

PRISM

A PPF Dispatch

Vol. 3, Issue 3 & 4 | March - April, 2021



The Policy Perspectives Foundation (PPF) is a non-profit, apolitical think tank on matters of national interest. PPF's activities focus on complex and interconnected challenges to peace, stability and development in India in cognizance of the external dimension. PPF is committed to spreading awareness, building capacity and promoting resilience.

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Corona, Crowds and the Country

– Vaishali Basu Sharma

The recent surge of COVID-19 virus has shaken the edifice India's otherwise staid healthcare sector with unprecedentedly high number of daily infections, deaths etc. As it often happens in moments of crises a curious mixture of facts and fiction created a miasma that affected popular perceptions and fueled panic.

India's daily COVID-19 case numbers, after falling steadily from mid-September 2020, began rising at the end of February 2021, picking up sharply by March. Around the same time political parties began campaigning for a series of state Legislative Assembly elections in West Bengal, Assam, Kerala, Tamil Nadu, and Puducherry, with voting starting at the end of March, and carrying on through April. There were also by-elections for the Tirupati (Andhra Pradesh) and Belgaum (Karnataka) parliamentary constituencies, and 14 Assembly constituencies.

There has been no dearth of violation of COVID-19 norms during this electioneering phase, leading to a surge in the pandemic. While Tamil Nadu and Kerala went for polls in a single phase, there were three phases for Assam. West Bengal is having assembly polls in eight phases. Polling in Tamil Nadu, Assam and Kerala ended on April 6, while the last day of voting in West Bengal was April 29. In addition to the Model Code of Conduct under which these states are since the poll dates were announced first on February 26, the Election Commission (EC) has also asked parties to comply with the broad COVID-19 guidelines it had issued in August 2020. The guidelines ask political parties and its workers to follow preventive measures including wearing masks, use of sanitizers, and observing social distancing in the larger interest of public health.

EC observers in West Bengal have been repeatedly stating the need to follow COVID-19 rules. Political parties were advised to choose for digital platforms for campaigning amidst the pandemic. But during the political rallies social distancing rules were



either entirely forgotten or no serious attempt made to implement these. As news channels covered the elections, star campaigners, political leaders and campaign managers were seen openly flouting pandemic safety guidelines. Videos on social media are abound with footage of violations of social distancing and mask-up norms at rallies. West Bengal witnessed a clear upward trend in daily coronavirus cases starting in the second part of March and thereafter recorded a very sharp increase. Other election states Assam, Kerala and Tamil Nadu witnessed similar rise in cases by late March and early April. Since the first week of April, the active cases in Assam have jumped by more than 10 times, while in West Bengal it has increased by over four times. In Kerala, the active cases between April 6 and 19 went up by over three times and in Tamil Nadu about three times. West Bengal crossed five figures in daily cases as the election phases passed. One Congress candidate from Shamsheerjang seat Rezaul Haque died from COVID-19 complications. Ajit Mangaraj another Congress candidate for the Pipili seat by-pass elections in Orissa died under similar conditions. Kajal Sinha, Trinamool Congress candidate from the Khardah Assembly also died after testing positive for COVID-19. Earlier Revolutionary Socialist Party (RSP) candidate Pradip Kumar Nandi had succumbed to the virus.

Why is it that with elections in the horizon political parties lose all sense or sensitivity to the necessity of adhering to safety?

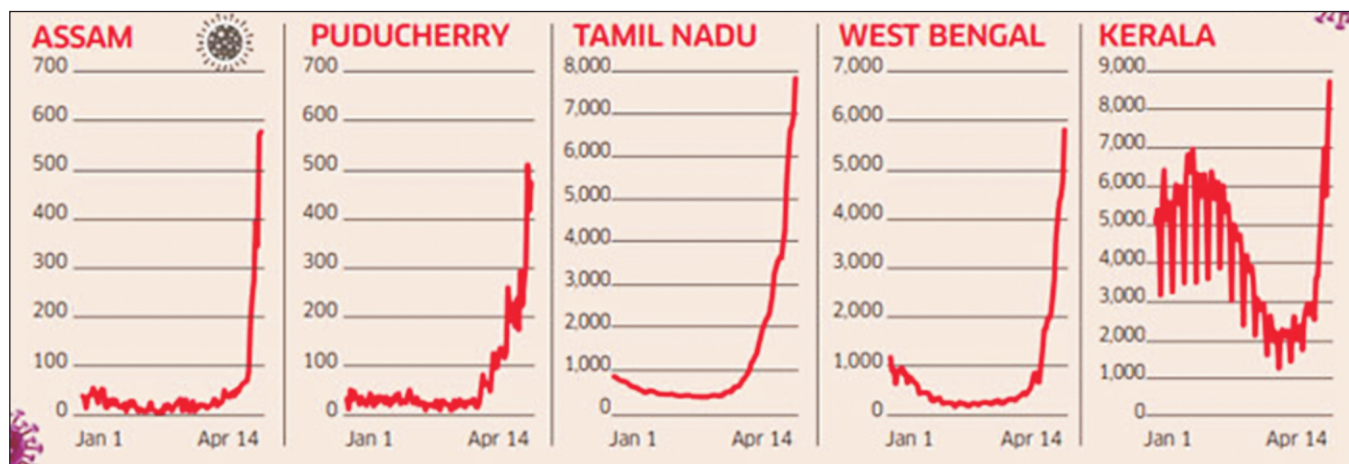
Things came to such a turn that the Election Commission was censured by the Calcutta High Court over its handling of the mammoth eight-phase election in Bengal in the middle of a lethal Covid second wave, forcing the EC to take 'serious

view of the laxity' in maintaining COVID-19 norms. The court observed that "the Election Commission is empowered to act, but what is it doing about polls in these COVID times? The EC is just passing circulars and leaving it to the people. But the EC has implementing authority."

Then on April 22, with only three phases of assembly elections remaining in West Bengal the election commission announced that it would book the organisers of political rallies under the Disaster Management Act if the rallies violate pandemic guidelines. Section 51 of the DMA states that violation of the pandemic norms can attract a year's imprisonment. How many rally managers were booked under DMA for violations?

Testing went Down: The Bihar assembly polls last year were the first elections held amidst the pandemic. Polls were announced on September 25 for three phases - October 28, November 3 and 7, 2020. Till September 25, there were 881 COVID deaths in Bihar, but after elections by December 12, the toll was 1,312. Bihar had reported 431 deaths in 79 days. Bihar had also decreased its testing during the election phase. Ideally, states going into election should follow a rigorous testing strategy, given the possibility that rallies and door-to-door campaigning can turn into super spreader events. But data indicates that states going to elections dial down testing during elections. Kerala was testing 61,806 samples on February 26--the day the model code of conduct was announced--on April 6, the last day of the election, this figure had reduced to 49,250 tests.

On the other hand, Assam was conducting nearly 13,300 daily during this entire period with no increase in testing.



Source: Economic Times

Leaders Argued for Outdoor Gatherings: Oddly in the same period March-April, as India witnessed a surge of 60.64 per cent in active cases, Maharashtra, where there were no elections, became the worst-affected state, with an increase of 19.79 per cent. This prompted some party leaders to argue that the risk of virus transmission at outdoor gatherings compared with events indoors remains extremely low. However, experts say that despite factors that substantially reduce the risk of transmission outside, standing in close proximity will still lead to a significant risk, particularly within 1m downwind of someone and face-to-face. Further this becomes particularly significant if the individual is generating an increased number of droplets and aerosols by shouting loudly. So clearly if people are in crowded places, in close proximity to others for long periods of time, not socially distanced, then infections will rise.

Conclusion: For sections that have argued for suspension of elections citing health emergency, it must be remembered that such a move may lead to authoritarian tendencies and unaccountable governance. For democracies to sustain and thrive, the conduct of elections, even in the wake of the pandemic, is essential. While elections are important and must be held, they must be undertaken with the right precautions and safeguards. Under the present circumstances when a deadly virus is raging large rallies and holding road-shows should have been avoided by all political parties. Campaigning could have been conducted through televised addresses, smaller live-streamed meetings, etc.

But as TV networks show crematorium queues, the main issue before political leaders seemed to be vote-seeking. The Commission failed to prevent all the senior leaders from campaigning on polling days or the live telecast of such campaigns. As the Election Commission failed to enforce its own guidelines, its integrity comes into question. At a time when every effort should be made to battle the risk of COVID-19 spread, the huge political congregations should have been shut down. The manner of campaigning that was witnessed by the nation exposes the lack of innovative planning or implementation of rules for elections under pandemic conditions by the EC. A simple response team could have been called to control the situation and maintain COVID-19 protocol during the polling

process. The Hon. Calcutta High Court observed, the Election Commission has behaved like a 'mere spectator' during this health crisis. Some of the welcome steps like smaller rallies, cancellation of road shows etc., that followed the observations of the Calcutta High Court would have brought laurels to the political parties concerned and shown the maturity of their leaders if these had been adopted by them earlier voluntarily. After all, Democracy in practice is a public good.

The author is an analyst on Strategic and Economic Affairs. She has worked as a Consultant with the National Security Council Secretariat (NSCS) for nearly a decade and is presently associated with PPF.

महामारी की दूसरी लहर और स्वास्थ्य सेवा में भारत की तैयारी

— पूजा कुमारी

भारत महज एक साल के अन्दर आज कोविड-19 महामारी की दूसरी लहर का भीषण रूप से सामना कर रहा है। पिछले एक सप्ताह से भारत दुनिया में कोरोना वायरस बीमारी के सबसे अधिक नये मामलों से जूझ रहा है। 30 अप्रैल, 2021 को 3,86,452 नए कोरोना वायरस मामलों आये हैं जो दुनिया में सबसे अधिक एक दिवसीय आंकड़ें हैं और एक दिन में भारत में सबसे अधिक 3498 मौतें हुईं। इसी के साथ अब-तक देश भर में कोरोना से मरने वालों की संख्या 2,08,330 हो गई है।

भारत में कोरोना वायरस का एक दिवसीय विवरण

दिनांक	नए कोरोना मामलों	मौतें
29.04.2021	3,79,257	3,645
28.04.2021	3,60,960	3,293
27.04.2021	3,23,144	2,771
26.04.2021	3,52,991	2,812
25.04.2021	3,49,691	2,767
24.04.2021	3,46,786	2,624
23.04.2021	3,32,730	2,263
22.04.2021	3,14,835	2,104
सोर्स : स्वास्थ्य मंत्रालय, भारत सरकार		

भारत पूरे विश्व में ऑक्सीजन एवं दवाईयों के निर्माण और निर्यात में सबसे बड़े निर्यातक देशों में से एक हैं, बावजूद इसके आज फिर से देश न केवल महामारी की दूसरी लहर की चपेट में आया बल्कि घरेलू मांग की पूर्ति में भारी कमी का सामना कर रहा है।

दिल्ली, मुंबई, बेंगलुरु सहित कई बड़े शहर तथा गम्भीर रूप से प्रभावित राज्यों ने कुछ दिनों के लिए सम्पूर्ण लॉकडाउन या कर्फ्यू घोषित कर दिया है। भारत का हर क्षेत्र इस महामारी का प्रतिकूल असर देख रहा है। शहरों से लेकर ग्रामीण भारत में बड़ी आबादी को कई परेशानियों का सामना करना पड़ रहा है।

इस वक्त देश भर के अस्पतालों में ऑक्सीजन की आपूर्ति एक विशेष समस्या है, हर रोज भारी संख्या में नये मरीज आने से अस्पतालों पर लगातार प्रभाव बढ़ता जा रहा है। राजधानी दिल्ली सहित मुंबई, भोपाल, कानपुर, बनारस और लखनऊ के कई अस्पताल पूरी तरह से इस कमी के साथ जूझ रहे हैं। मुख्य समस्या यह है कि समय पर अस्पताल के बेड तक मेडिकल ऑक्सीजन नहीं पहुंच रही है।

23 अप्रैल 2021 की रात को, ऑक्सीजन का स्टॉक कम होने के कारण राष्ट्रीय राजधानी के जयपुर गोल्डन अस्पताल में 20 गंभीर रूप से बीमार कोविड-19 रोगियों की मौत हो गई। 24 अप्रैल, शनिवार सुबह अस्पताल में भी केवल 45 मिनट के लिए ऑक्सीजन था और उन्होंने तत्काल सरकारी मदद की मांग की। 22-23 अप्रैल 2021, दिल्ली के सर गंगा राम अस्पताल में 25 कोरोना मरीजों की ऑक्सीजन की कमी के कारण मृत्यु हो गई। 21 अप्रैल, को महाराष्ट्र के नासिक में 24 रोगियों ने ऑक्सीजन की आपूर्ति में व्यवधान के कारण अपनी जान गंवा दी। ऑक्सीजन की आपूर्ति में व्यवधान के कारण दिल्ली, नोएडा और लखनऊ के कुछ अस्पतालों ने 'ऑक्सीजन आउट ऑफ स्टॉक' का बोर्ड लगा दिया।

देश भर में ऑक्सीजन की आपूर्ति में कमी को देखते हुए दिल्ली उच्च न्यायालय ने केंद्र से कहा, यदि जरूरत पड़े तो नए प्लांट लगाए, भीख या उधार मांगिये लेकिन ऑक्सीजन की आपूर्ति पूरी कीजिये। तो वहीं दूसरी ओर बिहार में भी ऑक्सीजन की भारी किल्लत से नाराज पटना हाईकोर्ट ने 22 अप्रैल को ये आदेश दिया है कि बिहार में अगर किसी अस्पताल को ऑक्सीजन की किल्लत झेलनी पड़ रही है तो वह सीधे पटना हाईकोर्ट को मेल करे।

इस समस्या पर ध्यान देते हुए पिछले साल नवंबर में संसद की एक स्वास्थ्य संबंधी स्थायी समिति ने अपनी रिपोर्ट में सरकार को यह सुझाव दिया था कि ऑक्सीजन के उत्पादन को बढ़ावा दिया जाये ताकि अस्पतालों में इसकी आपूर्ति सुनिश्चित हो सके। साथ ही कोरोना के मामलों में बढ़ोतरी को देखते हुए देश के सरकारी अस्पतालों में बिस्तरों की संख्या भी बढ़ाई जाये, अस्पतालों में बिस्तरों और वेंटिलेटर की कमी की वजह से इस महामारी को रोकने की कोशिशों पर प्रभाव पड़ रहा है।

इस वक्त एक अकल्पनीय त्रासदी देश में कई शहरों के शमशानघाट पर भी सामने आ रही है, जहां भारी संख्या में कोरोना से मृत लोग अंतिम संस्कार के लिए लाये जा रहे हैं। बहुत से शमशान घाटों पर मृतकों के परिवार वालों को 16 से 20 घंटे का लम्बा इंतजार करना पड़ रहा है। गुजरात में

लगातार कई शवों को जलाने के बाद एक विद्युत् शव गृह में चिमनी पिघल गई, तो कुछ अन्य जगहों पर लकड़ियों की कमी हो गई है। दिल्ली में तो शमशान घाट पर जगह न मिलने की वजह से कुछ परिवार पार्क में अंतिम संस्कार करने को मजबूर हो रहे हैं।

सरकार की पहल: सरकार ने रेलवे की मदद से एक 'ऑक्सीजन एक्सप्रेस' शुरू किया है, जहाँ मांग के अनुसार टैंकर ले जाने वाली ट्रेनें हैं साथ ही भारतीय वायु सेना सैन्य ठिकानों से ऑक्सीजन ले रही है। इसके अलावा वे 50,000 मीट्रिक टन तरल ऑक्सीजन आयात करने की योजना भी बना रहे हैं।

भारत में औद्योगिक उपयोग के लिए कम से कम 7,100 टन ऑक्सीजन की दैनिक उत्पादन क्षमता है, जो वर्तमान मांग को पूरा करने के लिए पर्याप्त है। प्रधान मंत्री कार्यालय ने 22 अप्रैल को कहा कि इस सप्ताह, सरकार ने देश के 20 सबसे बुरी तरह प्रभावित राज्यों को 6,822 टन तरल ऑक्सीजन आवंटित किया, जो कि 6,785 टन की संयुक्त मांग है। केंद्र सरकार ने अगले तीन महीने तक के लिए ऑक्सीजन और इससे जुड़े उपकरणों के आयात पर लगने वाले सीमा शुल्क पर छूट दी है।

PM CARES फंड से देश में सार्वजनिक स्वास्थ्य सुविधाओं के अंदर 551 समर्पित चिकित्सा ऑक्सीजन उत्पादन संयंत्रों की स्थापना के लिए धन के आवंटन को मंजूरी दी है। इन समर्पित संयंत्रों को विभिन्न राज्यों/केंद्र शासित प्रदेशों के जिला मुख्यालयों के चिन्हित सरकारी अस्पतालों में स्थापित किया जाएगा।

महामारी से जुड़ी समस्याएं: बीमारी के नये रूप को पहचानने और उस पर काम करने या वक्त रहते सही दिशा में तैयारी करने में देरी हुई। सार्वजनिक वितरण प्रणाली भारी बोझ और बिना किसी राष्ट्रीय प्लान के साथ कम कर रही हैं। जिसका नतीजा हम स्वास्थ्य सेवाओं की मांग और आपूर्ति में तालमेल की भारी कमी के रूप में देख रहे हैं। साथ ही देश भर के शहरों में अस्पतालों के बीच बेहतर ट्रांसपोर्टेशन की कमी भी देखी जा रही है। तो दूसरी ओर राजधानी दिल्ली में सरकार के पास ऑक्सीजन को स्टोर करने के लिए अपने टैंकर नहीं हैं।

ऑक्सीजन सहित दवाईयों की कालाबाजारी बड़े पैमाने पर कई परिवारों के लिए मुसीबत बन गई है। बहुत से लोग इनका स्टोर कर लोगों को मुंह मांगी रकम में बेच कर मुनाफा कमा रहे हैं जिस पर देश भर में पुलिस द्वारा छापेमारी भी की जा रही है।

कोरोना टेस्टिंग की रफ्तार धीमी हुई है। टेस्टिंग लैब्स के बाहर भारी संख्या में लोग लाइन में लग कर अपनी बारी का इंतजार कर रहे हैं। साथ ही रिपोर्ट आने और किसी भी गम्भीर बीमार व्यक्ति को अस्पतालों में बेड मिलने के लिए भारी मुसीबत का सामना करना पड़ रहा है।

जिस रफ्तार से नए मरीज आ रहे हैं उसके हिसाब से अस्थाई अस्पतालों और कोविड केन्द्रों की कमी है, जो कोरोना से लड़ने के लिए बनाये जा सकते हैं। हालाँकि विभिन्न सरकारें अब इस दिशा में काम कर रही हैं।

इस महामारी से लड़ने के लिए सरकार की नीति के तहत देश में सबसे पहले कोरोना योधाओं और फिर बुजुर्गों को वैक्सीन देने की नीति बनाई गई, जिसपर देश सफल भी रहा। लेकिन अब पूरे देश भर में 18 वर्ष से ऊपर सभी नागरिकों को वैक्सीन देने के जरूरत हैं जिस पर अब विचार हुआ है। क्योंकि विशेषज्ञों के अनुसार सभी नागरिकों को वैक्सीन देने से इस बीमारी से और बेहतर तरीके से लड़ा जा सकता है।

आगे के लिए रास्ता:

- सार्वजनिक वितरण प्रणाली और बेहतर ट्रांसपोर्टेशन की सुविधा में तेजी लाई जानी चाहिए।
- घरेलू मांग को देखते हुए कुछ वक्त तक के लिए ऑक्सीजन सहित दवाइयों के निर्यात पर अस्थाई रोक लगाई जानी चाहिए या दुनिया के अन्य देशों की तरह पहले अपने देश की घरेलू मांग पूर्ति वाली नीति को प्राथमिकता देनी चाहिए।
- ऑक्सीजन को राज्यों के पास स्टोर करने की लिए अपनी टैंकर भी होने चाहिए जो की अस्पतालों की मांग के अनुसार पूर्ति कर पाए।
- कालाबाजारी को रोकने के लिए अस्पतालों और उसके नजदीकी दवाई दुकानों के साथ एक पोर्टल पर काम किया जाना चाहिए।
- विशेषज्ञों के अनुसार सभी नागरिकों को वैक्सीन देने से इस बीमारी से लड़ा जा सकता है जिस पर तेजी से काम करने की जरूरत है, ठीक वैसे ही जैसे भारत ने पोलियो को खत्म करने के लिए नीति अपनाई थी।
- बड़े पैमाने पर छोटे अस्थाई अस्पताल और कोविड सेंटर के निर्माण की जरूरत हैं जो ऑक्सीजन सहित दवाइयों के साथ लैस हो। इससे बड़े अस्पतालों में बढ़ते बोझ को भी कम किया जा सकता है।
- बीमारी से लड़ने के लिए एक राष्ट्रीय पोर्टल बने जिसमें बीमारी से जुड़ी हर जानकारी के साथ समस्या निपटान की रणनीति हो साथ ही इसे देश के साथ साझा किया जाये।

(लेखिका पीपीएफ में शोधकर्ता है।)

International Cooperation in Disaster Management: Lessons from Fukushima

The Fukushima disaster at the nuclear plant in Okuma was caused by the Tohoku earthquake and

tsunami on March 11, 2011. It was the most severe nuclear accident since the Chernobyl disaster in 1986 and claimed nearly 20,000 lives. PPF organised a webinar on the March 11, 2021 coinciding with the 10th anniversary of the Fukushima disaster to deliberate on the lessons learnt from this event in the field of international cooperation in disaster management and pay tribute to the unsung heroes working to save lives and property during disasters. The webinar witnessed participation from experts and practitioners with a wealth of knowledge and experience in disaster risk reduction.

Prior to any discussion on disaster risk reduction, it is important to understand the nature and severity of the disaster which occurred in Fukushima. It was hit by an earthquake of 9 in magnitude which destroyed 750,000 buildings, 338 Km of road and 77 bridges but only 100 people were killed. This is a huge testimonial to concerted efforts of Japan towards disaster risk reduction. The following week there were aftershocks of which 262 were 5 in magnitude 49 were 6 in magnitude and 3 were over 7 in magnitude. In any other part of the world, these would have been major earthquakes but Japan withstood them through strong disaster risk reduction measures it took over the years.

The tsunami triggered due to earthquake was over 480 km in spread, the wave height at its maximum was 30 m and maximum penetration in land at river mouths was 40 km and in plane areas it was 10 km. There were six reactors in Fukushima Daiichi, two of them were under construction and were not really affected. The remaining four reactors had been constructed as per a design parameter made to withstand tsunami wave of 3.1 m above sea level based on centuries of experience. To add extra layer of safety the reactors were build 10 m above the sea level. The actual tsunami wave that hit the area was 15 m above the sea level. In all these reactors, power supply and 12 out of 13 generators were knocked out by the tsunami waves and as a result there was no facility for cooling. These reactors then exploded due to hydrogen explosion caused by lack of cooling and built up of gases. The end result was nuclear radiation leakage. This was also the time where evacuation of Tokyo which is inhabited by more than 35 million people was being considered. There was a lot of hysteria around nuclear leakage, in fact four Urban Search and Rescue (USAR) teams including Germany, France and Switzerland pulled out as their governments told them to leave

in due to nuclear leakage. The Government of Japan then placed a 20 km evacuation zone and 30 km prevention zone around Fukushima.

In the aftermath of this disaster, the Government of Japan worked in close coordination with the people in the affected region for recovery and reconstruction of Tohoku making commendable progress in improvement of infrastructure to restore normalcy. The speedy recovery of this totally devastated region amidst harsh conditions is one of the best models of post disaster reconstruction work for any country to emulate.

The Government of India responded by sending a 46-member team of National Disaster Response Force (NDRF) besides relief supplies to Japan. It was the first overseas mission for the NDRF personnel trained in handling disasters, including nuclear emergencies. The NDRF team was deployed at Onagawa, a port town of Miyagi Prefecture where they conducted search and rescue operations for missing persons. The painstaking efforts of the NDRF personnel in the bitter chill of Tohoku's blustery winds received appreciation from higher echelons and public at large in Japan. The friendly gesture of the Indian government during a crisis situation contributed significantly towards strengthening the bilateral relationship between the two countries.

India's involvement in the management of Fukushima nuclear crisis exemplified its advanced disaster risk reduction capabilities which have progressed substantially over the years due to strong policies and their effective implementation, commitment of decision makers and determination of skilled and qualified human resource. Today, NDRF forms the backbone of the India's disaster response.

Some of the relevant issues discussed during the webinar ranged from safety measures to be adopted by nuclear plants, particularly those in the high seismic zone or closer to the sea; need for efficient decision making processes for quick international response in case of major disasters; pros and cons of bilateral deployment of NDRF teams to affected country instead of deployment under United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) as per International Search and Rescue Advisory Group (INSARG) guidelines; and relevance and importance of INSARG certification to the NDRF

teams among others. The report summarises the proceedings of the webinar.

Mr. KM Singh Vice President, PPF noted that the webinar was being organised at an opportune time to commemorate the 10th anniversary of Japan's successful recovery from the Fukushima crisis and to pay homage to all those who lost their lives during this disaster. He noted that NDRF played a remarkable and compassionate role not only in search and rescue mission but also in dealing with loss of lives and deceased's bodies with utmost respect. The heroic efforts and dedication of NDRF team was recognised and lauded by the various Japanese higher authorities including the then Prime Minister of Japan. Very recently, Satushi Suzuki, Ambassador of Japan to India in his article in a national daily stated "*The courageous rescue mission of the National Disaster Response Force (NDRF) can never be forgotten. In their first overseas deployment, 46 members of NDRF engaged themselves in search and rescue in the town of Onagawa, where 85% of the buildings were swept away by a 14.8m high tsunami, and more than 800 people lost their lives. I would like to thank NDRF for their dedication, which left a touching impression on the people of Onagawa. Now, Onagawa, where the NDRF lent their helping hand, is reborn vibrantly.*"

Significantly, the incident in 2011 opened a new chapter in Indo-Japan bilateral cooperation in the field of disaster management with the signing of Memorandum of Cooperation (MoC) on for disaster risk reduction under which bilateral workshops have been held and cooperation between research institutions and private sector has been encouraged. This was a promising development and has continued since then. Another noteworthy dimension of 2011 crisis was reconstruction work undertaken in Onagawa's keeping its inherent nature intact. The reconstruction was undertaken based on sound technical and scientific inputs and with full involvement of community. Onagawa's reconstruction stands as a shining example of build back better.

A valuable lessons lesson learnt by NDRF was review and analysis of security and safety systems of all major nuclear facilities in the country. It was seen that there was a delay in departure of the NDRF team to the disaster site because of lack of decision-making structures and processes for international disaster response. Another lesson

was around reconciling the differences regarding suitability of bilateral response efforts over multilateral response (envisaged as part of UNOCHA). It was realised that response efforts under UNOCHA were faster compared to the bilateral response and if the host country agreed, the prior should be preferred. These and many other lessons and issues require deliberation to bolster India's international disaster response. Mr. Singh requested the esteemed panellists to throw light on some of the lessons that India could learn from Fukushima disasters.

Shri Kamal Kishore, Member, NDMA noted that Fukushima incident was a reminder that even the most technologically advanced countries and state of the art early warning and response systems can feel stretched in the wake of a complex disasters. The Fukushima disaster was a triple disaster as it involved an earthquake which caused a Tsunami forming huge waves. The tsunami waves in turn affected the nuclear plants. Owing to the complex nature of the disaster, it was a technically onerous challenge to address.

The risk assessment of Fukushima nuclear reactor before the tsunami showed that the probability of a nuclear leakage was very minuscule, possibly one in a million years. But the risk assessment did not take into account the possibility of a Tsunami of certain magnitude occurring which may exceed the design parameters of the reactor. This pointed towards an important lesson that hazards should not be looked at in isolation and scenarios where they are interlinked and result in cascading often catastrophic effects must be factored in. Such interlinked hazards are occurring in all parts of the world including India, the recent Uttarakhand disaster is an example. This makes it imperative to understand the notion of cascading risk of interlinked hazards even if it is difficult to mathematically calculate their probability or extent of potential damage.

Further focusing on resilience of a single structure is not enough and in an increasingly interconnected world there is a need to adopt a systems approach. In the Fukushima incident, the urban areas were not so much affected because their built environment was earthquake friendly. Despite this, the entire system was not prepared to brace the effect of an earthquake coupled with tsunami. To offset this fragmented approach to building resilient structures, a systemic view must be adopted.

India and Japan have been working to build long term resilience of infrastructure systems. There is a very wide support for it through the Coalition for Disaster Resilient Infrastructure. The Coalition comprises of 23 countries including the European Union, UN agencies and programmes, multilateral development banks and financing mechanisms, the private sector, and knowledge institutions. The third International Conference on Disaster Resilient Infrastructure (ICDRI 2021) was held from 17 to 19 March 2021 to build on lessons learnt from complex disasters like Fukushima to build long-term resilience of infrastructure systems.

Shri SN Pradhan, DG NDRF noted that the triple Fukushima disaster was disruptive and critical in the NDRF organisation's life which although being miles away from Japan was pressed into services to manage. NDRF's involvement in Fukushima incident was historic and is recognised and discussed in the national and international discourse on disaster risk reduction even after a decade.

Numerous lessons, like the need for INSARAG certification for preparedness and response was realised after the disaster and similar such experiences. The incident also established that for disaster response to be effective, it has to be essentially multilateral and systemic. It is crucial to understand that disasters do not know borders and may affect multiple communities and countries in one go and even to protect national interest multilateral and systemic response through collaboration between countries is necessary. For this reason, NDRF's approach to disaster risk reduction is to have both bilateral default channels and multilateral platform like INSARAG or UN open. Significance of multilateral cooperation is growing as the world is realising that in times of global crises such as COVID-19, united response is key.

Shri Pradhan also elaborated upon on some aspects of safety that emerged during the Fukushima incident in the Indian context.

Safety of Nuclear Plants: The safety of nuclear plants lies squarely with the Department of Atomic Energy (DAE) - the nodal entity for nuclear safety. The disaster management capacity building viz., training programmes and mock drills are organised at the behest of DAE and the Nuclear Power Corporation of India Limited. However, off late the impetus on preparedness to handle and manage nuclear disasters has reduced giving an

impression that India does not anticipate nuclear disasters or such exercises are not important. This is a matter of concern. A sharper focus is required on capacity building, mock drills, envisioning various nuclear disaster scenarios and rescue exercises for the same. The Hon'ble Home Minister of India in a promising announcement stated that within a span of three years all districts of India must go through mock drills with emphasis on Chemical, Biological, Radiological, and Nuclear (CBRN) threats. These drills should become a part of NDMA's programme calendar. This is indeed a welcome news wherein with in the rubric of mock drills specific CBRN drills can also be undertaken.

Delay in Dispatching NDRF Team to Japan: By the time NDRF team was ready to be sent i.e. on March 14, 2011 - three days after the disaster, there were many hindrances to its departure. There were no systems or precedent in place to guide this kind of international response. In the light of these problems, NDRF has written to all the ministries to get them involved as active stakeholders in the disaster response process. But the buy-in of the ministries in this regard has been limited probably because there is not enough appreciation of systemic response and disaster risk reduction is not considered a mainstream agenda item. Even though Government of India has clearly stated that every ministry must envisage its role and its own disaster management plan the efforts towards the same have not gained traction. The NDRF and NDMA will continue to push this agenda with the ministries.

Pros and Cons of Bilateral Deployment: One of the biggest pros of bilateral deployment is that it fits into diplomatic perspective of every nation as they can decide to help X nation but not Y. However, the nation-states are realising the merit of international certification for disaster response like International Search and Rescue Advisory Group (INSARAG). They recognise having a team in place with international certification is a part of their soft diplomacy and in overall interest. Also, standardisation is becoming the buzz word in all domains including disaster risk reduction, so countries are eager to get such standardised certification. Any country including India must realise this and keep both channels of bilateral and multilateral deployment open.

Relevance of INSARAG Certification to NDRF Teams Ensuring Prompt Dispatch: Speedy deployment is built into the NDRF processes.

INSARAG certification entails that within a limited number of hours the team should be ready and deployed in the disaster site. These are national commitments which are sacrosanct and if India abides by this, NDRF and the entire country will benefit by way of prompt deployment of disaster response forces and quick response. There was also a serious discussion about national accreditation process (NAP) wherein NDRF would become a NAP agency. It is a bold and disruptive vision with immense benefits vis-à-vis disaster capability building of SDRFs across the country. This vision must be taken forward.

Role of National Disaster Response Reserve (NDRR): Relief materials from NDRR are being used widely. In 2016, NDRR relief material was given to Sri Lanka and Malawi and in 2018 to Indonesia. Very recently in 2020, NDRR material was given to as many as five countries including Lebanon, Nepal, Cambodia and Vietnam. Ministry of External Affairs and Ministry of Home Affairs are now working in tandem to leverage at NDRR as an effective mechanism to extend international relief. They are working in tandem with each other so that NDRF can extend better support within and outside the country through NDRR.

Need for Intergovernmental Disaster Centre: Although the SAARC Disaster Centre is in place, there is a need to strengthen existing platforms or establish new ones to foster multilateral disaster response.

Bilateral responses are fast and prompt and NDRF is capable and well-equipped to execute disaster responses through this channel. But it deeply believes that international certification is both desirable and essential to create a modern, advanced and world class disaster response force with worldwide outreach.

Shri M Shahshidhar Reddy, Former Vice Chairman of NDRF reminisced how the team took on the formidable challenge of rescue and search operations in Fukushima The NDRF's exemplary work won wide acclaim from higher echelons and community at large in Japan. He noted that the team was trained in use of the state of the art equipment and was one of the first ever teams to execute an international response of this scale. Even though the team was not internationally certified by INSARAG, it performed very well amidst difficult conditions in Fukushima and proved to be the best disaster response team sent to Japan at that

time. India learnt a definite lesson from the incident when the then Prime Minister of India called a special meeting of NDMA to review India's preparedness in nuclear emergencies. The NDMA was then directed to ensure world class preparedness for such emergencies. Consequently, the six states with commissioned nuclear plants were inspected to test their existing nuclear emergency plan by conducting mock drills. The observations and findings of this exercise were submitted in the form of a report. Advancing these efforts, India must aim to bolster its disaster risk reduction efforts.

Shri Arjun Katoch, Ex Chief Field Coordination Support System, UNOCHA shared that once the Fukushima disaster occurred, the only international assistance the Government of Japan sought was United Nations Disaster Assessment Coordination Committee. Shri Katoch was nominated as the team leader of this Committee which included members from seven countries and many other international bodies. During this period, the government of Japan allowed 890 rescuers, 38 dogs and 29 teams from 15 countries in the affected areas. Each of these teams had to negotiate their entry separately with the Government of Japan and there was no automatic deployment of teams. The Committee worked directly with Ministry of Foreign Affairs and the Prime Minister's Office (PMO) of Japan and all the four affected prefectures. Its role was to get the Japan's story out to the world as all documentation was only in Japanese and use of English was minimal. Other tasks of the Committee were to establish coordination between the various rescue teams and overall international coordination with the Government of Japan. He spoke in detail about the following important lessons that India must learn from Fukushima incident in Japan.

Sustained Risk Reduction: India needs to invest in sustained risk reduction which is often neglected. Japan's continuous disaster risk reduction efforts helped in minimising the loss of life to 100 during the Fukushima earthquake, even though massive infrastructural losses could not be avoided. If a disaster of this magnitude struck India, the casualties will be in thousands and not hundreds. To avoid such massive losses of life, disaster risk reduction must be taken seriously.

Use of Military in Disasters: Japanese self-defence forces had 1,06,000 troops responding to the

Fukushima disaster. They formed the backbone of Japanese disaster response. In addition, USA had 20,000 self defence personnel, along with 365 aircrafts and helicopters and 65 ships helping out Japan. The best data on nuclear radiation and leakage used to come from US military as their seventh fleet was off shore and they had advanced sensors better than any other system in place. Thus, it was an enormous military response. In India there is a tendency to underplay the role of the military. The perception is that disaster response is an MHA, NDMA or state affair. This mind set needs to change. It must be realised that in a major disaster response effort, military must be involved. The sooner defence forces are integrated into the disaster risk reduction systems the better it will be for nation's disaster response preparedness.

Chain of Control at Central Level: In Japan, government response to the disaster was centralised to the National Disaster Committee chaired by the PM. The four affected prefectures, Ministries of Foreign Affairs and Defence, National Police Agency, Fire and Disaster Management Department were working in silos reporting to one Committee. Therefore, decision making was delayed. The PMO and the political hierarchy was naturally worried about Fukushima Daiichi but there were half a million displaced people from earthquake and tsunami affected areas who required assistance. The latter did not get as much attention as it should have. India should avoid such centralised chain of control and NDRF, NDMA and MHA should figure out systems facilitating communication and coordination at much lower levels for speedy response.

Legislation Mandating Nuclear Response Exercises: Post the Fukushima disaster, there is a law in Japan which mandates conduct of nuclear response exercises once a year in all the prefectures which have nuclear plants. A similar legislation which makes nuclear response exercises and involvement of decision makers in this compulsory, is essential in India. The decision makers - the political class are often not aware of ramifications and human impact of such disasters; thus, they must be sensitised by making their participation mandatory in such exercises.

Institutional Preparedness to Receive Assistance: Japan at the time of incident was not prepared to receive assistance as it was a donor country. A total

of 121 countries and 49 bodies offered their assistance to Japan. The problem here was not 'non-availability' of assistance but how to politely decline these requests for assistance as it would have swamped the response system. The Japanese authorities leaned very heavily on the UN Committee to filter out these offers based on certain criteria. India also needs to have this kind of institutional preparedness to filter out and receive assistance.

Community Preparedness: Tsunami in Japan ultimately took 21,000 lives, in spite of the fact that Japan has the best systems for community preparedness globally. Japan has sign posts everywhere which tell where to go in case of earthquakes and tsunamis; children from lower school are drilled into safety measures and what to do during these disasters. Japan's mobile phone system of early warning is unparalleled in the world. Yet, once tsunami struck so many lives were lost. However, thousands more have died if they did not have such strong community preparedness systems in place. In India on the other hand, both emergency response forces and community preparedness are lagging behind and require immediate attention.

Role Played by Media: During Fukushima disaster, international media had created a frenzy which was nowhere close to the actual situation in Japan. Such sensational media portrayal does more harm than good. In India, the enormity of the impact media can have (in terms of creating fear and hysteria) if it is not provided immediate and accurate information is not recognised. Proper communication channels and systems to interact with media and feed them correct information needs to be put in place beforehand in the country.

Nuclear Accident Responses have Wider Effects of Nuclear Radiation: Many countries like Germany and Switzerland went off nuclear energy completely after the Fukushima accident. In Fukushima the official clean up status shows that Japan has not even moved beyond cleaning the nuclear power plants rubble even after a decade of the disaster. The clean-up may take another 40 years. Japan is still storing 1.2 billion tonnes of contaminated water in 1000 plus tanks to keep the nuclear plants cool. Japan is struggling for space to keep this water. In India nuclear power only contributes to 5% of the total energy. There is a need to then think, is taking such a big risk worth it.

Radioactive isotopes like Uranium 239 have a half-life of 24000 years, they take very long to decompose. A densely populated country like India cannot afford nuclear leakages and letting isotopes escape into the environment.

Speaking specifically about NDRF team's deployment in Fukushima, Shri Katoch said that it was a very good idea. However, the deployment must happen in time, the NDRF team reached Japan on March 28, 2011 while the other USAR teams reached on March 13-14 and most of them left on March 18. Therefore, decision making processes must enable prompt deployment of response teams.

In terms of benefits of bilateral deployment, it was mentioned that all deployment was essentially bilateral in nature. In Japan each USAR team and its government negotiated separately with the Government of Japan for their deployment. Any deployment thus has to be agreed bilaterally first. The international bodies can help with the coordination between various teams. Bilateral deployment has become even more necessary given the COVID-19 related restrictions on and downfall of international travel. Therefore, bilateral deployment is going to take precedence over UNOCHA driven deployment because the latter cannot force any country to take or give assistance.

From the perspective of capability development, all NDRF teams should adhere to international standards laid down by INSARAG but an international certification may not be necessary. In Japan, four teams from Nepal, Taiwan, Mexico, Turkey and Mongolia were not certified but their efficiency was not affected. For operational matters, NDRF teams should fully meet INSARAG standards through establishment of internal classification and audit systems. They should be actively participating in INSARAG activities such as training, conferences and workshops, so that they are completely updated on international good practices.

SAARC Disaster Management centre as an intergovernmental body has been set up in Ahmedabad. The Centre, however, requires enormous upgradation in terms knowledge, skills and technology for disaster response to match its other advanced counterparts like ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA).

Prof. Rajib Shaw, from Keio University, Japan began by noting that reconstruction and recovery after a disaster is a long process. It not only entails physical recovery but involves rebuilding human lives, networks, communities and entire cities. Sharing his recent experience of visiting sites of Fukushima disaster, Prof. Shaw shared that affected cities have constructed museums by way of which they tell their own story of grappling with the disasters with others and future generations in particular. Another fascinating aspect that he noticed was that many young people including school and college students shared their stories and perspectives about future of their cities in these museums.

Due to nuclear leakage in Fukushima prefecture an area spreading around 20 km radius had to be evacuated, therefore many of the cities had zero population. But slowly people are coming back to these areas. Interestingly, young people who had settled in Tokyo after the evacuation were going back to these areas in the wake of COVID-19. They were essentially reconnecting with their roots and this seemed to be a positive trend.

Fukushima faced Natural Hazard Induced Technological Disaster (NAHTIC). Prof. Shaw threw light on studies being done on NAHTIC in the Asia Pacific. He noted that many countries across the world are running with increased risk of NAHTIC and most often common people are not aware of this. Thus, it was necessary to educate and sensitise people towards these risks. Global and regional disaster risk reduction frameworks were developed post Fukushima viz., Sendai Framework; United Nations Disaster Risk Reduction (UNDRR) Words into Action Guidelines and WHO Guidelines on Chemical Hazards, ASEAN Secretariat Guidelines. All these stress upon preparedness and management of NAHTIC. Additionally, a lot of publications and literature is being developed on NAHTIC to bring in more awareness and sensitise relevant stakeholders.

In light of high probability and risk of NAHTIC, a policy framework for preparedness and management is required at the global, regional and national levels. At the national level, policy, regulations and multi-hazard risk assessment is critical. Adherence to only INSARAG standards is not sufficient, capabilities to mitigate CBRN threats are also required. At the local level, awareness

generation, community preparedness and decentralised planning and risk assessment for management of cascading risks are important. To this end, capacity development of local response forces is extremely vital. Moreover, transboundary discourse on risk and preparedness is needed as disasters do not follow borders and boundaries.

Shri Alok Avasthy, Leader of NDRF team to Fukushima began by speaking about the capabilities of the 46-member NDRF response team that was sent to Fukushima. The team was capable of responding to natural disasters as well as CBRN emergencies. This was a differentiator for the NDRF team as most of INSARAG certified teams are adept in providing only collapsed structure rescue but often lack in CBRN response. The NDRF team was skilled to perform round the clock operations and was self-sufficient in lodging and boarding. The team was well-prepared for the impending nuclear threat as it carried CBRN protective gear and equipment for protection against radioactive contamination threats. Many of the USAR teams which had reached Japan earlier left by March 18, 2011 as they were not trained in handling radioactive emergencies. The embassies were getting closed and people were leaving Japan. The NDRF team on the other hand was pitched in when it was clearly declared that Fukushima was a nuclear and radiological emergency.

The team was mentally prepared that it would be posted at Fukushima but after landing in Japan they were stationed at Rifu Cho and passed by Fukushima Nishi which was very close to the nuclear reactor area. The members started monitoring the radiation levels right from the airport. The isotope identifier showed very high and rare readings for radiation levels which are only seen in places where the actual leakage may have happened such as Chernobyl or in this case, Fukushima.

The NDRF team dealt with many challenges because of difficult weather and sub-zero temperatures and completed a 320 km long and arduous journey to Rifu Cho near Sendai town in Miyagi. They set up the base camp in the parking of Miyagi Stadium as the entire stadium was converted to a mortuary and was full of corpses.

Describing the operation area, Shri Avasthy stated that there was a 20 m high tsunami which smothered all structures and flattened all the areas that came in its way. Most of these structures were

wooden or made of composite materials. The tsunami waves also washed away many vehicles and slammed them inside the houses. The NDRF team was the first team which worked in Onagawa area and cleared the approach road by lifting the debris and rubble of destroyed structures. The team was able to do so by applying the principles of collapsed structure rescue, CBRN threat management and first line medical response. Further, whenever the team was recovering any dead bodies, it kept two-minute silence to pay respect to the deceased. This was recognised as a very humane gesture by the people of Japan. The team recovered a lot of money, unused water and food items which was officially handed over to Japanese responders and donated to their relief camp, respectively.

Many lessons were learnt by the NDRF team from Japanese people and their response to the disaster. Even in the event of such devastating tragedy, the Japanese people were calm there was not a single chest beating or wild grief scene. About 50 workers stayed back to pump sea water in nuclear plants demonstrating their noble spirit of sacrifice. The people showed kindness and tenderness, restaurants cut prices and the strong cared for the weak. Conscientious behaviour was another strong aspect of the Japanese, when power went off in stores people put things back on the shelves and left quietly. Also, elderly, adults and children alike were well-trained for handling such disaster situations they knew what to do. Media in Japan showed restraint in its bulletins and did only calm and responsible reporting. The Japanese architecture was incredible as it could withstand an earthquake of very high magnitude of 9 with tenacity and minimal losses. It was also heartening to see the gratefulness of Japanese people. Japanese authorities and people expressed immense gratitude towards India's NDRF team at all possible fora. Upon successful completion of the mission, the NDRF team was felicitated by various Indian and Japanese dignitaries including the then Japanese Prime Minister and the emperor and empress of Japan.

Concluding Discussions

In the concluding interactive segment, a video on impact of COVID-19, various disasters that occurred in different parts of the world during the pandemic and creation of resilient infrastructure amidst these dynamic situations was screened. The

video called upon participants to participate in the third International Conference on Disaster Resilient Infrastructure, 2021 organised by CDRI to discuss issues of disaster resilience and forge partnerships into action. Following this, participants raised pertinent questions. How disaster preparedness of India's nuclear power plants is being ensured in collaboration with the health sector in the wake of COVID-19 pandemic? Post Fukushima incident, Japan has not allowed creation of nuclear plants in the country, how can it be convinced to open its doors for nuclear power. What can India learn from this? What challenges India may face to escalate its disaster preparedness to that of Japan's level?

A plethora of suggestions were made in this regard and an unequivocal support was shown for NDRF teams to achieve INSARAG standards of disaster risk reduction along with skill enhancement in managing cascading disasters including CBRN threats. After the Fukushima disaster, India made a lot of investments to upgrade its nuclear disaster preparedness and remove redundancies and security lapses. Although it is difficult to comment on how effective these steps have been. India must reduce its dependence on nuclear energy which is small at 5 per cent as it cannot afford to brave effects of nuclear disasters like Fukushima which was still not as severe as Chernobyl where the entire reactor exploded. Impetus should be given to renewable energy sources. Community awareness and preparedness are most essential aspects on any disaster risk reduction strategy and the country must focus on them. The main endeavour should be to train the last mile person on disaster preparedness.

Lessons from Disasters in Uttarakhand & Strategy for Disaster Risk Reduction in Multi-hazard Ecosystem

In recent times environmental changes and ensuing disasters and tragedies have affected different parts of India, and Uttarakhand in particular. The sudden deluge in Chamoli, Uttarakhand on February 7, 2021 caused large scale loss of lives and properties massive damage to the Tapovan Vishnugad Hydroelectric Project and Rishi Ganga Hydroelectric Project. Located in the fragile and delicate ecological terrain of Himalaya and having suffered a series of major disasters in the last three

decades - earthquakes (1991, Uttarkashi & 1999, Chamoli), flash floods (2013, Kedarnath) besides cloud bursts and landslides etc., Uttarakhand is no stranger to disasters. These calamities spur a lot of discussion but are not backed up by adoption of concrete steps towards disaster risk reduction.

Although government is the primary stakeholder in disaster risk reduction, people also have a crucial role to play in mitigating the impact of climate change. The recent disaster at Chamoli is yet another grim reminder as well as an opportunity for a serious and deep introspection to find ways and means to avert such calamities. It is in this context that the PPF in association with NDRG and Sphere India organised a webinar on '*Lessons from Disasters in Uttarakhand & Strategy for Disaster Risk Reduction in Multi-hazard Ecosystem*' on February 25, 2021. The webinar witnessed participation from eminent speakers, experts and practitioners working in the area of disaster mitigation and management, climate change and sustainable development. The present report summarises discussions and key recommendations mooted during the webinar.

Shri KM Singh, Vice President PPF set in the context of the webinar. He said that in the last two decades, the fragile ecology of Himalaya has borne the brunt of various disasters. Unabated construction of dams and infrastructural projects in the area has made it vulnerable to disasters and calamities. In a large country like India there is over-dependence on government to mitigate disasters and the role of people at large in restoring ecological balance is not recognised enough. Operating in a fire-fighting mode, the government often gives knee-jerk reaction to these disasters rather than undertaking systematic and holistic steps for disaster risk reduction. For instance, the National Disaster Management Authority (NDMA) was created in 2005 after the Gujarat earthquake and Tsunami. Constitution of NDMA was nevertheless a promising step for disaster management. However, NDMA presently does not wield the same power as it used to in the past.

In 2014, the Supreme Court's Expert Committee strongly recommended that there should be no further construction of hydropower projects in the Himalayan para-glacial region. The Government also took a similar stance in 2019. Still many of the hydropower and construction projects are still

underway - as development in the area cannot be ignored completely. It is also worthwhile to note that fruits of developmental work being undertaken in Uttarakhand are being shared by the neighbouring states. But, the tragic effects of disasters in the area are primarily faced by people of Uttarakhand only.

In such a scenario, there is urgent need to strike a balance between economic development and preserving the fragile Himalayan ecosystem. Further, the inhabitants of Uttarakhand who are the primary victims must have a stake and play an active role in developing and adopting disaster risk reduction strategies and efforts.

India must follow the international standards like Hyogo Framework, 2005 which emphasised on disaster preparedness including community preparedness and more recent Sendai Framework, 2015 focusing on disaster risk reduction. India is still wanting in the areas of community preparedness and disaster risk reduction and continues to operate in a response and relief-centric mode.

Given this situation, deliberation on a strategy for disaster risk reduction informed by lessons learnt from past disasters for multi-hazard ecosystems like Himalayas is imperative. This strategy must be people-centric and should galvanise active participation and partnership between government and people.

Shri Rajendra Kumar Bhandari, who was the key note speaker at the webinar said that Uttarakhand as a region has presented most fascinating and complex climate change problems for experts and practitioners. So much so that if one could crack Uttarakhand problem, valuable lessons can be learnt to address similar issues anywhere around the world. Uttarakhand is bordering China and Nepal, therefore it not only assumes cultural, religious, economic importance but has immense strategic significance as well. Besides this, Uttarakhand has many scars and wounds of past disasters, which have deeply impacted the region. Further, it houses structures like Tehri Dam which are vital for the entire country. Consequently, Uttarakhand, provides an enormous opportunity to learn about disaster mitigation from evidence-based experience. While studying Uttarakhand it is critical to keep in mind the factors such as population density, physiography and elevation and how they impact efforts for disaster mitigation.

Analysis of earthquake data of 1900 from Uttarakhand shows that there were numerous earthquakes in the region with potential to resurface again. Since 1800s many tragedies have struck the Alaknanda valley which have repercussions for the present and future. However, these changes not taken into account while planning infrastructural projects in the region. Such projects largely focus on Detailed Project Report (DPR), conduct of Environmental Impact Assessments (EIA), development of Emergency Management Plan (EMP), software modelling followed by actual construction. In this entire process, the rich history and lessons to be learnt from the disasters of the past is ignored. This strait jacketed approach is a gross injustice to the dynamic mountain ecosystem and its history which has a direct bearing on disaster risk assessment and safety measures.

Further, infrastructural projects must also be looked at from the perspective of the threats they pose to heritage structures, such as landslides on pilgrim routes. These result in inheritance of loss which have long lasting impact lingering for centuries and generations.

Experts are at times in a hurry to make decisions while planning such projects. They rely on their strengths but ignore the weaknesses - the unknown and the uncertain. Different people studying the same problem often come up with different angles, different lenses and different lessons. The experts make conjectures on mere perceptions and sometimes half-truths or outright lies. Therefore, experts should draw lessons based on thorough investigation and interactive dialogues and inputs from a multidisciplinary team. Drawing well-researched and valid lessons from past tragedies and using them to formulate a disaster risk reduction strategy is very crucial.

The Great Nanda Devi tragedy of February 7, 2021, involved Nanda Devi which is 7,816-meter and Joshimath which is located at 1,890-meter elevation. A possible chain of events leading to the tragedy based on available evidence shows that on February 6, the mountain ranges looked unchanged but on February 7 there was a landslide in the ranges with massive breaking of rock masses on hanging glaciers and dust clouds forming around the ranges. This led to release of kinetic energy and melting of snow and ice. The plummeting of the landslide mass from steep Nanda Devi Hills into the Rishi Ganga Valley could

have led to ephemeral blockade of the narrow gorge of river Rishi Ganga with possible water impounding and the eventual outburst of mud rock avalanche. Accelerating mass movement could have added undrained loading from the rear and loss of shear strength. The rapid mass movement in Rishi Ganga would have joined river Dhauri Ganga at village Raini at 3,700-meter elevation after travelling over 10 Km. Thereafter, rapid motion, mud-rock mass would have surged down river Dhauri Ganga damaging the hydropower plant at Tapovan. The water level would have then risen significantly in river Alaknanda at its confluence with Dhauri Ganga near Joshimath.

Other visuals and videos on social media also show that massive flow of water took varied curvatures and flowing through sharp bends and causing a lot of damage along the way. Thus, the water did not merely flow from one point to another, it went through various changes on its way. To understand these changes there is a need to study hydrodynamics. The amount of dust left as residue is also a hard evidence should also be analysed. Many times, experts do not reconstruct how the entire event happened and miss out on studying the debris cover and other related aspects which are hard evidence. Therefore, a clear visualisation of chain of events backed by evidence is required before concluding what happened and how it happened in such disasters.

Another example of Alaknanda tragedy of 1970 depicted that the build-up of the disaster was between July 1-19 and the actual disaster happened on July 20, 1970. It was world's finest example of cascading tragedies. The tragedy involved a dam which was created at the junction of Alaknanda and Patalganga rivers. Patalganga brought in a lot of landslide debris which choked the river and also resulted in drifting of Alaknanda River from its bank which led to breaching of the 45-meter-high dam causing flood wave affecting many places in the valley. The boulders brought down by water as debris when collided resulted in a build-up of static electricity. Similar, phenomenon happened in Malpa tragedy where when Malpa rock detached there was build-up of electricity and lightning could be seen by the people in the affected area. The ocular observations of people present during the disasters and their stories should be listened to by experts and scientists while understanding these phenomena and issuing early warning signs.

Major rivers in Uttarakhand, Bhagirathi and Alaknanda originate in the Chaukhamba Range at Gangotri and Satopanth, respectively. Dhualiganga River is born at Kunlong, Nitipass and it meets Alaknanda at Vishnuprayag. Rishiganga and Girthiganga are tributaries of Dhauliganga. All these rivers and tributaries have their own characteristics and the way they behave. Downstream of Vishnuprayag right from Joshimath to Srinagar, Alaknanda and its tributaries have narrow gorges, steep gradients and sharp bends. Patalganga off loaded debris at this location. Dhauliganga is steepest at 7.5% gradient while Alaknanda's mean gradient is 4.8%.

While engineering and analysing geological profile, geotechnical characteristics, road behaviour and building and housing pattern, the topography, the specific characteristics of rivers and their drainage pattern provide valuable insights on stability or instability of such an area. Another point of caution is over emphasis and discussion on meteorological parameters in the last few days of a disaster. In the run up to Alaknanda tragedy and when it struck (1-20 July, 1970), it rained 126.5 mm at Joshimath. During 19-20 July, 1970 (8 AM-8 PM) the rainfall came down to 14.1 mm. On 21 July (2 PM-8PM), the rainfall was 212.8 mm and previous maxima was 200 mm. This limited information was the only scientific study done by experts to conclude that there was cloud burst or heavy rainfall causing the disaster. Although deeper analysis from an engineering perspective, uncovered that there were massive blockages and water level rise in Patalganga and Alaknanda - the water level had rose to 45.7 mm within 45 minutes. The focus only on rainfall - the last factor which contributed to the disaster by experts meant that they had only looked at only the tip of the iceberg.

In fact, massive blockades have been common, for instance in 1857, 1976 and 1979 there were blockades in River Mandakini. On August 24, 1894 busting of dam at Birahi was breached after rising water level for 10 months at Srinagar and two days later by 4m at Haridwar. There have also been many landslides. For example, landslides on Rishiganga at Reni. In 1968, the landslides blocked the river and water level rose to 40 meter high, by May 1970 silting continued and in July 1970 the dam at Rishiganga was breached destroying left bank

approach of the Reni Bridge 250 meter upstream; a double tube 40-meter span bridge at Helan and causing loss life and property at Belakuchi.

The Great Malpa tragedy of August 18, 1999 which struck again on August 14, 2017 is also a case in point. As mentioned earlier, there was a landslide and the resultant debris and water wiped away the entire Malpa village causing large scale loss of life and property and 19 years later in 2017 the same tragedy struck again destroying the entire village. The bridges washed away during the tragedy were reconstructed in the same manner and were not safe, the principle of build back better was not followed. This clearly shows that lessons were not learnt from the past and no course corrections were made. Science and technology can help in minimising losses and issuing early warning signs in these situations. First responders can be capacitated in use of technology to avert human and property losses. However, the onus of using latest, cutting-edge and advanced technology to issue local and global warnings beforehand and to prevent such disasters is on the government authorities.

Safety of critical strategic structures like Tehri dam should also be closely examined. In the rim area of the dam a number of landslides are happening and water levels are rising. This was not anticipated before. During the Kedarnath tragedy of June 2013 water level in the dam rose from 750 meter to 775 meter while the maximum holding capacity of the dam is only 830 meters. Similar rise was also seen in 2008. In most unfortunate circumstances, if the dam breaches or the rivers change course and then there is an immediate threat to nearby villages. In this situation, likelihood and severity of these threats must be carefully assessed and local people must be informed and alerted of any impending threat beforehand.

Even though these tragedies have affected various areas of Uttarakhand severely, they are not novel phenomena, they have been happening in India and other parts of the world. Such disasters do not happen due to sudden climate fluctuations but shape up through gradual geological changes taking place over a long period of time. Therefore, it is wrong to say that a cloudburst or heavy rain caused a disaster, these are at best triggering factors. In order to develop effective early warning systems and mitigation strategies, lot of cues can be taken by studying the disasters of the past. A close

study of such factors will show that the development of townships around areas and rocks whose stability is uncertain is a massive problem. This requires government to take up proactive steps and large investments to restructure such areas keeping in mind the required safety considerations. Retraction and melting of glaciers, formation and bursting of glacial lakes leading to flooding thereby precipitating mammoth disasters have been seen in the recent past. In the backdrop of rapid climate change, human factors viz., inadequate planning, designing and unplanned urbanisation among others contribute to disaster severity. Removing entire mountains to widen of roads or construction of tunnels without paying attention to ground water system and aquifers are some examples of poor planning.

Strategy for disaster risk reduction requires thinking at scale and clarity on what is vital, essential and desirable in scope. Saving lives must be the topmost priority for any disaster risk reduction strategy through strong prevention and emergency relief and response.

A culture of safety must be aimed through strategic thinking and focus on prevention, preparedness and quick response. A holistic vision of harnessing global knowledge on disaster risk reduction for ensuring personal safety must be endorsed. Resultantly, the action must focus on achieving personal safety followed by global safety.

Professionals must be capacitated and people's participation must be sought for creation of a culture safety to capitalise on individual and collective efforts for sustainable development which warrants safety from variety of disasters. This essentially means embracing the concept of total safety where such structures are designed and created which are safe from different kind of disasters. Efforts should be towards creation of safe infrastructure, with multidisciplinary teams working together to develop comprehensive strategies. Careful planning on where investments should flow is also required. There are problems and areas where safety can be ensured, in such cases investments must drive safe infrastructure projects. But in scenarios where disasters cannot be prevented investments must be made for early warning, relief and rehabilitation.

Cataloguing of most common or frequently occurring problems are the local people and the

first responders to implement solutions on ground. This should be coupled with developing a community-based early warning system. Having alternative contingency plans and engineering solutions before any structure collapse is important. Such plans are in place developed in many countries.

Lessons from disasters should be drawn for forward planning, alongside the use of big data for threat and vulnerability analysis in disaster prone areas like Alaknanda Valley is important to keep experts and local people abreast with latest updates and situation in their area and accordingly take action.

Disasters are great teachers; they offer enormous learning opportunities. All disasters take test first and teach afterwards and they teach lessons until we learn. Therefore, nature must not be commanded but obeyed. Build defences against disasters in mind of men. Undertake difficult things when they are easy and not when the problems become more complex. Integrate disaster risk reduction with development planning, we must assess whether the various projects underway in Uttarakhand have integrated disaster risk reduction in their plans adequately or not. People must be trained and assured that they can do quite a lot with what they have and where they are.

Discussant Prof. Amita Singh, JNU said that no policy maker can under look, avoid or be negligent towards ecological terrain. To ensure this, an interactive approach seeking inputs of not just scientific experts but a multidisciplinary team and local people is necessary. However, while studying ecological terrain this kind of multidisciplinary and interactive consultation has been overlooked in India.

EIA experts have been bringing attention to ecological terrain in various developmental project. Although it is also true that many of these assessments still remain ritualistic as voices of environmentalists are not heard or ignored to fast-track developmental projects. For example, the EIAs for Tehri and Sardar Sarovar dams were challenged continuously but still they were fast tracked to begin work. But any developmental project that is against the nature would not be sustainable.

Similarly, the focus on god's fate and disasters being acts of God must be checked. No disaster is merely an act of God. The disasters take shape when developmental work ignores ecology, nature of

mountain and rock system and tamper with its fragile balance. Therefore, disasters are wholly man-made because humans have been negligent about nature and its systems. This is why an ethical introspection is required among the decision makers who prioritise development over ecological balance.

District, town and country planning authorities and municipalities are critical stakeholders who plan and approve constructions but they are not involved in disaster management. Lessons from the past are not learnt, like in the case of Malpa tragedy. Despite protest of local people, infrastructural projects are still undertaken in fragile areas in the name of speedy infrastructural development. In this sense, importance of multi-stakeholder collaboration is enormous. Disaster management has to be everybody's business right from scientific experts to administrators, academia and lawyers. Passion for disaster mitigation and safety needs to be inculcated among everyone and should become a part of curriculum of every discipline.

Comprehensive risk assessments of projects remain elusive. There is dearth of continuity in risk assessment efforts by national bodies. Risk perceptions vociferously shared by local people based on their rich experience is neglected and construction of multi-storey hotels and buildings continues in hilly areas unchecked.

Shri Vikrant Mahajan, from Sphere India a coalition of organisations working on disaster risk reduction said that disaster risk reduction is not one single body's responsibility be it government or scientific community or local people or disaster managers. Everybody including corporates have a stake in disaster risk reduction. As a coalition, Sphere India's core mandate is to bring different stakeholders together to work in synergy for disaster prevention and risk reduction.

An important dimension of disaster risk reduction is people's vulnerability assessment. This entails understanding where do people live, how do they live and the kind of losses they face when struck by disasters and how relief and settlement can be provided to them. All efforts should be made to protect people and minimise loss of life and property during a disaster.

Government driven EIAs have several lacunae and do not provide reliable risk assessments. This calls for a need to conduct disaster risk audit of every developmental project. Such audits should not only

look at existing risks but emerging new risks due to changing landscape and geography of an area.

The complex link between rich biodiversity, climate and rain pattern in Uttarakhand requires greater scrutiny. The recent forest fires have affected biodiversity in the area and scientists have predicted that these fires will be a recurring phenomenon. The fires will lead to loss of biodiversity thus, accelerating the climate alteration in the region.

Multi-stakeholder and multi-sectoral collaboration for disaster management cannot be stressed enough. To foster synergy between various sectors, existing disaster management systems including government, non-government and community systems must be analysed in terms of their strengths and weaknesses. The weak areas must be firmed up through adequate corrective steps. This will improve systemic performance for effective risk mitigation. A road map for system strengthening and multi-sectoral collaboration should be charted out. One of the promising steps in this direction has been organisation of dialogues between community-based organisations and State Disaster Management Authority facilitated by Sphere India. Similar initiatives are required in this direction. Sphere India is eager to collaborate with like-minded organisation to collate existing research on disasters in Uttarakhand and consult and collaborate with State Government and people of Uttarakhand for a way forward for sustainable development in the region.

Conclusion: The webinar brought to fore multi-faceted dimensions of disaster risk reduction. People's participation and multi-sectoral collaboration were recognised as unequivocal strategies to bolster disaster risk reduction strategies and chart out a road map for effective mitigation of disasters. Ineffective handling of these tragedies also gives rise to some fundamental questions, answers to which were attempted by the participating experts.

Since the disaster, there have been many explanations as to why the disaster happened. Hypotheses by scholars suggest that cosmic influence also affected glacial morphology and led to the flooding in the recent disaster of Uttarakhand. Although a valid explanation must be supported by hard scientific evidence. The focus

should also be on underlying geological changes and not merely triggering factors. At policy level what are the three key things that need to be kept in mind in India for disaster management given the COVID pandemic situation? Integration of disaster management in development planning must be executed in real terms in DPRs, EIAs and actual planning processes. This could be done through serious discussions and dialogue around risk assessments of projects. Realistic risk assessment is necessary through reliable and multi-hazard mapping at large scale taking into account anthropogenic factors. Ushering in people's participation in disaster management is pivotal. Disaster risk reduction is a first-rate issue which must be accorded highest priority.

Disasters also affect inter-state river disputes. Yamuna River is a victim of inter-state problems. The three states involved have overlapping demography and ecology but still they are not able to come to a consensus. Many states in India have not updated disaster management plans some of these plans are 10 years old. This points towards sheer lack of planning, accountability and focus on disaster management. This is a very important issue and must be integrated in social science research. lack of decentralisation and coordination between different state agencies and states may not be a triggering point for disasters is in fact a reason behind mismanagement of resources, lack of planning and mutual animosity to working together.

Uttarakhand being a pilgrim state has flourishing tourism, transportation and hospitality industry which provide livelihood to the people, which pose threat to ecological balance. Roads, dams and tunnels are required for development but they have to be made safe. Time and effort should be invested in open dialogue and discussion on risks posed and safety standards adopted. All solutions that are provided for development projects must be nature friendly. For instance, hydropower projects and constructions which involve diverting rivers systems are nature confronting and unsustainable. Instead, innovative engineering solutions which are nature friendly deem fit. At the same time investments are essential for rejuvenation of nature.

It is felt that the River Basin Management Bill of 2019 which aims at management of river basins of countries through independent authorities if passed and implemented will solve the problem. However, problem of disaster management is too complicated to be resolved through a single bill. It is not just about river basin management or setting up of an authority, the problem lies in sharing power. It involves many layers and levels - the location, site management, the resilience of people, the functioning of institutions, the research and investigative capacities of local municipalities and on the top of it NDMA's leadership.

Hitherto, the community capacity building initiatives in the county have been piecemeal and lack structure and continuity. Disasters being a state subject, requires state disaster authorities and district authorities to play a predominant role in community capacity building.

Community-based capacity building rooted in learning and building upon community experiences and indigenous knowledge is key. Owing to science and technology, it has become easier to get early warning signs and alerts, however they must be relayed to communities in time and in a manner in which they can understand and take necessary action. Such initiatives have been taken in Bihar and Eastern UP, wherein along a river basin upstream and downstream communities have been connected and they communicate and alert each other based on level of water rise in the river. Panchayati Raj Institutions (PRIs) also have a central role in issuing early warning signs to communities. In Bihar, PRI members have been trained to relay early warning alerts from issuing agency to the community at large.

Experts can catalogue, clearly state, educate and warn communities and provide them escape routes in case of all the known and/or recurring hazards which threaten people in a particular disaster-prone area. Those disasters which are anticipated based on some hard evidence can be assessed through simple instrumentation. People can be trained in simple instrumentation which they can use to forecasts such disasters in communities. Single window for information to issue reliable and timely early warnings and alerts in communities to counter rumours and fake news also serves as an effective strategy.

Late Prof. P.N. Mukherji, In Commemoration

Partha Nath Mukherji, one of the eminent sociologists of the country, former director of Tata Institute of Social Sciences, Mumbai and past president of the Indian Sociological Society, died on 12 February 2021 at the age of 81. On 14th March 2021 PPF held a commemorative meeting in honour of Late Prof. P.N. Mukherji. He is fondly remembered for his eminent contributions to sociology ranging from indigenisation to social change as well as crystallised nation states.

Following are a few Extracts from his address on Netaji Subhash Chandra Bose's 123rd Birth Anniversary (as part of Ruminations series of the PPF) in 2020 in which he spoke of 'Differentiation, Integration and Exclusion: Dynamics and Challenges to Nation-Building.'

India is by far the most complex country in the world. To imagine India in its 'wholeness' is virtually impossible, hence the need to go on endlessly re-discovering her. One after the other, cataclysmic changes have threatened the existence of the Indian state—the humungous transfer of persecuted, life-endangered populations from Pakistan (from both the western and eastern frontiers) following the Partition, to the incendiary language agitations that rocked the country in the 1950s, to secessionist threats from the North-East and Kashmir, and later in the west (Khalistan). It is puzzling how India regenerates herself, one historical upheaval after another.

Three threshold points mark the evolution of the 'nation'. First, the landmark Treaty of Westphalia signed in 1648, which called for the ending of the Eighty Years' War between Spain and the Dutch and the Thirty Years' War in the German phase. The principle of 'exclusion of external authority over domestic issues' reflected the belief that 'the autonomy of states was a precondition for the relative monopoly of 2 power within. Second, the French Revolution of 1789 witnessed a victorious people explicitly declaring itself a nation. An aggressive policy of constructing a unitary nation with its citizens having a single political and cultural identity provided the initial normative definition of the modern 3 democratic nation state. Third, the post-colonial phase is marked by (a) the formation of new states in Asia, Africa, Latin America and elsewhere, mostly emerging out of the shackles of colonial tutelage; (b) the establishment of the United Nations; (c) the rise of the multicultural USA; (d) the rapid process of transformation of the world system leading to global integration of the labour market and much else.

The concept of nation is perhaps even more bewildering. The general discourse admits of variety of conceptualisations of nation, nationalism, and the nation-state.

India's two leading historians, Irfan Habib and Bipan Chandra were confused by the many voices that made up the discourse. Both set out to explore the reality, only to converge on the conclusion that India indeed was a nation with a civilisational depth that found its identity through the national movements spearheaded by Gandhi, and including other national leaders who fought their anti-imperialist battles. Habib took pains to trace the origins of India's nationhood from Rig Vedic times through Sanskrit, Greek and Persian sources, and attested the contributions of Alberuni, Amir Khusro, Akbar and Abul Fazl's A'in-e-Akbari; and of social reformists such as Ram Mohun Roy, Ishwar Chandra Vidyasagar and Keshav Chandra Sen; and others. Bipan Chandra with his team, in their seminal work India's Struggle for Independence 1857-1947, concluded that the struggle for national independence developed into the Indian national movement, neither led nor controlled by the bourgeoisie, 'developed into one of the greatest mass movements in world history'. In fact, 'its multi-class, popular, and open-ended character meant that it was open to the alternative hegemony of socialist ideas'. Significantly, it was argued that the Indian national movement had begun the process of the Indian nation-in-the-making.

Ethno-linguistic identity has always been a repository of potentially politically combustible sentiments. Ethno-nationalism is primarily anchored in cultural particularistic values, while civic nationalism, generally speaking, is cultural universalistic in orientation. But neither of these are exclusively cultural particularistic or cultural

universalistic. This does not mean ethnic nationalism does not at all entertain cultural universalistic values, nor does it mean civic nationalism is ethnicity free; rather it is ethnicity-transcending. Societies can be analytically divided into domains of asymmetries. The number of domains is theoretically as many as the scientist conceives of as analytically relevant for explaining or exploring reality. I have identified five domains in terms of counter-concepts of discrimination (cultural-ethnic), exploitation (class), oppression (political), gender disparity, and eco-environmental (physical-natural interface with human society).

I hold that the nation-state is a dyadic concept. The 'nation' and the 'state' are analytically separate and yet one does not exist without the other. The state, which is a political institution, is a structural concept. The 'nation', on the other hand, is a cultural construct. State formation and nation building are two analytically separate processes, with different historicities. The formation of a state does not ipso facto mean the establishment of a crystallized nation-state. It does mean, more often than not, the beginning of a crystallising nation-state. The process of transition from a crystallising to a crystallised nation-state is the task of nation-state building. The nation-state covers the whole range of non-linear; zigzag stages through which it attempts to crystallise as a nation-state. This period of the process of crystallisation of the nation-state is generally characterised by internal strife and conflicts, sometimes fierce and violent and at other times non-violent, leading to accommodations, adjustments, new syntheses or ruptures. Social movements and conflicts, ethnic and non-ethnic can be regarded as the solid building blocks of a strong and crystallised nation-state.

There is little doubt that India is going through a phase of redefining the nature and character of the Indian state. During the freedom movement the Indian (sub-continental-level) national movement got differentiated into an ethnically plural civic secular nation state (India), and an ethnically exclusionary, ethno-national homogeneous state based on religion (Islamic Pakistan). The former has stood the test of time despite many reservations that dogged its emergence as a post-colonial nation state. The latter, suffered cessation owing to the primacy of ethno-linguistic nationalism over ethno-religious nationalism, which could not be resolved (Bangladesh). Pakistan continues to be more fragile as an ethnic nation-state, as competing and conflicting ethnicities, within the fold of Islam, have not ceased to give up their ethno-linguistic assertions. Bangladesh, in contrast, does not have such a challenge.

There is perceptible shift taking place in the thinking and actions of a significant number on the project of Hindu ethno-nation; the problems of livelihood, well-being and democratic principles of liberty, equality, and freedom as enshrined in the Constitution, are being perceived as far more important in the face of a cascading decline of the economy, and the increasing use of state and vigilante force to subdue protest. The question is: will the civic-centered counter-mobilisations in opposition to the ethno-national spirit of redefining the nation, work out a dialectic that will result in a reintegration of a more mature civic-secular nation state with enhanced citizen-consciousness; or will it result in a Hindu ethno-national state with non-nation space for other communities; or will an altogether different scenario take shape that is not within our reckoning? Prognostications over the future scenario can be done with theoretical framework and the substantive historical and contemporary empirical reality. The Indian nation is certainly at crossroads.


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