MARITIME RESEARCH CENTER
FOUNDATION FOR UNDERWATER DOMAIN AWARENESS

RAJ PATH INFRACON PVT. LTD.

NIR DHWANI TECHNOLOGIES

COP26 and the Brahmaputra – A New Perspective Based on the Underwater Domain Awareness (UDA) Framework – 04/06

WEBINAR

REPORT

05 April 2022 | 1600hrs

COP26 and the Brahmaputra – A New Perspective Based on the Underwater Domain Awareness (UDA) Framework – 04/06

WEBINAR

REPORT

05 April 2022 | 1600hrs

Table of Contents

MRC-NDT/UDA/04 Apr 2022

Covering Note

The Maritime Research Centre (MRC), Pune and M/S NirDhwani Technology Pvt Ltd, organised a webinar titled “COP26 and the Brahmaputra – A New Perspective Based on the Underwater Domain Awareness (UDA) Framework – 04/06”, on 05 Apr 2022, for the policy makers, scientific community, executives from the stakeholders and also students & faculty from the Academia. It is the third of the series of six webinars.

The webinar was a high level dialogue among the senior strategists and experts from the industry, security establishments, diplomatic community, policy makers and others to evolve a common strategy at the national and regional level. The panel members were unanimous in endorsing the relevance and the urgency of the UDA framework for effective governance in the Brahmaputra River Basin. The panel members included:

(a) Lt Gen V G Khandare (Retd), PVSM, AVSM, SM. Adviser to the Defence Ministry and Former Military Adviser, NCSC.
(b) Prof Anjal Prakash, Research Director, Indian School of Business (ISB).
(c) Dr. Nilanjan Ghosh, Director ORF Kolkata.
(d) Prof Sucharita Sen, School of Social Sciences, JNU Delhi.
(e) Dr. Ruby Maloni, Former Head Dept of History, University of Mumbai.
(f) Prof Jayanta Bandyopadhyay, Former Professor at the IIM Calcutta.
(g) Dr(Cdr) Arnab Das, Founder & Director MRC, Pune

A report has been prepared to summarize the deliberations during the webinar and to give a broad way forward for actionable inputs for the various agencies and organizations both in the government and private sector. The detailed concept note has been attached. The substantive comments made by the esteemed panel members has also been summarized as part of this document. The video recording of the three hour high level dialogue is available at https://youtu.be/8Dvx08QmIEI

Dr (Cdr) Arnab Das
Founder & Director
Maritime Research Centre,
Pune

Report on Outcomes of the High Level Dialogue: COP26 and the Brahmaputra – A New Perspective Based on the Underwater Domain Awareness (UDA) Framework – 04/06

A webinar on the topic "COP26 and the Brahmaputra – A New Perspective Based on the Underwater Domain Awareness (UDA) Framework – 04/06" was held on the 05 Mar 2022 at 1600 hrs online, organized by the Maritime Research Centre (MRC), Pune and M/S NirDhwani Technology Pvt Ltd (NDT). The webinar was structured to discuss multiple dimensions of the issue with participants from several key areas like the policy makers, security agencies, blue industry, scientific community, diplomacy, and associated entities. The detailed concept note for the event and the list of panel members have been attached along with a brief on the substantive points made by the esteemed speakers.

The MRC, Pune was established as a technology based Think Tank to contribute to a national discourse and policy advocacy on Underwater Domain Awareness (UDA) in the Indian maritime zones, including internal waters, territorial waters, and the vast Exclusive Economic Zone (EEZ), the last extending over 23 lakh square kilometres. This contribution covers the entire spectrum of issues covering strategy, technology and innovation, and human resource development. The MRC seeks to complement the ongoing efforts to realise the vision of the Hon'ble Prime Minister of ensuring Security And Growth for All in the Region (SAGAR) in the Indian Ocean Region (IOR). The NDT is a start-up with niche R&D based capabilities in underwater acoustic hardware & software to enhance UDA capabilities. NDT is backed by researchers for high-end research based algorithms development & hardware configuration along with former naval colleagues to undertake field deployments.

The Indian Ocean Region (IOR) has attained significant strategic relevance in the 21st century. The strategic importance is related to maritime activities on all fronts and there is substantial interest among the nations within the region and outside to maintain their strategic maritime presence. The IOR, hosting important Sea Lanes of Communication (SLOCs) and massive undersea resources remains extremely critical for Blue Economic growth. However, the volatile regional geopolitical fluidity makes it a fertile ground for extra-regional powers to meddle with the domestic politics of the nations in the region. Consequently, the regional cooperation and the maritime governance have emerged as a major cause of concern. A detailed version of a holistic UDA framework as proposed by MRC, Pune is attached at enclosure-1. The socio-economic status of nations in the region requires a massive push towards economic growth even as the geopolitical and geo-strategic situation demands a nuanced approach. The safe, secure and sustainable growth model requires a comprehensive strategic vision with nations in the region coming together to pursue an effective roadmap on the way forward. The SAGAR vision is for

IOR security and development being primarily the task of the littoral states whilst extra-regional users of these waters adhere to the well-known principles of international law and conduct: any other approach is fraught with high prospects of military confrontation and regional instability. The maligned non-state actors are boldly having a free run, fuelling piracy and terrorism finding encouragement from certain internationally well-known quarters. Brahmaputra River Basin (BRB) governance has been a major cause of concern. Strategic cooperation with a binding framework is inescapable.

The ***UDA framework*** proposed by the MRC has significant merit in ensuring effective maritime governance in the IOR and beyond. The deliberations through the webinar recognized the relevance of the UDA framework and proposed setting up of a Centre of Excellence on the UDA Framework. The specific way forward collectively envisioned by the distinguished speakers and the participants are as follows:

(a) The importance of the river basin in ensuring sustainable growth across the stakeholders needs to be recognized and prioritized. Environmental Impact Assessment (EIA) has to be undertaken more comprehensively.

(b) Role of think tanks with deeper understanding of science & technology aspects in policy formulation was acknowledged. Closer interaction between the government and entities like MRC was encouraged. Sensitising our law makers both at the centre and the states needs to be taken up on priority.

(c) Setting up of a ***Centre of Excellence*** (COE) for progressing the UDA framework for effective maritime governance was unanimously endorsed. More details on the COE is attached at enclosure-2.

(d) The panellists also approved a three tier strategy of ***outreach, engage and sustain.*** The details are mentioned below:

Outreach The stakeholders across the stakeholders within and the nations in the region need to be made aware of the specific takeaways of the UDA framework through workshops & seminars, academic & corporate exchanges, short courses and bilateral & multilateral interactions. This kind of activities will facilitate heightened diplomatic outreach for India in the region.

Engage Post the outreach, we need to engage with these stakeholders and the nations for more involved capacity and capability building across multiple stakeholders. This will include UDA fellowships, academic degree programs in our institutes for their students & young professionals and joint projects under bilateral & multilateral MoUs. This will give us deeper penetration into their governance mechanisms.

Sustain The deeper penetration needs to be sustained with regional regulatory framework, establishment of a Centre of Excellence and inclusion of the UDA framework as an agenda point in the regional and global forums like IORA, BIMSTEC, IONS, Indian Ocean Commission, G-20, G-07 and more.

The three tier strategy will require massive capacity and capability building at the national level first. This can be achieved with a dedicated national capacity & capability building program, backed by the NITI Aayog. A User-Academia-Industry partnership with participation of all the stakeholders is required on priority.

There is significant merit in taking forward the above way ahead and the Maritime Research Centre (MRC), in partnership with M/S NirDhwani Technology Pvt Ltd (NDT) is well equipped to play a leading role in progressing the UDA framework for effective maritime governance in the IOR and beyond for true realization of the SAGAR vision. MRC will be keen to engage with the key authorities and institutions to take forward the policy advocacy, development of technology & innovation and comprehensive capacity & capability building. The MRC website (https://mrc.foundationforuda.in/) has more details on the projects being undertaken by them along with the engagements undertaken in the last four years since its inception.

Enclosure-1

Underwater Domain Awareness (UDA) Framework

The concept of Underwater Domain Awareness (UDA) in a more specific sense will translate to our eagerness to know what is happening in the undersea realm of our maritime areas. This keenness for undersea awareness from the security perspective, means defending our Sea Lines of Communication (SLOC), coastal waters and varied maritime assets against the proliferation of submarines and mine capabilities intended to limit the access to the seas and littoral waters. However, just the military requirement may not be the only motivation to generate undersea domain awareness. The earth's undersea geophysical activities have a lot of relevance to the wellbeing of the human kind and monitoring of such activities could provide vital clues to minimize the impact of devastating natural calamities. The commercial activities in the undersea realm need precise inputs on the availability of resources to be able to effectively and efficiently explore and exploit them for economic gains. The regulators on the other hand need to know the pattern of exploitation to manage a sustainable plan. With so much of activities, commercial and military, there is significant impact on the environment. Any conservation initiative needs to precisely estimate the habitat degradation and species vulnerability caused by these activities and assess the ecosystem status. The scientific and the research community need to engage and continuously update our knowledge and access of the multiple aspects of the undersea domain. Fig. 1, presents a comprehensive perspective of the UDA. The underlying requirement for all the stakeholders is to know the developments in the undersea domain, make sense out of these developments and then respond effectively and efficiently to them before they take shape of an event.

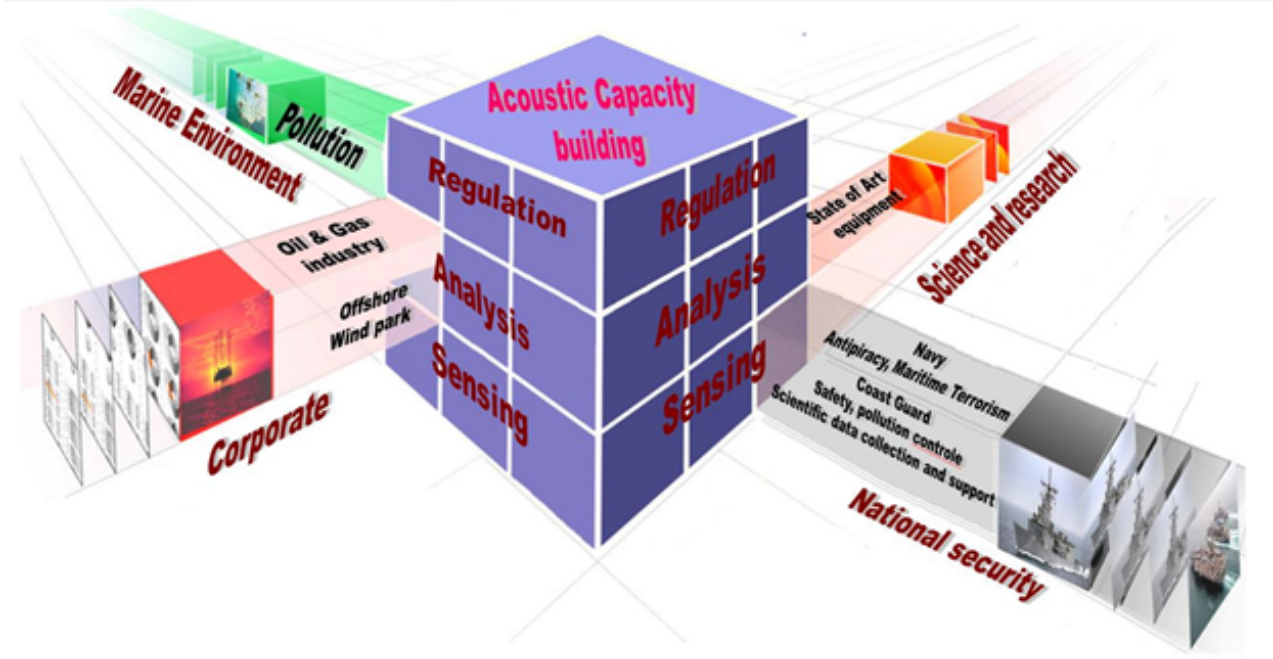

Fig. 1 Comprehensive Perspective of Undersea Domain Awareness

The UDA on a comprehensive scale needs to be understood in its horizontal and vertical construct. The horizontal construct would be the resource availability in terms of technology, infrastructure, capability and capacity specific to the stakeholders or otherwise. The stakeholders represented by the four faces of the cube will have their specific requirements, however the core will remain the acoustic capacity and capability. The vertical construct is the hierarchy of establishing a comprehensive UDA. The first level or the ground level would be the sensing of the undersea domain for threats, resources and activities. The second level would be making sense of the data generated to plan security strategies, conservation plans and resource utilization plans. The next level would be to formulate and monitor regulatory framework at the local, national and global level.

The figure above gives a comprehensive way forward for the stakeholders to engage and interact. The individual cubes represent specific aspects that need to be addressed. The User-Academia-Industry partnership can be seamlessly formulated based on the user requirement, academic inputs and the industry interface represented by the specific cube. It will enable more focused approach and well defined interactive framework. Given the appropriate impetus, the UDA framework can address multiple challenges being faced by the nation today. Meaningful engagement of Young India for Nation Building, probably is the most critical aspect that deserves attention. Multi-disciplinary and multi-functional entities can interact and contribute to seamlessly synergize their efforts towards a larger goal.

The UDA Framework as proposed above has been formulated jointly by the Maritime Research Centre (MRC), Pune and M/S NirDhwani Technology Pvt Ltd (NDT). The focus is on all the three aspects namely Policy, Technology & Innovation and Human Resource Development. More details are available in the MRC website https://mrc.foundationforuda.in/

Centre of Excellence on
Underwater Domain Awareness (UDA) Framework

This proposal includes the establishment of a ***"Centre of Excellence"*** comprising 5 sub-centres (or verticals), under the MRC, which would be characterised by a strong coherence but with independent activities. This Centre will advance the capacity and capability building objectives outlined at para (I) above. All the five centres will draw inputs from each other but have their unique and well defines Key Result Areas (KRAs) and Key Performance Areas (KPAs). The five sub-centres under the Centre of Excellence are listed below:

(a) The first will be ***strategy centre*** that will keep track of the R&D and industry requirements to build effective policy frameworks. There will be data driven policy formulation to address the stakeholder requirements. The KRA for the strategy centre will be to identify gaps in the domestic and regional policies and formulate effective way forward to build regional cooperation and effective maritime governance. The KPAs will reflect in seamless diplomatic interactions in the IOR and the wider Indo-Pacific region. India's leadership in the regional forums like IORA, BIMSTEC, G-20, G-07 and the Indo-Pacific Oceans Initiative will be key indicator of our success.

(b) The second will be a multi-disciplinary ***research centre*** that will provide cutting edge inputs with site specific field experimental R&D to address the core acoustic capacity and capability building requirements. The IOR with its unique tropical littoral waters needs sustained indigenous R&D efforts to overcome the challenges and capitalize on the opportunities. These efforts should be able to provide nuanced inputs for the strategy centre for effective policy formulation with data driven real time ground understanding. This should minimise the dependence on the technology imports and also enhance our strategic capabilities. Home grown science & technology dominance will minimize strategic risks for security and other critical projects. The activities of this sub-centre would be of relevance to our maritime outlook in its widest scope.

(c) The third will be an ***incubation centre*** that will map the research outcomes of the research centre to application specific requirements of the stakeholders. Start-ups and industries can draw ideas from here and build business plans. India's self-reliance on critical strategic issues will be critically depend on this initiative. The start-ups are always known for their agility to build high-tech solutions and the UDA framework has unimaginable possibilities. The effective eco-system provided by this incubation centre will nurture the talent pool we have in the country and provide innovative directions to channelize their efforts towards nation building.

(d) The fourth will be a ***training centre*** that will ensure the professionals and practitioners from the stakeholders, including partner countries to understand the nuances of the UDA framework and apply them effectively in their operations and strategic planning. This will not only make our practitioners more scientific and effective in their routine operations but also promote building the national infrastructure and bring seamless collaboration across the stakeholders. This facility will add to our diplomatic leverage in the pursuit of our larger maritime objectives.

(e) The fifth will be the ***academic centre*** that will build academic programs along with project based learning to prepare the next generation of students and professions to attain higher professional qualifications to appropriately take forward the UDA framework. The professional enhancement will be a very critical aspect to bring regional cooperation. The young generation and the experienced professionals sitting together and working on regional issues need no elaboration for its impact on regional cooperation. These centres will be the hotbed of innovations and ideas for effective progress and seamless interactions at all levels of decision making.

Substantive Comments by the Esteemed Speakers

Lt Gen V G Khandare (Retd), PVSM, AVSM, SM.
Adviser to the Defence Ministry and Former Military Adviser, NCSC.

"Brahmapurtra is the lifeline of Assam"

- Lt Gen VG Khandare

In his opening remarks, Lt Gen V.G Khandare congratulated everyone on National Maritime Day and thanked the Maritime Research Center and NDT for holding the webinar together. He added that the Brahmaputra should be accorded the same level of importance as all other rivers, and that the economic activities in and around the Brahmaputra basin are vital to the entire north-eastern region. The Brahmaputra, he remarked, is a lifeline for the people of Assam and Bangladesh.

He spoke about the intricacies of the north-eastern region, its economic factors, environmental challenges, and long-term goals.

In conclusion, he applauded Dr (CDR) Arnab Das, for his comprehensive work on tying together the Underwater Domain Awareness (UDA) Framework.

Prof. Suchitra Sen
School of Social Sciences, JNU Delhi.

Prof Suchitra Sen began by discussing a two-part transboundary water management project. She concentrated on the project's second part, which focused on giving a platform to people's voices on the ground and learning about how they engage with the river's ecosystem.

She briefly discussed her prior work on the gender atlas, and important issues pertaining to gender escape and gender space. Furthermore, she talked about an interesting trend of female to male relative work participation being higher in the mountainous spaces where the rivers originate from compared to the valley region.

She concluded by speaking about the need for inclusivity in flood control and transboundary river management challenges.

"Over 60 crore people will live in cities by 2040, and a substantial chunk of our cities would be vulnerable to climate change."

- Dr. Anjal Prakash

<u>Dr. Anjal Prakash</u>
Research Director, Indian School of Business (ISB).

Dr. Anjal Prakash gave a presentation on a report published by Intergovernmental Panel on Climate Change (IPCC). He mentioned his contributions to the special report by IPCC on the ocean and cryosphere.

He informed the audience of the progress on the second part of the report, dwelling deeper into climate change adaptation vulnerabilities.

He made the following two pertinent points in discussing key issues from the IPCC report.

1. The first point he brought to everyone's attention was that climate change is already taking place.
2. The second issue he brought to attention was that we will continue to experience extreme weather events even if we succeed in reducing global warming - pointing to the irreversibility of the climate crisis.

He then discussed in detail the Brahmaputra river and the impact of human activity on its hydrology. He brought forward an important topic of the vulnerability of India's urban areas compared to the rest of the world to "climate-induced hazards."

He addressed how people's livelihoods are changing in ecologically fragile locations such as Bangladesh's Brahmaputra region. He indicated the difficulties faced by people who rely on river water for farming, fishery, and other purposes.

He talked about the Himalayan glaciers and the Kailash ManSarovar, and addressed how the number, frequency, and severity of cyclones have increased. He also discussed some key problems in management of the Brahmaputra River.

He then touched upon some pertinent and deep rooted topics of the influence of climate change on gender, caste and inequality, income inequality and security issues. He concluded his address by emphasizing on the importance of acting now.

Dr. Nilanjan Ghosh
Director ORF Kolkata.

"Brahmaputra is one of the world's longest, most important, and least understood river basins"

- Dr. Nilanjan Ghosh

Dr. Ghosh began by thanking Dr. Prakash for his presentation and expressing his gratitude for being a part of this webinar. He also discussed the Ganga Brahmaputra Mignon (GBM) Basin.

He briefly touched upon his with Prof. Jayanta Bandyopadhyay on water and poverty. Further, he talked about the role of Brahmaputra's biodiversity which creates an ecosystem for the community to thrive.

Moving on, he highlighted some strategies for geostrategic issues. He shared an insightful perspective on the need for public perception to be driven by scientific data as opposed to conjectures. He talked about the highly complex drainage system of Brahmaputra Basin.

Moving on, he discussed several theories about Chinese interventions on the Brahmaputra, the Brahmaputra-Yarlung River link, and the Tibetan component of the basin. He also mentioned the Memorandum of Understanding between the two countries on the Yarlung Tsangpo.

Then he went on to discuss the three stations along the Tibetan border that share data on water level discharge and rainfall. He also briefly discussed the Teesta River, the Gajoldoba region, and the boro patties.

Dr. Ruby Maloni
Former Head Dept of History, University of Mumbai.

Dr. Ruby Maloni discussed the riverine history and lessons she acquired as a historian of the Indian Ocean, trade, the seas, and the waterways.

She focused on critical issues in contemporary society - ecology, water consumption, and the environment. She stated that the history of rivers, much like mythology, is deeply linked to religion and religious rituals. Furthermore, practically all religions revere the Brahmaputra River, particularly Hindus, Buddhists, and Jains, and each religious paradigm has its own legend to offer. Because the Ganga is one of the world's most important rivers, and because it is the most sacred river to Indians, it is also the most polluted. As she argues, the causes are the discharge of human sewage as well as animal waste, the rapid increase in population density, and the disposal of industrial waste into rivers, which has been going on for centuries. Furthermore, she stated that as India's industrialization accelerates in numerous towns and cities, such as Kanpur, Banaras, and other locations, the disposal of industrial trash into rivers becomes a major issue, which is particularly true of the Ganga. Urbanization is the single most important cause or factor for water contamination in India. We are fortunate to have mineral resources, as she stated earlier. She also remarked that India is endowed with abundant aquatic resources, but we are incapable of managing them. Our inability to focus on or deal with the situation has resulted in a number of long-term environmental challenges, including water scarcity and the generation and collection of waste water, both of which are critical. Cities having populations of more than one lakh inhabitants are anticipated to generate 15,600 million liters of wastewater every day. Furthermore, she states that her goal in participating in this webinar is to bring attention to the growing water concerns in India and around the world. Human interference is the factor that has modified the shape and flow pattern of every river throughout history. "Political blame games and diplomatic dialogues have taken place in the past and present, but what can be done now to solve this very urgent problem?" she asks. Furthermore, the deterioration of rivers, especially the Brahmaputra, which is approaching a critical stage, necessitates ongoing and substantial civil society debate as well as policy adjustments by the Indian government. She concludes by saying that "people's health is intimately intertwined with the help of rivers."

Prof Jayanta Bandyopadhyay
Former Professor at the
IIM Calcutta.

Prof. Jayanta Bandyopadhyay claims that the Brahmaputra is India's greatest flowing river. He remarked that climate change in the Brahmaputra requires a lot of in-depth understanding, and that it is not the IPCC's or even the FCCC's responsibility, but rather of all of us as Indians and Asians who share the Brahmaputra. He also mentioned the fact that all ten Hindu Himalayan rivers flow from a single place known as Man Sarovar or Mount Kailash. He then went on to discuss the Brahmaputra's meteorological system. He mentioned that the issue and challenges for those who understand ecology begin right there, because this is where the south Asian southern monsoon and the east Asian summer monsoon interact and create massive amounts of concentrated furious precipitation.

Prof. Bandyopadhyay goes on to add that Brahmaputra management must begin with the integration of meteorological, rainfall, and hydrology; otherwise, simply monitoring cubic feet of water passing through one station every day, hour, or minute will not result in any significant policy changes. He believes that the issue is not one of educating the general person, who has a minor part in such matters, but rather of educating our scientists, engineers, and policymakers, who have access to data, hydrology theories, and design and engineering. He also mentioned how a single small hydropower dam in China will dry up the Brahmaputra, causing a ruckus. He claims that we must understand science & good peer-reviewed publications rather than spectacular journalistic works. He believes that Brahmaputra requires special attention, and that when it comes to navigation, Brahmaputra's potential can only be realized if we comprehend the river's flow in terms of water diversity, energy, biodiversity, and silt. There will be silt, sediment flow, and sediment deposition as long as the Himalaya is standing, & as long as the monsoon is hitting the Himalayas. As a result, the river's ecology must be comprehended from the sky to the Ganga's confluence. He concluded by saying that deep scientific interdisciplinary analysis is required in the case of Bramhaputra.

Remarks by Host

Dr. (Cdr) Arnab Das
Founder & Director,
MRC, Pune

Dr. Das acknowledged an excellent start of the Webinar by valuing extensive statistical data along with the strategical perspective involved. He further mentioned the perspective of the Underwater Domain Awareness (UDA) framework which is developed at the Maritime Research Center.
The said framework shall give a safe secure sustainable growth in the entire Indo-Pacific region bringing our focus into the tropical growth. A quick mention about the geopolitical and the geostrategic perspective overviewing the larger tropical interactions. He also flagged out a point about sharing the Brahmaputra basin and its association with the four countries China, Bhutan, Bangladesh, and India. Along with this, he also stated about the China Water stress. While planning he requested the experts to focus on the Brahmaputra Basin people, economy, and nature.

A further mentioned about the government policy and how we can contribute in prevention to future acoustic habitat degradation, “Development is important but how do we navigate development with better awareness” so Underwater Domain Awareness (UDA) framework.
“Water quality Management and its issues also need to be enhanced, “ he added.
Keeping track of security in geopolitical situations, how to build systems, where our infrastructure investments and developmental programs are securely handled, was another issue raised by Dr Das. He also spoke about Blue Economy with its various projects and sustainability concerns.

Lastly, he spoke about the Underwater Domain Awareness (UDA) framework which was a lot of research and studies are required thus, inviting all the stakeholders to work in hand which shall pull in the resources and synergizes efforts. This framework can also invite the youth of India to some significant employment opportunities.
A lot of information about Acoustic mapping, sensitizing people with various programs to make people aware along with fieldwork looking forward to keen contribution by the stakeholders.
Dr Das concluded the purpose of such webinar to – “Outreach and Engage with sustainable projects where we can bring the policy technology interventions and the capacity building.”

Enclosure-3

Concept Note

The river Brahmaputra has played a critical role in shaping the culture, heritage and economy of Assam. There is potential for more and it is essential that we build capabilities and capacities for a safe, secure and sustainable growth of the region with optimum utilization of the resources in the river.

- The ‘safe’ addresses the disaster management efforts originating from the river – it could mean prevention and post event rehabilitation.
- The ‘secure’ address the security concerns that may originate from the river or even endanger assets in the river. The volatile security situation in the region does demand fresh initiatives that are able to address the concerns.
- The ‘sustainable growth’ pertains to economic growth with minimal degradation to the river flora and fauna.

The river ecosystem particularly in the tropical regions represents significant biodiversity with rich source of food and other resources. The sustainable growth model will require substantial efforts in ensuring minimal degradation of the river ecosystem. The river species including the river dolphins use sound or acoustic signals for multiple biologically critical functions like communication, navigation, foraging, breeding, etc. Thus, the acoustic habitat plays a critical role in their wellbeing and population abundance. There are innumerable dimensions of human interaction with these freshwater bodies. The growing human interventions can limit our usage of this critical resource and make us extremely vulnerable. The usage apart from domestic consumption can range from navigable waters for river transport, hydropower generation, exploitation of the living & non-living resources, climate control, wellbeing of the local flora & fauna, disaster management and more. The river provides a vital source of livelihood and economic prosperity to the region and also poses a great challenge to human life, flora & fauna, due to floods and erosion disasters. At present, the consumptive use of the river waters is at a minimum stage. However, the annual yield of the basin forms almost 30% of the annual water resources of the country. Thereby the basin has a great importance in supporting the water & energy security of the country.

The COP26 dialogues have brought out the critical role of the renewable energy sources in mitigating the climate change by substitution of fossil fuels for energy generation. Brahmaputra basin is the single greatest source of renewable energy to the extent of 40,000 MW and the same forms a very vital part of INDC goals committed by the nation to the world. Impacts on these resources also needs to be carefully evaluated and provided for. Moreover, Bangladesh is also critically short of renewable energy sources and will have to be supported by India for their wellbeing. Brahmaputra developments are important in this regard also. The Underwater Domain Awareness (UDA) is extremely critical for effective governance at all levels. There are multiple mega initiatives from the Government of India (GoI) today to enhance our growth and prosperity, however the sustainability remains a concern. A high-technology infrastructure needs to be put in place that can monitor the entire situation in real-time and provide the decision makers actionable

inputs on a tactical and strategic level. Right from the policy & technology interventions as well as capacity & capability building to manage such a high-technology systems will require substantial understanding and strategic vision. Organizational structure and interaction among the government and private players need to be planned to facilitate effective governance mechanism. Pooling of resources and synergizing of efforts across stakeholders, with high deployment of Science & Technology (S&T) tools, is the key to success. The COP26 summit has once again drawn attention of the entire global community to sustainable growth models and the climate change concerns. The Brahmaputra with its unique characteristics is a good case study to build on such sustainable development models.

Proposal

The state of Assam is extremely blessed in terms of the mighty river Brahmaputra flowing from one end to the other with over 900 kms of river length across the state. The resource availability is unprecedented, however the challenges of water resource management also has its own dimensions and dynamics.

The MRC and M/S NirDhwani Technology Pvt Ltd (NDT), organized a webinar on ***05 Apr 2022 at 1600 hrs.*** The title of the seminar was ***"COP26 and the Brahmaputra: A New Perspective Based on the Underwater Domain Awareness (UDA) Framework"***. The seminar brought all the stakeholders together focusing on the UDA framework on multiple aspects of the water resource management issue. A detailed seminar was formalized and forwarded to the policymakers, stakeholders and practitioners for a nuanced way ahead.

Program

1600 hrs - Opening Address by Lt Gen V G Khandare (Retd), PVSM, AVSM, SM.
Adviser to the Defence Ministry and Former Military Adviser, NCSC.

1620 hrs - Introductory Remarks on the UDA Framework and the River Systems.
Dr(Cdr) Arnab Das, Founder & Director MRC, Pune.

1640 hrs - River Management Challenges and Opportunities.
Prof Anjal Prakash, Research Director, Indian School of Business (ISB).

1700 hrs - Water Governance and the Geostrategic Perspective.
Dr. Nilanjan Ghosh, Director ORF Kolkata.

1720 hrs - Living with the River – Gender and Space Along Brahmaputra.
Prof Sucharita Sen, School of Social Sciences, JNU Delhi.

1740 hrs - Riverine History and Lessons Learnt.
Dr. Ruby Maloni, Former Head Dept of History, University of Mumbai.

1820 hrs - Closing Remarks - Science, Environment and Economy in the Himalaya.
Prof Jayanta Bandyopadhyay, Former Professor at the IIM Calcutta.

Convenor

Dr.(Cdr) Arnab Das, Founder & Director MRC, Pune.
Mobile-9665033463, Email-director.mrc@foundationforuda.in

COP26 and the Brahmaputra – A New Perspective Based on the Underwater Domain Awareness (UDA) Framework – 04/06

ESTEEMED GUESTS

LT GEN V G KHANDARE (RETD)
Adviser to the Defence Ministry,
Former Military Adviser, NSCS.

DR. NILANJAN GHOSH
Director ORF Kolkata.

PROF ANJAL PRAKASH
Research Director, Indian School of Business (ISB).

PROF SUCHARITA SEN
School of Social Sciences, JNU Delhi.

DR. RUBY MALONI
Former Head Dept of History, University of Mumbai.

PROF JAYANTA BANDYOPADHYAY
Former Professor at the IIM Calcutta.

HOST

DR (CDR) ARNAB DAS
Founder & Director
MRC, Pune

You can reach us at
www.mrc.foundationforuda.in
director.mrc@foundationforuda.in