Policy and Legislation Section United Nations Conference on Trade and Development
1155-1210 (15 min)	Enhancing Climate Resilience of Indian Coastal Cities	Mr Shubham Tandon Project Officer – Disaster Risk Reduction and Climate Change Adaptation United Nations Development Programme
1210-1225 (15 min)	Utilising Coastal and Marine Ecosystems for Protection against Climate Change Impacts	Dr Chime Youdon Associate Fellow National Maritime Foundation
1225-1240 (15 min)	Role of People-led Initiatives in Enhancing Climate Resilience of Coastal Communities	Mr Mohammad Mahmodul Hasan (Virtual) Coordinator, Climate Change Program Christian Commission for Development in Bangladesh (CCDB)
1240-1255 (15 min)	Q&A	
CLOSING SESSION		
1300-1305 (05 min)	Vote of Thanks	Emcee - Ms Divya Rai Programme Executive National Maritime Foundation
1305-1400 (55 min)	LUNCH (at Varuna Naval Officers Mess)	

POLICY RECOMMENDATIONS

The National Maritime Foundation (NMF) and the India Office of the Konrad-Adenauer-Stiftung (KAS) jointly organised the half-day symposium entitled "**CLIMATE-CHANGE-INDUCED THREATS TO CRITICAL MARITIME INFRASTRUCTURE: NATIONAL AND REGIONAL PERSPECTIVES**" on **Tuesday 04 October 2022**. The event was conducted in physical format with virtual participation from international speakers.

The symposium successfully brought together international experts to share their unique perspectives and experiences on the growing risks posed by the impacts of climate change to maritime infrastructure and deliberate upon commensurate adaptation strategies that are being or should be adopted to minimise these risks. The two professional sessions delved into the themes "*Quantifying Current and Projected Climate Change Impacts on Critical Maritime Infrastructure*" and "*Building Climate Resilience into National and Regional Maritime Infrastructure*". The inter-related key policy recommendations that emerged from the symposium, are mentioned below:

1. A growing number of peer-reviewed scientific studies have shown that climate change is making extreme weather events, such as heatwaves, floods, and tropical cyclones, more frequent, more intense, and less predictable. To better prepare for the storms of the future, there is a need to enhance the national and regional scientific and technological capacity to improve weather forecasting models and long-term climate models to better predict the evolution of individual extreme events and the overall changes in their trends due to climate change, respectively.
2. There is an urgent need to undertake comprehensive local- and national-level climate change risk assessment studies that not only take into account current observed trends in climate-change-induced hazards but also projected changes for 2030/ 2050/ 2100. The risk assessments must also need address systemic issues such as rapid urbanisation, population growth, expansion of informal settlements, etc., that exacerbate climate risks, as also the growing likelihood of multiple disasters occurring at the same time or in a cascading manner.
3. Climate change induced sea-level rise poses a monumental and irreversible threat to critical maritime infrastructure. In order to inform policy decisions at the national level and development plans at the local level, we need to produce downscaled sea-level rise projections for 2030/ 2050/ 2100 at the district-, state-, and national-levels.
4. In response to sea level rise and high storm surges, a number of adaptation options could be considered on a case-to-case basis, such as protecting the coast using sea dykes, seawalls, barriers, etc., increasing the elevation of coastal infrastructure wherever possible, advancing seaward by land-fill, using sand or other material or by planting vegetation, and, retreating and relocating from areas that cannot be protected.

5. We must also explore Nature Based Solutions (NBS) for creating climate and disaster resilient infrastructure. NBS are being increasingly recognised as cost-effective solutions that provide additional socio-economic benefits through ecosystems services.
6. In addition to hard-infrastructure based measures, we must also incorporate 'soft measures' such as changes in policies, standard operating procedures, emergency preparedness protocols, working protocols, training exercises, building codes, etc.
7. In building coastal climate resilience, it would be critical to involve local communities in the planning, formulation, and implementation stages of the adaptation plans. It is essential to empower local communities through training programs on disaster preparedness, response and recovery, and climate change adaptation and mitigation. There is also a need to promote and facilitate community-led technological and social innovations to solve local-level challenges arising from climate change.
8. We must recognise that most types of maritime infrastructure are built to last several decades, 50 years on average. The impacts of climate change are accelerating and significant uncertainty remains in the pace and magnitude of future climate change. Therefore, the adaptation strategies must also be dynamic. This requires a completely new approach that is more amenable to modifications and upgrades on five- to ten-year timescales.
9. Finally, we must utilise existing regional and sub-regional frameworks such as the Indo-Pacific Oceans Initiative, the QUAD security dialogue, the Indian Ocean Rim Association, the Indian Ocean Naval Symposium, the Indian Ocean Commission, BIMSTEC and ASEAN, to promote sharing of best practices and technologies and prioritise climate change adaptation as a critical action point.

GLIMPSES FROM THE SYMPOSIUM



Figure 1: Images from Opening Session.



Figure 2: Image from Release of NMF Report on “Assessing Climate Change Risks-to and Resilience-of India’s Seaport Infrastructure and Operations”.



Figure 3: Images from Professional Session I on “Quantifying Current and Projected Climate Change Impacts on Critical Maritime Infrastructure”.



Figure 4: Images from Professional Session II on “Building Climate Resilience into National and Regional Maritime Infrastructure”.



Figure 5: Images of the audience taken at different points in the symposium.



Figure 6: Group photograph taken at the end of the symposium.

KEY TAKEAWAYS

- (a) Coastal areas around the world are amongst the most vulnerable to the impacts of climate change, because in addition to the impacts such as heatwaves, droughts, and extreme rainfall events, all of which are common to hinterland regions as well, coastal regions are increasingly experiencing sea-based threats such as far-more frequent and intense cyclonic storms and the long-term challenge of sea-level rise. Together, these impacts pose direct and quite significant challenges for critical maritime infrastructure which was the main subject for this symposium.
- (b) Nations have varying ideas for what constitutes ‘critical infrastructure’. In fact, most nations have not formally defined their ‘critical infrastructure’. In India, the National Critical Information Infrastructure Protection Centre (NCIIPC) defined ‘*critical sectors/ infrastructure*’ as those “*that are critical to the nation and whose incapacity or destruction will have a debilitating impact on national security, economy, public health or safety*”. While the NCIIPC is principally focussed on ‘*information*’ infrastructure, the proposed definition could be extrapolated to physical infrastructure as well.
- (c) Considering the growing energy demands, India has a massive network of oil and gas exploration and extraction infrastructure, as also oil refineries for finished products. Out of 34 million metric tonnes (MMT) of oil and 33 billion cubic metres (CBM) of gas that are extracted within the country annually, 50 per cent of oil and nearly 67 per cent of gas comes from offshore facilities. The protection of offshore energy infrastructure, therefore, is a critical component of national security.
- (d) The maritime trade sector forms the backbone of the global economy. Over 80 per cent, by volume, of all international merchandise trade is carried upon the sea. For India, this number is around 95 per cent. India has 12 major ports and over 200 non-major ports, situated along the 7516 km long coastline, that facilitate this trade and are, therefore, critical for the Indian economy.
- (e) Insofar as national security is concerned it is important to remember that a vast majority of the Indian Navy’s and the Indian Coast Guard’s bases, headquarters, hospitals, and training facilities are located in high-climate-risk regions along the coastlines of Mumbai, Goa, Kochi, Chennai, Visakhapatnam, Kolkata, as also in islands of the Lakshadweep and the Andaman and Nicobar chains. Any damage incurred by critical infrastructure or support facilities such as power and communication lines, will hamper the operational readiness of the Indian Navy and the Indian Coast Guard.
- (f) In the context of climate change risks to critical maritime infrastructure in sectors such as transport, power & energy, telecommunication, government, etc., the academic literature is quite scant. Most of the literature has originated in the last decade or so, that too primarily in developed countries.

(g) Recent records have shown that the frequency of high-intensity cyclonic storms has increased markedly in both the Arabian Sea and the Bay of Bengal in recent decades. This increase has been primarily driven by the increase in sea surface temperatures in the Indian Ocean due to global warming caused by increased greenhouse gas concentrations in the atmosphere. Studies also indicate that this trend is expected to continue in the future without significant mitigating actions to reduce the pace of global warming.

(h) While the east coast of India is rather familiar to powerful cyclones which have now become a nearly annual occurrence, the west coast has not witnessed high-intensity cyclones historically. Consequently, the country's maritime infrastructure along the west coast is particularly underprepared and therefore more vulnerable to these extreme weather events. This became evident in 2021 when cyclone Tauktae hit the west coast as an Extremely Severe Cyclonic Storm (ESCS) and caused significant damages estimated at over Rs 15,000 crore to the states of Kerala, Karnataka, Goa, Maharashtra and Gujarat.

(i) In addition to the possibility of causing physical damage to infrastructure, cyclonic storms result in economic losses by simply causing operational shutdowns. Considering seaports as an example, standard operating procedures dictate that during any cyclonic storm a port is to halt all operations, all vessels inside the port are asked to move outside to the anchorage area, all cargo-handling equipment is to be anchored and secured, and other facilities are to be secured appropriately. This shutdown period could last for a few hours to a few days depending on the intensity and duration of the cyclone. If any significant structural damage is incurred, the recovery period could be even longer, stretching up to weeks.

(j) In order to better prepare for the storms of the future, there is a need to enhance the national and regional scientific and technological capacity to improve weather forecasting models and long-term climate models to better predict the evolution of individual cyclones and the overall changes in their trends due to climate change, respectively.

(k) There is an urgent need to undertake comprehensive local- and national-level climate change risk assessment studies that not only take into account current observed trends in climate-change-induced hazards but also projected changes for 2030/ 2050/ 2100. This is highly relevant in the maritime sectors such as ports and shipping, fisheries, and energy, since the existing development plans in these sectors do not address the growing risks from climate change. The risk assessments must also need address systemic issues such as rapid urbanisation, population growth, expansion of informal settlements, etc., that exacerbate climate risks, as also the growing likelihood of multiple disasters occurring at the same time or in a cascading manner.

(l) The Indian Ocean, the Bay of Bengal in particular, is experiencing one of the fastest rates of sea level rise than anywhere else in the world. Sea level rise poses a monumental, irreversible and long-term threat to critical maritime infrastructure in coastal and island nations of the Indo-Pacific.

(m) The Working Group I contribution to the Sixth Assessment Report, entitled “Climate Change 2021: The Physical Science Basis”, released by the UN Intergovernmental Panel on Climate Change (IPCC) in 2021, projected that the global mean sea level (GMSL) rise could be in the range of 0.63-1.01 m by 2100, relative to 1995-2014 levels if no mitigation action is taken. The report also acknowledged that there are significant uncertainties in model-based projections for sea level rise due to the complex nature of the land-based ice-sheet dynamics. In the “*low-likelihood worst-case scenario*” GMSL could rise by as much as 2 m by 2100, which would be utterly catastrophic for all coastal and island nations.

(n) In order to better inform actions at the local level and policy at the national level, the global projections for sea level rise must be downscaled to produce more detailed projections at the district- or state-level. This is a challenging scientific problem and one that needs to be supported through financing for research and development.

(o) In response to sea level rise and high storm surges, a number of adaptation options could be considered such as protecting the coast using sea dykes, seawalls, barriers, etc., increasing the elevation of coastal infrastructure wherever possible, advancing seaward by land-fill, using sand or other material or by planting vegetation, and, retreating and relocating from areas that cannot be protected. The feasibility and practicality of a particular approach would depend on the geographical limitations of the particular region and the associated economic, technological, and human costs.

(p) We must simultaneously explore Nature Based Solutions (NBS) for creating climate and disaster resilient infrastructure. NBS are being increasingly recognised as cost-effective solutions that provide additional socio-economic benefits through ecosystems services. Some of examples include better forest and soil management to reduce the risks from flooding due to extreme precipitation, increasing ‘green spaces’ in urban areas to reduce extreme heat stress and flooding risks, naturalisation of river banks to provide floodplain storage and regulate water flow, restoration and plantation of coastal wetlands such as mangroves and salt marshes to mitigate the impact of storm surges and prevent coastal erosion.

(q) In addition to hard-infrastructure based measures, we must also incorporate ‘soft measures’ such as changes in policies, standard operating procedures, emergency preparedness protocols, working protocols, training exercises, building codes, etc.

(r) In building coastal climate resilience, it would be critical to involve local communities in the planning, formulation, and implementation stages of the adaptation plans. It is essential to empower local communities through training programs on disaster preparedness, response and recovery, and climate change adaptation and mitigation. There is also a need to promote and facilitate community-led technological and social innovations to solve local-level challenges arising from climate change.

(s) Finally, perhaps the most important and yet frequently ignored aspect that must be addressed in climate change adaptation planning pertains to the dynamic nature of climate

change. Most types of maritime infrastructure are built to last several decades, 50 years on average. The impacts of climate change are accelerating and significant uncertainty remains in the pace and magnitude of future climate change. Therefore, the adaptation strategies must also be dynamic. This requires a completely new approach that is more amenable to modifications and upgrades on five- to ten-year timescales.

SOCIAL MEDIA COVERAGE



Figure 7: Screenshots #1 of live social media marketing on Twitter during the event. The tweets were made from the official twitter handle of the National Maritime Foundation [@nmfindia](https://twitter.com/nmfindia).



Figure 8: Screenshots #2 of live social media marketing on Twitter during the event. The tweets were made from the official twitter handle of the National Maritime Foundation [@nmfindia](https://twitter.com/nmfindia).



Figure 9: Screenshots #3 of live social media marketing on Twitter during the event. The tweets were made from the official twitter handle of the National Maritime Foundation [@nmfindia](https://twitter.com/nmfindia).

Video Recording: The four-part recording of the event can be found here <https://drive.google.com/drive/folders/1GsgqLZIdSogrWxD3A62gdSBWLBDNFNcuC?usp=sharing>

EVENT REPORT

INTRODUCTION

1. Recognising the urgency and seriousness of the risks posed by climate change to national and regional security in the Indo-Pacific, the **National Maritime Foundation** and the **India Office of the Konrad-Adenauer-Stiftung** have embarked on a long-term one-of-its-kind concerted project in which Indian and international experts, academics, policymakers, and other stakeholders, would be brought together to address the national and regional implications of climate change with regard to the different elements of human security, economic security, and hard security, in the form of research papers, policy briefs, discussion forums, and symposia. The inaugural symposium under this project focussed on the theme **“Addressing Climate-Change-Induced Security Threats to Critical Maritime Infrastructure: National and Regional Perspectives”**. This was the first in a series of symposia that will sequentially delve deeper into various sub-themes under the broader ambit of climate security, specifically in the maritime domain.

2. The symposium successfully brought together international experts to share their unique perspectives and experiences on the growing risks posed by the impacts of climate change to maritime infrastructure and deliberate upon commensurate adaptation strategies that are being or should be adopted to minimise these risks. The two professional sessions delved into the themes *“Quantifying Current and Projected Climate Change Impacts on Critical Maritime Infrastructure”* and *“Building Climate Resilience into National and Regional Maritime Infrastructure”*.

WELCOME REMARKS

4. **Vice Admiral Pradeep Chauhan, AVSM & Bar, VSM, IN (Retd) Director-General, National Maritime Foundation** welcomed all the panellists and participants to the symposium. He set the context for the symposium by outlining the purpose of the symposium, the nature of the collaboration with Konrad-Adenauer-Stiftung (KAS), the way forward and the need to sensitise and work together with the National Disaster Management Authority (NDMA) of India. He reminded the audience that, in India, there is abundant literature on critical *‘information’* infrastructure and the infirmities related to the IT sector. When it comes to critical *‘physical’* infrastructure, the literature is practically negligible. Within critical infrastructure, maritime infrastructure forms a major subset which is essential for the Indian economy, as also for maintaining strong relations with our maritime neighbours and ensuring security and prosperity in the broader Indo-Pacific region. He highlighted that India recognises the threats to critical maritime infrastructure from acts of terrorism and has indeed taken steps to address those threats, particularly since the 2008 attacks on Mumbai. However, he lamented the fact that we are not doing enough as a nation, as a region, and as a global community to assess and mitigate the threats posed by the growing impacts of climate change, which was the primary motivation for this symposium. He congratulated KAS for their commendable efforts in recent decades to facilitate important dialogues in India and enhance international cooperation within the region.

He acknowledged the long-standing, highly productive institutional partnership between the NMF and India Office of KAS. Finally, he urged the participants and the audience to avoid the tendency to converse in generalities and address the *specifics*. He highlighted the need to provide targeted solutions and policy recommendations to the government authorities to address the risks from climate change to critical maritime infrastructure. In this context, he urged the NDMA to not only focus upon the Indian mainland and the island territories but also on the challenges in the broader region and countries in India's maritime neighbourhood and exchange best practices.

5. **Mr Pankaj Madan, Deputy-Head India Office, Konrad-Adenauer-Stiftung**, at the outset, acknowledged the strong professional ties between KAS and the NMF and thanked the team that put together the symposium. He highlighted the fact that rising sea-levels and extreme weather events that are increasing in frequency and severity, due to climate change, are hurting the booming urbanisation and leading to loss of lives and livelihoods in the coastal regions of India. Quoting Rabindranath Tagore, Mr Madan urged the audience to be fearless in the face of new and more severe dangers arising due to accelerating climate change. In the context of the symposium, he pointed out the criticality of maritime infrastructure for the survival of the coastal populace and to ensure the effective functioning of the supply chains. He highlighted that the Indian coastline is particularly vulnerable to climate change due to frequent flooding, cyclonic storms, and land erosion due to sea level rise. The high population density in coastal regions also adds to their vulnerability. He pointed out the need for strengthening the early warning systems, evacuation procedures, and HADR capabilities, that have indeed in recent years saved many lives during disasters. He reminded the audience that Germany and India have both adopted the Sendai Framework for Disaster Risk Reduction 2015-2030, which aims to enhance international cooperation and reduce the harmful effects of climate change. He also pointed out that Germany is one of the member countries of the Coalition for Disaster Resilience Infrastructure (CDRI) that was launched by Prime Minister Narendra Modi in 2019. Finally, he highlighted the topics that will be covered during the symposium and acknowledged the esteemed speakers that will be sharing their perspectives and insights.

6. **Mr Krishna S Vatsa, Member, National Disaster Management Authority, India**, in his keynote address, outlined the key contemporary issues arising from climate change and the steps that are being taken to address those issues. He pointed out that while scientific measurements have shown that both the Arabian Sea and the Bay of Bengal are warming, we need more research to establish with certainty the extent of warming and make future projections. Similarly with sea level rise, it is well-established that there are three main contributing factors, (1) thermal expansion of the ocean water, (2) melting of continental ice sheets and mountain glaciers, and (3) land subsidence due to anthropogenic activities, however, we need more research to establish with certainty the current trends and future projections. In the context of extreme weather events, he pointed out that the frequency of cyclones affecting India's coastline is increasing. This is particularly worrisome for the West Coast of India since the region have not witnessed many cyclones historically. The Government of India, including the NDMA, has taken several steps in recent years which have been successful in reducing the number of casualties from cyclones, however, in light of the changing risk profiles he

emphasised the need to be prepared for such extreme events. In the context of adverse impacts on maritime infrastructure, he shared the examples of Mumbai port and Visakhapatnam port that incurred significant losses due to cyclone *Tauketae* and cyclone *Hudhud*, respectively. He highlighted the threats posed by land erosion to coastal communities and shared the initiatives that are being implemented by the NDMA to address coastal erosion. He emphasised on taking a multi-faceted approach towards risk mitigation, in addition to hard infrastructure, he emphasised the need to incorporate nature-based solutions and work together with local communities. He highlighted the efforts being made together with the Coalition for Disaster Resilient Infrastructure (CDRI) in making the energy infrastructure more resilient in the coastal regions. He spoke about the need for more comprehensive and detailed risk assessment studies to inform commensurate adaptation strategies. In this context, he indicated the potential for collaboration and cooperation between the NMF and the NDMA, as also with other organisations across the country, to conduct such studies in the future.

PROFESSIONAL SESSION I: QUANTIFYING CURRENT AND PROJECTED CLIMATE CHANGE IMPACTS ON CRITICAL MARITIME INFRASTRUCTURE

7. **Vice Admiral Pradeep Chauhan, AVSM & Bar, VSM, IN (Retd) Director-General, National Maritime Foundation**, moderated the opening session. In his opening remarks as the moderator, he emphasised the need to define ‘critical *physical* infrastructure’ at the national and regional levels. Naturally, at the national level, the definitions may vary to some extent as different types of infrastructure may be ‘critical’ to different countries. He also highlighted the challenges that would arise in the implementation of an adaptation strategy due to involvement of a large number of stakeholders in the maritime domain, pointing out that there are at least 15 ministries, 20 agencies, and several private companies working in the maritime domain in India. He reminded the audience of the national and regional security concerns that would arise as a result of the impacts of climate change, providing the example of sea level rise along the coast of Bangladesh is expected to displace thousands of people, the movement of the displacement population to the urban areas in the hinterland will add pressure to the already strained urban infrastructure. He pointed out the need to conduct more comprehensive and robust risk assessment studies to guide our strategies. Finally, he emphasised that proceedings of the symposium must inform and guide the policymakers in the government of India and our neighbours in the region.

8. **Commodore Sudhir Singh, Officer In-Charge, Offshore Defence Advisory Group (ODAG) Cell, New Delhi**, presented his perspective on climate-change induced threats to India’s offshore infrastructure. Considering the evolving energy scenario and plans for installation of new offshore energy infrastructure (tidal, offshore wind, etc.), he urged that the impact of climate change on the energy infrastructure in India warrants a much more serious study than ever-before. He reminded the audience that India is still largely dependent on fossil-fuels for energy, with 50 per cent, 36 per cent, and 9 per cent of the total energy consumption being derived from coal, petroleum, and gas, respectively. He also pointed out that 50 per cent of oil and 67 per cent of gas that is extracted in the country annually, comes from offshore

assets. Citing recent literature, he highlighted the impacts of extreme temperature events on oil and gas extraction infrastructure, particularly in higher latitude regions. He spoke of the impacts on extreme precipitation and flooding events oil refineries and processing facilities and operations. He identified cyclonic storms with high wind speeds as the most dangerous threat to coastal and offshore energy infrastructure not only through direct structural damage but also by disrupting critical support facilities such as power and communication. He provided the example of Hurricane Katrina in 2017 in the USA, which destroyed 113 platforms, severely damaged 19 oil drilling rigs, and caused 19 mobile offshore drilling units to be adrift. In the context of sea level rise, he emphasised that the long-term nature of the threat must be taken into account since most maritime infrastructure has a lifetime of multiple decades. Finally, he provided recommendations for the way forward and highlighted the need for increasing internal capability, enhancing the knowledge base of management personnel, design engineers, and contractors, increasing capital investments, risk-evaluation studies, etc. He emphasised the need for a holistic resilience strategy which includes (1) anticipatory capacity, (2) absorptive capacity, (3) coping capacity, (4) restorative capacity, and (5) adaptive capacity.

9. **Cdr Pawanjit Singh, Cdr-DNOM-Directorate of Naval Oceanography and Meteorology (DNOM), Indian Navy**, at the outset, provided an overview of the current trends in the impacts of climate change and their future projections under different greenhouse gas emissions scenario. He highlighted the emerging security risks due to climate change such as food and water scarcity, loss of biodiversity, increasing health risks, increasing poverty, and internal and external migration of people. He provided an analysis of critical timelines for climate-change-induced security impacts in the Indian Ocean Region (IOR); he indicated that about 2.5 million people along the Myanmar coastline are expected to be affected sea level rise by 2050; the southern Nicobar islands are likely to be submerged by 2040-2050; by 2050, with a predicted 50 cm rise in sea level, Bangladesh may lose 11 per cent of its land; between 2060 and 2080, Seychelles may lose 70 per cent of its landmass; Maldives may lose 77 per cent its landmass by the year 2100. He emphasised that the inundation of coastal and island territories, changes in coastlines leading to changes in baselines, opening of alternative shipping routes, and more frequent hydrometeorological disasters, will have significant impacts on the Indian Navy's operations by affecting the naval infrastructure and strategic positions. He also highlighted the maritime security and legal issues that would arise due to migration of 'climate refugees' to India. In his concluding remarks, he provided a few mitigating and adaptive measures that should be taken such as creation of protective infrastructure, conservation and protection of coastal and marine ecosystems, protective and preventive measures for naval installations, land reclamation or creation of artificial islands with higher elevation, climate-change-focussed multilateral initiatives, etc.

10. **Dr Pushp Bajaj, Research Fellow and Head of Blue Economy and Climate Change Cluster, National Maritime Foundation**, shared his views on climate change threats to India's seaport infrastructure and operations. He reminded the audience of the criticality of maritime trade, in 2021, merchandise trade accounted for nearly one-third India's total GDP and nearly 95 per cent of that trade travelled through the sea, facilitated by India's 12 major ports and over 200 non-major ports. He highlighted that ports are among the most vulnerable of the critical

maritime infrastructure simply due to their geographical location on the coast and the exposure to sea level rise and cyclonic storms. He pointed out that India's ambitious plan for development of the maritime sector, the Maritime India Vision 2030, which focusses on creating world-class greenfield ports, modernising existing ports, port-led industrialisation, and public-private partnerships, does not lay specific emphasis on protecting the infrastructure against the impacts of climate change. He presented the findings of the National Maritime Foundation's latest study on "Assessing Climate Change Induced Risks-to and Resilience-of India's Port Infrastructure and Operations", supported by the 2021-22 Fellowship of the CDRI, including climate-risk profiles of Mumbai Port and Paradip Port that were generated in consultation with the respective port authorities. The risk profiles indicated that cyclones and heavy precipitation events pose the most significant threats ports, followed by sea level rise and extreme temperature, as perceived by the port authorities. In his concluding remarks, he highlighted the need for more in-depth, quantitative risk-assessment studies of all major and non-major ports in a phased and systematic manner, and the scope to extend the study into the Indian Ocean Region (IOR) and promote greater cooperation on climate change adaptation and disaster resilience.

11. **Prof Md Mustafa Saroar, Professor, Department of Urban and Regional Planning, Khulna University of Engineering and Technology, Bangladesh,** presented his views on climate change threats to coastal urban infrastructure in Bangladesh. He pointed out that while no country or region in the world is immune to the impacts of climate change, low-lying deltas and island countries in the Indo-Pacific are particularly vulnerable hotspots. Setting the geographical context for Bangladesh, he mentioned that Bangladesh shares more than 100 rivers with India, most of which originate from the Himalayan region and all of which ultimately drain into the Bay of Bengal. He also highlighted that the Bay of Bengal is a breeding ground of cyclones, and the region is also experiencing one of the fastest rates of sea level rise. A 1-metre rise in sea level could inundate areas home to 24 million people and a projected 15 per cent increase in precipitation would affect 71 million people; the numbers could be even higher due to the fast-growing population in Bangladesh. He pointed out that, according to recent studies, the coastal districts of Patuakhali, Barguna, Bagerhat, Khulna, and Satkhira are the most vulnerable to saltwater intrusion, coastal inundation, cyclones, and storm surges. He outlined the critical urban infrastructure that are exposed to climate-change-induced events including transportation infrastructure, housing infrastructure, trade, commerce, and industry, parks and recreational infrastructure, power and energy infrastructure, health and educational infrastructure, etc. He then presented a case study of the Khulna Metropolitan City which experienced remarkable growth and development in recent decades and is expected to continue to grow in the future. He highlighted the climatic and non-climatic factors that will seriously impede the city's growth and safety, particularly for more vulnerable low-income settlements. Finally, he highlighted the measures (both hard and soft measures) being taken in Bangladesh at the national and local levels to minimise exposure to climate hazards, reduce the vulnerability, and increase adaptive capacity.

PROFESSIONAL SESSION II: BUILDING CLIMATE RESILIENCE INTO NATIONAL AND REGIONAL MARITIME INFRASTRUCTURE

12. **Dr Ranit Chatterjee, Co-founder, Resilience Innovation and Knowledge Academy (RIKA), India and Visiting Associate Professor, Keio University, Japan**, moderated the second professional session. He stressed on the criticality of maritime trade and its high vulnerability to climate change, particularly in South Asia and South-east Asia. He emphasised the need to address the vulnerability of soft assets, such as human resource, policy, economic growth, etc., in addition to the hard assets, such as, ports, oil pipelines, subsea structures, etc. He outlined the characteristics of ‘risks’ in the context of climate change, including systemic risk, new and emerging risks, transboundary risk, and cascading and compounding risk. In describing the concept of ‘infrastructure resilience’, he reminded the audience of the commonly used ‘4R’ system wherein Resilience is defined through four main characteristics of a system- Redundancy, Resourcefulness, Rapidity, and Robustness. He suggested the need to add an extra ‘R’ to the definition, corresponding to ‘Reflexivity’ which he described as the system’s ability to be dynamic and flexible in the face of new challenges. Finally, he highlighted the need to enhance the resilience of ‘social infrastructure’ including social capital, governance structures, policy, cultural diversity, knowledge capacity, etc.

13. **Ms Regina Asariotis, Chief, Policy and Legislation Section, United Nations Conference on Trade and Development**, was the first speaker in the session and delivered a presentation on global best practices in enhancing climate resilience of seaports. At the outset, she contextualised the problem by sharing estimates of projected global economic losses due to climate change induced hazards if adaptation measures are taken. She then highlighted the importance of seaports to the global economy and the direct and indirect threats posed by climate change to seaports. Utilising the IPCC’s definition of ‘climate risk’, she broke down the risk to ports into ‘hazards’, ‘exposure’, and ‘vulnerability’. She presented the projections for extreme sea level events and extreme heats for global ports under different future warming scenarios. She highlighted that exposure and vulnerability are heavily site-dependent and therefore require field studies; she shared the results from a recent study of the UNCTAD of the ports in Jamaica and Saint Lucia which showed that all critical transport infrastructure assets are at high risk from climate change by even as early as 2030. She lamented the fact that we are not prepared for the risks emerging from climate change as is evident from recent survey-based studies. She emphasised the need to accelerate adaptation planning and climate action- conduct high-quality vulnerability and risk assessment studies, increase capacity building and better access to affordable climate finance, utilise ecosystem-based adaptation approaches, avoid maladaptation/ ‘over-engineering’, and strengthen legal and policy frameworks. As an example, she highlighted the EU Strategy on Adaptation to Climate Change which incorporates important legal and policy changes and provides guidelines for climate proofing of critical infrastructure.

14. **Mr Shubham Tandon, Project Officer-Disaster Risk Reduction and Climate Change Adaptation, United Nations Development Programme**, spoke about enhancing climate resilience of Indian coastal cities. At the outset, he highlighted how rapid urbanisation, movement of rural population to urban centres, poor management of resources, and the impacts

of climate change, together pose major challenges to India's coastal cities. He pointed out that in urban centres, in particular, systemic and cascading risks become highly relevant; high population density and poor infrastructure services could exacerbate losses from natural disasters. He emphasised the need to revise the city-level disaster management and climate change action plans which are now outdated, as also the city building bylaws, regulations, and standards to account for the current and projected impacts of climate change. He highlighted the need to conduct climate risk assessments of coastal regions that account for compound, cascading, and systemic risks and at the 'micro-level' to support local development planning and processes. He stressed on the importance early-warning systems, community-based resilience measures, protection and conservation of coastal ecosystems, and utilising nature based solutions for urban resilience. Finally, he shared a video from an ongoing project of the UNDP entitled *"Enhancing Climate Resilience of India's Coastal Communities"*.

15. **Dr Chime Youdon, Associate Fellow, NMF**, delivered a presentation on mainstreaming nature-based solutions for creating climate and disaster resilient infrastructure. She reminded the audience that infrastructure forms the backbone of the global economy, connecting people, enhancing quality of life, and promoting health and safety. She then pointed out the impacts of climate change on coastal infrastructure; In 2005, 136 largest coastal cities globally suffered losses worth USD 6 billion; by 2050, these losses are expected to rise to at least USD 52 billion per year. She then provided examples of 'hard-infrastructure' solutions, such as dikes, seawalls, etc., that are being explored around the world to protect coastal regions, however, she pointed that such measures prohibitively expensive, especially in the developing parts of the world. In this context, nature-based solutions provide cost-effective solutions that also provide socio-economic co-benefits. She highlighted there is no standard definition of 'nature-based solutions', the International Union for Conservation of Nature provides a holistic definition which states, *"actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits"*. Through case studies and examples, she highlighted how nature-based solutions can be utilised to minimise disaster and climate risks, for instance in landslide prone areas, restoring forests could stabilise soils and slow water runoff, better forest management can also reduce risk of wildfires. In urban centres, well designed green spaces can reduce heat and flood risks. Restoration and protection of coastal wetlands can protect the coastline against storm surges and sea level rise. She highlighted the potential-of and shared examples of current initiatives in nature-based solutions for climate change adaptation in India and neighbouring countries in South Asia and South-east Asia. Finally, she emphasised the need for integrating nature-based solutions in nationally determined contributions (NDCs), the need to increase capital investment, to work together with local communities, and to scale up monitoring and evaluation systems for nature-based solutions

16. **Mr Mohammad Mahmudul Hasan, Coordinator, Climate Change Program, Christian Commission for Development in Bangladesh (CCDB)**, was the final speaker for the session and the symposium. He explored the role of people-led initiatives in enhancing climate resilience of coastal communities. At the outset, he explained points of vulnerability of Bangladesh to climate change, he highlighted that over the last 13 years Bangladesh has seen 12

major cyclones, in an average year 18 per cent of the landmass is inundated by flooding, and the soil salinity has increased by 26 per cent over the last three decades. Giving a brief background of the CCDB, he explained his role in the Climate Change Division of the CCDB and how they are working to enhance resilience through community-based/led initiatives. The CCDB established the Community Climate Resilience Centre (CCRC) which focusses upon early warning systems, fund raising, information sharing, and market linkages, among other things. In this context, he highlighted the importance of training and capacity building programmes for disaster management, climate change adaptation, gender equity, etc. He shared their work on building climate-resilient agriculture through people-led solutions that utilise climate-adaptive technologies, rainwater harvesting, desalination plants, crop-rotation methods, seed storage facilities, etc. He also highlighted the need to generate alternative livelihoods through skill development for the vulnerable communities that may be conventionally solely reliant on fishing or farming. Finally, he emphasised the critical role of the youth in climate change action, he highlighted the CCDB's work in collaboration with schools in involving the youth through training programmes, and generating volunteering opportunities.

SPEAKER PROFILES

(In order of their appearance in the Programme)



Vice Admiral Pradeep Chauhan, AVSM & BAR, VSN, IN (RETD), Director-General, National Maritime Foundation, New Delhi. An alumnus of the National Defence Academy, the Defence Services Staff College, the Naval War College, and the National Defence College, with BSc, MSc and MPhil degrees under his belt, Admiral Chauhan, is currently the Director-General of the National Maritime Foundation, New Delhi, which is India's foremost resource centre for the development and advocacy of strategies for the promotion and protection of India's maritime interests.

The admiral retired on 30 November 2013 after an illustrious, rich, and varied four-decade-long career in the Executive Branch of the Indian Navy. This included a stint in Antarctica, as also a three-year deputation to the Government of Mauritius, where he set up and commanded the Mauritius National Coast Guard. His sea-going service incorporates as many as four command-appointments. After doing the 42nd NDC, he was the Principal Director of Naval Operations and thereafter went on to command the Indian Navy's sole aircraft carrier of that period, the *Viraat*. As a Rear Admiral, he was the Navy's first Assistant Chief of the Naval Staff (Foreign Cooperation & Intelligence), where he conceptualised and executed the Indian Ocean Naval Symposium (IONS). As a Vice Admiral, he has been Chief of Staff of the Western Naval Command; and was, in his last naval appointment before retirement, the Commandant of the Indian Naval Academy (Ezhimala). He has been commended three times by the President of India for sustained distinguished service. Not one to rest on past laurels, he has remained active even after retirement and is a much sought-after thought-leader and leadership mentor. Apart from being on the visiting faculty of the higher-command establishments of all three of India's defence services, as also tri-Service establishments such as the College of Defence Management, Hyderabad and the National Defence College, New Delhi, he has also been advising the government through his interaction with the Integrated Headquarters of the Ministry of Defence (Navy), the Ministry of External Affairs, and the National Security Council Secretariat. He is, in addition, a prolific writer with over 95 published professional articles and papers, and, a respected Adviser and Fellow of several important think-tanks.



Mr. Pankaj Madan has been active with Konrad-Adenauer-Stiftung, India since February 1991. At this juncture, he is the Team leader Programme and deputises for the Resident Representative to India of KAS as and when the need arises. During his long experience with KAS, he has been responsible for building, maintaining, and enhancing old partnerships while forming new ones with political parties, think tanks, institutions, and personages of repute. He has authored reports on various topics focusing on geo-strategic and geo-economics issues and curated many programmes as well as research projects.



Shri Krishna S. Vatsa has worked in the area of disaster risk reduction and recovery for the last 25 years. Prior to joining as Member, NDMA, Krishna S. Vatsa worked as Policy Advisor, Disaster Recovery, Bureau for Policy and Programme Support (BPPS), UNDP in New York and Nairobi during 2015-20. He served as the Regional Disaster Reduction Advisor, South & South- West Asia in New Delhi from 2008 to 2014. He joined UNDP in 2007 as Early Recovery Coordinator in Philippines.

As a career civil servant, Krishna S. Vatsa joined the Maharashtra Emergency Earthquake Rehabilitation Programme in the state of Maharashtra in 1995, and implemented a large-scale earthquake recovery programme during the next four years. He has also served as Secretary to the Government of Maharashtra, Relief and Rehabilitation from 2003 to 2006, and then as Secretary, Rural Development & Panchayati Raj from 2006 to 2007. In course of his career, he extensively consulted for several national and international organizations in the area of disaster risk reduction and recovery. Krishna S. Vatsa has a Doctor of Science in Disaster Risk Management from the George Washington University, Washington, DC and published extensively on the subject.



Cmde Sudhir Singh graduated from the National Defence Academy based at Pune, and was commissioned into the Indian Navy in 1989. He is a Weapons Specialist and has served on board various guided missile destroyers. He has commanded two guided missile destroyers, an offshore patrol vessel and a mine counter-measures vessel. He has also served in the Operational staff of the Fleet. The officer has done a short assignment at the United Nations, New York, in the Department of Peace Keeping Operations in 2009. He has undergone the National Defence University course in the Republic of Korea and has obtained a Master of Philosophy degree in Defence and Strategic Studies, whilst being posted as the Directing Staff at the Naval War College

at Goa. He has worked at the Disarmament and International Security Affairs Division of the Ministry of External Affairs, New Delhi, as Director (Military Affairs) and is presently appointed as the Officer in-Charge of ODAG Cell (Delhi) at IHQ, MoD (Navy).



With an education qualification of BE Mechanical from VTU University Karnataka, **Cdr Pawanjit Singh** was selected as Squadron Cadet Captain. Post completion of the basic training, he joined INS Shivaji as instructor on his first appointment and was subsequently selected to undergo Met Course. He completed his Advance Met Course from IMD, Pune in 2009 and was awarded MSc in Meteorology and Atmospheric Sciences from Cochin University of Science and Technology (CUSAT). In 2012, he was selected as the commissioning crew in Russia after completing a short Russian language course in Mumbai. During his tenure abroad, he was selected to undergo Advance Oceanography course at SNOM and completed the same in the year 2015. Before joining DNOM, he

was posted at NODPAC as SSO (Ocean).



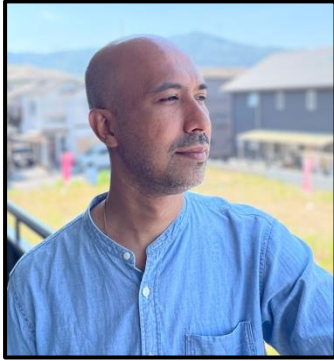
Dr Pushp Bajaj is a Research Fellow and the Head of the Blue Economy and Climate Change Cluster at the National Maritime Foundation in New Delhi, India. His research areas of interest include climate change impacts on India's maritime and naval security, climate resilience of India's critical maritime infrastructure, India's domestic and foreign climate policies, sustainability in the maritime domain, and the Blue Economy. He was recently recognised as a Fellow of the 2021-22 Coalition for Disaster Resilient Infrastructure (CDRI) Fellowship. Prior to joining the Foundation, Dr Bajaj worked as an independent science writer and

researcher focusing on climate change and the environment. He has published several articles in international peer-reviewed journals and reputed digital and print news platforms and magazines on sustainable development, climate science, climate policy, and related areas. He received his PhD in Chemistry from the University of California, San Diego, USA, where he was a graduate researcher for the NSF-funded Center for Chemical Innovation - Center for Aerosol Impacts on Chemistry of the Environment based in San Diego, CA, USA. He is an alumnus of the Indian Institute of Technology Madras in Tamil Nadu, India and St. Stephen's College of the University of Delhi, India.



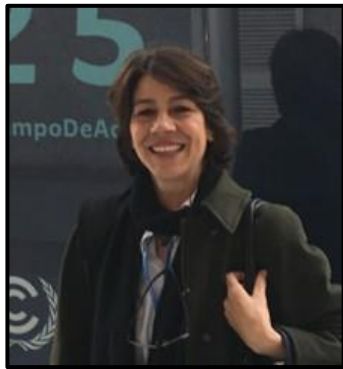
Professor Mustafa Saroar lectures on Sustainable Urban Management at Khulna University of Engineering and Technology (KUET), Bangladesh. He did PhD from the Asian Institute of Technology (AIT), Bangkok & Norwegian University of Science & Technology (NTNU), Trondheim, Norway (As an Exchange Norwegian Government/MFA Scholar). He holds an MSc from the Technical University of Dortmund, Germany (as German Government/DAAD Scholar). Prof Saroar worked for many institutions including Unicef, UNDP, USAID, FAO, WHO, GIZ, RVO, and CGIAR institutions. He has published 27

Scopus/Web of Science indexed peer-reviewed papers from leading publishers including SpringerNature, Elsevier, T&F, Wiley & Sons, Emerald, Cell and Cambridge University Press. He has presented as a keynote/plenary/invited speaker at more than 30 high impact international conferences held in North America, Europe, Oceania, Latin America, Africa, and Asia. Prof Saroar is very often invited as an expert panel discussant on issues of Urban Sustainability by government agencies, international organizations, and industry. Professor Saroar's almost a dozen of interviews have been published/shown by many print and electronic media (news channels) in Bangladesh.



Dr Ranit Chatterjee is an architect turned disaster management professional with a doctoral degree in environmental management from Kyoto University, Japan. Having a work experience of over 10 years, he has been involved in various projects spanning from architectural planning & conservation to disaster risk reduction in countries across Asia such as India, Japan, Nepal, Laos, and so on. He has previously worked with UN organizations, national and local governments, the private sector, and academia. Ranit has Co-founded RIKA India, a research-based startup to undertake research to bring evidence on disaster risk reduction and climate change adaptation. In addition, he is one of the founding members of

UINSPIRE Alliance, a network of young professionals to further science, engineering, technology and innovation in the Asia Pacific region. Ranit is an IRDR Young scientist fellow (Integrated Research on Disaster Risk), a CEM member of the IUCN business and biodiversity group and an Advisory member of UNDRR's Stakeholder Engagement Mechanism (SEM). He has several academic publications to his credit.



Regina Asariotis is Chief of the Policy and Legislation Section in the Division on Technology and Logistics of the UN Conference on Trade and Development (UNCTAD), where her work focuses on transport law and policy (<https://unctad.org/ttl/legal>). This includes work, since 2008, on the implications of climate change for international maritime transport and trade, with a focus on climate change impacts and adaptation for seaports and other critical transport infrastructure, including in Small Island Developing States (SIDS) (see <http://SIDSport-ClimateAdapt.unctad.org>). Before joining UNCTAD in 2001,

Regina was a Senior Lecturer in Maritime Law at the University of Southampton, where she taught international maritime law and international trade law. She holds a German law degree, an LL.M from the University of Southampton and a PhD from the University of Hamburg and is a Barrister (England & Wales) and Attorney at Law (Greece), as well as Member of the Chartered Institute of Arbitrators (CI Arb).



Mr Shubham Tandon is an enthusiastic Environment professional with more than 10 years of experience; engaged in project management activities related to building rural and urban resilience, environment protection through Disaster Risk Reduction and Climate Change Adaptations, sustainable development and enhancing institutional capacities of the government and the local community as well.

He has successfully coordinated joint programmes with central ministries like the Ministry of Home Affairs, Ministry of Urban Affairs, Ministry of Environment Forest and Climate Change etc. and various state governments. Additional to a close understanding of working with multi-lateral and bi-lateral organizations Mr Tandon holds an in-depth knowledge of the UN system through his role with UNDP since 2016.

Mr Tandon holds a master's degree in Disaster Management and was a gold medalist from Tata Institute of Social Sciences, Mumbai. He did his B.Tech in Mechanical Engineering and was involved with Cummins India before transitioning to the development sector.



Dr Chime Youdon is an Associate Fellow at the National Maritime Foundation, New Delhi, India. Her work focuses on the issues of climate resilience and adaptation of critical maritime infrastructure, sustainable development of coastal urban agglomerations, blue economy, and global climate change politics. She holds the CDRI Fellowship (2021-22) at the Coalition for Disaster Resilient Infrastructure. She also holds the VAdm K.K. Nayyar Fellowship at the National Maritime Foundation for which she is working on climate resilience of coastal urban agglomerations. She has done her PhD from the Centre for European Studies, School of International Studies, Jawaharlal Nehru University, New Delhi.



Mr. Mohammad Mahmudul Hasan has been working in Christian Commission for Development in Bangladesh (CCDB) since 2019 as Coordinator, Climate Change Program. Mr. Hasan previously worked as a Manager in Grameen Shakti, Bangladesh. Prior to working in Bangladesh, he also worked as a researcher at Aalto University in Finland. Hasan is a certified KIC InnoEnergy Graduate from the European Institute of Innovation and Technology (EIT), where he earned dual M.Sc. in “Innovative and Sustainable Energy Engineering” at Royal Institute of Technology (KTH), Sweden and Aalto University, Finland. Hasan also holds

M.A degree in environmental science from Sodertorn University, Sweden, M.Sc and Honors Degree in Environmental Science from Jahangirnagar University, Bangladesh. Mr. Hasan participated as an observer and panellist at the United Nations Climate Change Conferences COP 21, COP 22, COP 23, COP 25. Mr. Hasan actively participated as panellist in the sessions at the 1st UN Asia-Pacific Ministerial Summit on the Environment in 2017 and the 5th Asia-Pacific Forum on Sustainable Development in 2018 at UNESCAP in Bangkok. Hasan’s professional work has centered on climate change issues, community resilience building, sustainable village development, social mobilization, adaptation and mitigation technologies, energy and environmental policy, renewable energy, sustainable biomass power generation, and solid waste management.

ABOUT THE ORGANISERS

National Maritime Foundation (NMF)

Located in India's capital, New Delhi, the **National Maritime Foundation (NMF)** is one of India's premier think-tanks and the only one in India that is focused entirely upon the maritime domain and is the foremost resource-centre for the development of strategies for the preservation, promotion, pursuit, and protection of India's maritime interests. The NMF is a 'Track 1.5' institution, with a healthy mix of highly-qualified and experienced uniformed and civilian scholars, who conduct research on a wide range of important strategic, economic, socio-economic, socio-cultural, environmental, scientific, legal, and historical issues in the maritime domain. For more information, visit <https://maritimeindia.org/>. Follow us on [Twitter](#), [LinkedIn](#), and [Facebook](#) for regular updates about our events and activities.

Konrad-Adenauer-Stiftung (KAS)

The Konrad Adenauer Stiftung (KAS) is a political foundation. Established in 1955 as "Society for Christian-Democratic Civic Education", in 1964 the Foundation proudly took on the name of Konrad Adenauer, the first Chancellor of the Federal Republic of Germany.

With 16 regional offices in Germany and over 120 offices abroad, the Konrad Adenauer Foundation is committed to achieving and maintaining peace, freedom, and justice through political education. We promote and preserve free democracy, a social market economy, and the development and consolidation of the value consensus. We focus on consolidating democracy, the unification of Europe, and the strengthening of transatlantic relations, as well as on development cooperation.

The leitmotif of the Konrad Adenauer Foundation "Germany. The next chapter" is supported by a thematic focus. With the three main topics Innovation, Security and Representation, and Participation, it is quite clear which topics the Konrad Adenauer Foundation will focus on in the coming years.

We cooperate with governmental institutions, political parties, and civil society organizations, building strong partnerships along the way. In particular, we seek to intensify political cooperation in the area of development cooperation on the foundations of our objectives and values. Together with our partners, we make a significant contribution to the creation of a global order that empowers every country to determine its own developmental priorities and destiny in an internationally responsible manner.

The Konrad Adenauer Stiftung has organized its program priorities in India into five working areas:

1. Foreign and Security Policy
2. Economic, Climate, and Energy Policy

3. Rule of Law

4. Political Dialogue focused on Social and Political Change

5. Media and Youth

The India Office of the Konrad Adenauer Foundation takes great pride in its cooperation with Indian partner institutions that implement jointly curated projects and programs.