

WEBINAR REPORT ON
“Use of Science and Technology in Early Warning of Disaster in North Eastern Region of India”



Webinar on Prime Minister's 10 Point Agenda No. 6 on DRR

Use of Science and Technology in Early Warning of Disaster in North Eastern Region of India

THURSDAY, 20th MAY 2021 | 03:00 - 05:30 PM

PATRONS

- Maj Gen M K Bhandal, VSM, Executive Director, NIDM
- Shri P L N Raju, Director, NESAC
- Dr. Albert Langley Dikhar, SOB, Principal, St. Anthony's College

GUIDANCE & SPEAKER

- Prof Sarbosh Kumar, Head, GEOSI, NIDM

GUIDANCE

- Shri Shekhar Chatterjee, Asst Professor, NIDM

SPEAKERS

- Dr. Suresh Bhanush, Scientist G, CSIR-NEST, Jorhat
- Fr. Joby Joseph SOB, St. Anthony's College, Shillong
- Dr. Parag Phulstari, Professor, Gauhati University, Dept. of Geological Sciences
- Dr. Dagan Sharma, Scientist SD, NESAC

CONVENOR & SPEAKER

- Dr. Preeti Sori, Sr Programme Consultant, IUNDR-NIDM

COORDINATOR

- Mrs Nisha Chatter, Assistant Professor, St. Anthony's College

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Organised by
India Universities and Institutions Network on Disaster Risk Reduction
National Institute of Disaster Management (NIDM)
Ministry of Home Affairs (MHA), Govt. of India
in collaboration with
North Eastern Space Applications Centre (NE-SAC)
and
Department of Geology, St. Anthony's College, Meghalaya

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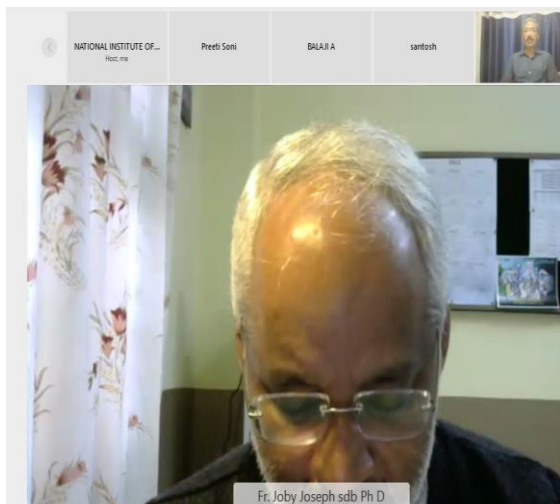
Stay Protected from Corona | Wear your Mask Properly | Wash your Hands Regularly | Maintain Social Distancing

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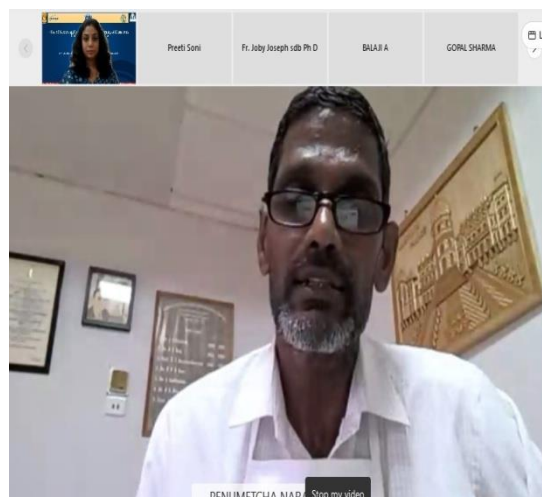
Background

India University and Institution Network on Disaster Risk Reduction - National Institute of Disaster Management (IUINDRR-NIDM) in collaboration with **North Eastern Space Applications Centre (NE-SAC)** and **Department of Geology, St. Anthony's College, Shillong, Meghalaya** conducted a Webinar on *Use of Science and Technology in Early Warning of Disaster in North Eastern Region of India*. The webinar began with the Dr. Preeti Soni, Senior Programme Consultant, IUINDRR-NIDM, introducing the Webinar theme and the schedule of the programme. She also welcomed the dignitaries and participants and then gave an overview of the collaborative webinar.



Rev. Father Joby Joseph SDB, St. Anthony's College, Shillong delivered the key note address of the Webinar on behalf of. Rev. Br. Dr. Albert L. Dkhar, Principal St. Anthony's College, who could not attend the Webinar due to the sudden demise of his mother, for whose eternal repose the Webinar held a one-minute silence in prayer. In his keynote address Fr. Joseph gave a brief analysis about the Webinar. He emphasised on the need of taking precautions, educating and informing the stakeholders and using science, technology and research in this line to have a safe, secure and better future.

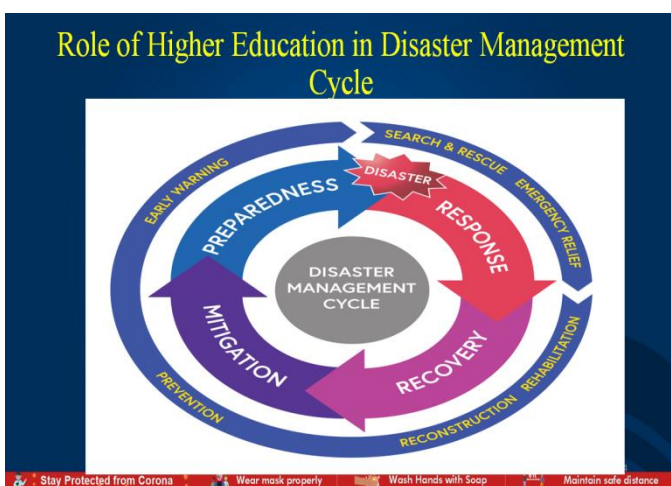
The Director of North Eastern Space Applications Centre, Shri P L N Raju gave the special keynote address for the Webinar where he spoke about the key role of North Eastern Space Application Centre (NE-SAC) in Disaster management. He informed that NE-SAC has a centre called North Eastern Regional Disaster Risk Reduction (NERDRR), established in 2013, which co-ordinates with Department of Space and National Disaster Emergency Management (under Ministry of Home Affairs). He spoke about the



various programs to acquire satellite data which is analysed by NESAC. He particularly spoke about floods and landslides in the North-Eastern States and how their prediction and planning can be done using current technologies. He mentioned the use of technology in predicting and managing earthquake and forest fires as well as use of science and technology in agricultural field.

Professor Santosh Kumar, Head GDRR, NIDM, enlightened the participants with his knowledge and experience about the regional issues of North-East India. He gave the fundamentals that need to be worked out with institutions and the stakeholders. He emphasized on the use of science and technology in early warning system, disaster scenario and other uncertainties which may play a vital role in the immediate future. He very well explained the need for trust factor and confidence in the system, science and scientist. The cascading effect of disaster and need for its proper study was also pointed out. He mentioned that the early warning systems network in the North-East Region must be connected and early warnings must be generated with exchange and sharing of knowledge. The terrain of North-East India being different from that of the other parts of the country, he urged the development of a system that is moulded to this particular setting, and accordingly universities and institutes should co-operate for a collective study and come up with new discoveries and information. He talked about the relevance of IUINDRR-NIDM activities with all the above-mentioned factors.

Dr. Preeti Soni, SPC, delivered the basic idea of disaster and disaster management in a very

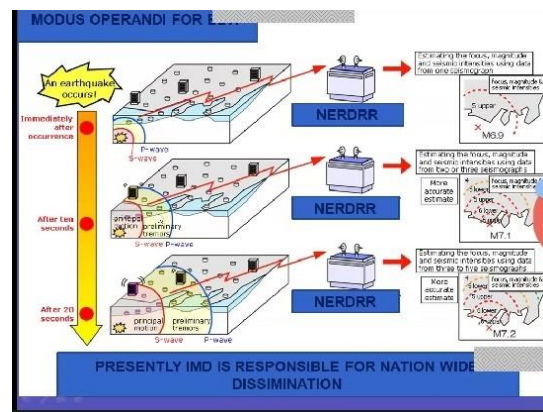


simple and yet meaningful way. She gave a brief idea about the concepts of disaster, mitigation and preparedness, and minimising the disaster risk impact on humans and other living organisms. She emphasized how use of science and technology can help to achieve that objective. She stressed on the involvement of women and children, and

the community as a whole, to utilise their technique and knowledge and information to prepare them for a coming disaster and make use of early warnings. She talked about the post disaster stage preparations and relief plans immediately after the disaster and how people respond to a disaster event. She discussed Sendai's Framework and spoke about the four priorities: understanding of disaster, strengthening disaster risk governance to manage

disaster risk, investing in disaster risk reduction, and enhancing disaster preparedness for effective response. She also mentioned Sendai's framework for seven global targets. She then discussed about the Prime Minister's 10 points and specifically on agenda 6 that deals about the role of higher education in DRR. She emphasised on having committees in every institution for engaging stakeholders in disaster risk management and advocating public awareness programs for the common people by the institutions. She spoke about use of different departments of an institution in the phase of recovery and how students and teachers can come together and help the society or community.

After Her presentation, Dr. Saurabh Baruah, Scientist G, CSIR-NEIST gave a wonderful technical session on the topic "Seismic Hazard of Meghalaya Plateau and its vulnerability: Use of Science & Technology for Dissemination of Early Warning". He talked about the importance of science and technology in dissemination of early warnings. He focused on the seismic hazards in the states of North East India and discussed different earthquakes that has affected the area. He pointed out the ignorance of ordinary citizens in taking proper precautions in the face of impending disasters as well as not availing published scientific information for building safe structures. He showed various maps highlighting the vulnerability of the NE states of India to earthquakes. He stressed why it was so important to discuss and work on earthquake disaster and management in the North-East Region. He demonstrated early warning systems for earthquakes and spoke on the necessity further studies in this line. He also showed some of CSIR-NEIST's ground work in Shillong city and displayed maps on seismic hazard assessments towards the end.



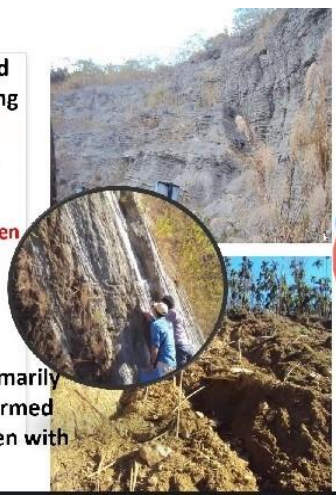
Dr. Parag Phukon, Professor, Gauhati University, Department of Geological Sciences, delivered a talk on "Landslides in the NE Region of India: Causes and Consequences". He started with brief explanation of the meaning of landslides and other general terminologies related. He very well correlated the multi hazard scenario in North East India and pointed out that the hazards cannot be dealt in isolation and that a holistic approach is needed. He showed the link between the monsoon, topography and landslides in these regions and also the need

Expansion and new construction of road and railway network resulting in slope modification

Examples:

- The E-W corridor between Silchar and Lumding
- Dimapur-Kohima Road section

☐ **Geological control: primarily shale dominated, deformed sedimentary rocks often with reactive clay layers**



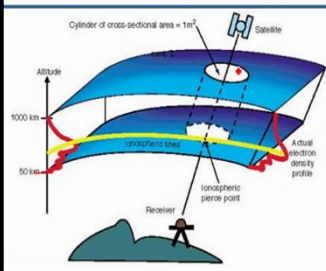
for solid scientific research for a meaningful preparedness strategy to develop an early warning system. Casual factors, preparatory factors and triggering factors of mass movement were discussed as well as the causes and consequences in detail. He gave examples of many recent landslides in NE India and explained the reasons for them. He focused on the land use practices and other anthropogenic activities which are some of the major reasons for landslides in the region. He concluded by saying that there was a need for data driven approach in disaster management with strong component of research and understands the connection between the landslides, flood, erosion and sediment aggradations in Brahmaputra valley for a comprehensive disaster management strategy.

At last, Dr. Gopal Sharma, Scientist SD, North Eastern Space Applications Centre (NESAC) delivered a talk on a unique topic “Earthquake Precursors detection by Space Technology Inputs: Some Success Stories and Early Results”. He cited the use of space technology, especially highlighting Global Navigation Satellite System (GNSS) which gives global coverage, good accuracy and integrity. Speaking in simple terms for students to understand, he revealed how changes in Total Electron Content (TEC) in the ionosphere help derive information about precursors of earthquake days in advance before the occurrence of the quake. While such an advanced theme was explained in simple details, he shared some of his observations in relation to the Nepal Earthquake (2015) and Manipur Earthquake (2016), which showed good promises as advance warnings before earthquakes occur. He also highlighted how TEC anomalies help in analysing seismic data and information throughout the Himalayan range.

NATIONAL INSTITUTE OF... Host me

GORIL SHARMA Preeti Soni BALAJI A PARAG PHUKON

Total Electron Content (TEC)



Altitude
1000 km
50 km

Cylinder of cross-sectional area = 1m²

Satellite

Actual electron density profile

Ionospheric pierce point

Receiver

[Komjathy and Langley, 1966. Proceedings of the 1996 IGS Workshop.](#)

It is the total number of electrons integrated between two points, along a tube of one metre square section.

It is measured in TECU where **1TECU = 10¹⁶ electrons/m²**

NESAC

Webinar on: Use of Science and Technology in Early Warning of Disaster in North Eastern Region of India

Key takeaways

- Science and Technology institutions such as NE-SAC and CSIR-NIEST along with universities and colleges like Gauhati University and St. Anthony's College have an important role to play in risk reduction activities and must come forward for undertaking risk reduction activities.
- Future collaborative training and awareness programme with the involvement of students and scholars of the University may be conducted.
- Disaster Management Plan within the University and other institutions must be prepared and drilled.
- The use of science and technology must be acknowledged and such studies encouraged and confidence must be shown to science and the scientist.
- There is a need for data driven approach in disaster management with strong component of research and understanding.
- There should be committees in every institution for engaging people in disaster risk management and having public awareness program for people out of the institution.

At the end of the webinar, Ms. Nisha Chetti, Assistant Professor, Department of Geography, St. Anthony College, Shillong gave vote of thanks to all resource persons, collaborators, NIMD, NIDM IT team and participants who gave their valuable time and knowledge to make the programme successful. Total about 330 participants were attended the programme.

List of Participants

Sl. No.	Name	Email
1	Basra	basra2909@gmail.com
2	Anand Talli	anandtalli024@gmail.com
3	Kosygin	kosygin_1@mtu.ac.in
4	Nishna Sarkar	knockmenish920@gmail.com
5	Evadahun Wann	www.evadawann@gmail.com
6	LALNUNTHARI -	ralte.thartei@yahoo.com
7	Raja Durai G	dhigildurai@gmail.com
8	ARCHANA THAKUR	archana.nov20@gmail.com
9	KOUSTAV DUTTA	duttakoustav15@gmail.com
10	Baiza Rafiqi	baizarafiqi15@gmail.com
11	Farhana Sultana Rahman Neog	farhanasultanarahmanneog@gmail.com
12	Happy Singh Sethi	sethi125051@gmail.com
13	Labli Das	lablidas545@gmail.com
14	Dr.Pachaiyappan	edugreengrtcoe@gmail.com
15	B Joshi Ram	joshiram326@gmail.com
16	Doreen Lyngdoh	doreenlyndoh7@gmail.com
17	Habile Destine T.Nongsiej	habiledestine07@gmail.com
18	Sivananda Kumar	sivananda.kumar@christuniversity.in
19	Rashmi Tyagi	rtyaashmi@gmail.com
20	Sachin Kumar	sach.geo@gmail.com
21	Akshayjit Podder	chem.akshayjit.aus@gmail.com
22	Suresh	srsghmn@gmail.com
23	Dr. Issabella Eva Kharpran	evaezavel@gmail.com
24	Komal Joshi	komalgjoshi12@gmail.com
25	Khaleda Hasina	ajizulhaque7788@gmail.com
26	Melissa Kharkongor	melissabok@gmail.com
27	Bogitora Panyang	bogitorapanyang@gmail.com
28	Jay Kumar Gupta	jaykay9144@yahoo.co.in
29	Sudarsana Saikia	sudarsanasaikiajht@gmail.com
30	Mrigen Barman	mrigenbarman2011@gmail.com
31	Deepjyoti Mahanta	geomahanta95@gmail.com
32	ASHISH GUPTA	connect@advag.in
33	Imnasenla Molier	imnasenlamolier@gmail.com
34	Van Jennifer Joan Wallang	vjjwallang@gmail.com
35	Ashutosh Jaiswal	ashutoshjaiswal.sociology@gmail.com
36	HITESH SHARMA	hiteshsharma201600@gmail.com
37	Dr Ritu Tiwari	rseasons@yahoo.com
38	John Kenny Kusun	johnkennykusun36@gmail.com
39	Priyanshu Chaturvedi	priyanshuchaturvedi72@gmail.com
40	Manabendra Nath	manabendra.nath@rediffmail.com
41	Uddipta Narayan Patar	pataruddipta@gmail.com
42	Queency Susngi	queencysusngi@gmail.com
43	Rahool Kr Talwar	rethinkhospitality19@gmail.com
44	Tabbusum Siddiqui	tabbysiddiqui1487@gmail.com

45	Dkunal	kunalpagare9090@gmail.com
46	Nilesh Kumar	visit2nilesh@gmail.com
47	JOY CHANDRAN	vu3joy@gmail.com
48	Sunita Pandit	sunitapandit779@gmail.com
49	Sanjay Bosamiya	sbosamiya8976@gmail.com
50	Anil Singh Chandel	anilchandell23@gmail.com
51	Irfan Makhdoomi	irfanyaqoob26@gmail.com
52	Navdeep singh	navdeepdcd@gmail.com
53	VC Hemchand Yadav Univ. Durg	arunapalta@rediffmail.com
54	Tingky	tingkyhaokip20@gmail.com
55	Baiahunlang Lyngdoh	lyngdohbaiahunlang@gmail.com
56	NAVARATAN GUSAIWAL	navaratangusaiwal@gmail.com
57	Anisha Pohsnem	anishapohsnem2@gmail.com
58	Thiyagarajan Radhakrishnan	rashmithiyagu@gmail.com
59	Rajesh Dwivedi	rajeshdwived.329p@gov.in
60	Raj M	rajm@gmail.com
61	Sarmistha BhagawatI	bhagawatisarmistha@gmail.com
62	AMARA KAMALA NAYAK	kamalparu93@gmail.com
63	Kapani Manini Regina	maniniregina625@gmail.com
64	Nganthoiba Maisnam	mnganthoibamaisnam@gmail.com
65	Shekher Chaturvedi	shekherc@gmail.com
66	Santosh	profsantosh@gmail.com
67	Dr,Abhrankash Kanungo	abhrankashk@gmail.com
68	Ramesh Bhatt	ramesh.bhatt1987@gmail.com
69	Shubhra Kamthan	kamthanrunjhun@gmail.com
70	Divya P	divyap282@gmail.com
71	Savitha Ulavi	savithaulavi1@gmail.com
72	Raju Roy	rajulive24@gmail.com
73	Dr Sweta Kumari	gargswetakumari@gmail.com
74	Sreerama AK	ajay4sreerama@gmail.com
75	NALINEESH YADAV	nalineesh6995@gmail.com
76	Swandeeep Sarmah	lordrubu@gmail.com
77	BAROT HITE <input type="checkbox"/> HKUMAR R	barothitesh13188@gmail.com
78	Vivek Shridhar Patil	patil.viveks48@gmail.com
79	Eric Lamphrang Hek	hekeric655@gmail.com
80	Recordius E. Kharbani	rikomg@gmail.com
81	Jitul	jitulbora01@gmail.com
82	Kamaldeep Sangwan HIRD	kamaldeep.gis@gmail.com
83	ARUP DHAR	atdrva2019@gmail.com
84	Br.Collinsius Wanniang	collinsius@gmail.com
85	Deepak Kumar	dip2859@yahoo.com
86	Ajaya Dalai	ajaya.dalai@adityabirla.com
87	Vicky Diengdoh	v.diengdoh@yahoo.in
88	ANJALI VERMA	anjusktv@gmail.com
89	Ms. Lyn Rodrigues	lynangelinrodrigues@gmail.com
90	Niranjoy Laishram	niranjoy.laishram2001@gmail.com

91	TANMOY GHOSH	tanmoykughosh@gmail.com
92	Sangeeta Sharma	sangees_online@rediffmail.com
93	J.LAWRENCE VU3XQI	lawrence.lawru@gmail.com
94	John Jude Dickie	johnjdickie@gmail.com
95	JESSMITA GOGOI	jessmitagogoi2386@gmail.com
96	Atul Kohli	geoatul@gmail.com
97	Satish Sharma	satishsharma13245@gmail.com
98	Manav Rai	raithapa376@gmail.com
99	Debeena Nongmaithem	debeenanong01@gmail.com
100	AA SARMA	apsarma1@gmail.com
101	Mardrella F Kharmawphlang	mkmawphlang@gmail.com
102	Md Farhan Ahmad	farhanahmad078654@gmail.com
103	Anuska Baruah	anyskabaryah2002@gmail.com
104	Devesh Walia	wadevesh@gmail.com
105	Hari Sankar Rout	swati_pab@yahoo.co.in
106	Iarisa Anette R. Dorphang	iarisa1913@gmail.com
107	zpPjMPbg387	tskarthikbabu1@gmail.com
108	Rakesh Kumar	rakesh2098@gmail.com
109	Naphisahun	nafylyngdoh@gmail.com
110	Shaji George Mathew	smgeorges@gmail.com
111	Meeranda Kharkongor	meerandakharkongor@gmail.com
112	Nitya Nand	nietya187@gmail.com
113	Mohit Das	momofires911@gmail.com
114	Pritom saikia	pritom.saikia50@gmail.com
115	Kanon devi	kanondevi13@gmail.com
116	Nitika Singla	nitikanikks.ns@gmail.com
117	Neil Badondor Riahtam	riahtamn@gmail.com
118	Anthony Quin Kharlyngdoh	anthonykharlyngdoh@gmail.com
119	DR. GIRISH TEWARI	gc.tewari@gmail.com
120	Phibadahun Nongrang	phibadahun123@gmail.com
121	NISHA CHETTRI	ncnisgeo177@gmail.com
122	Upasana Yadav	uyadav@lko.amity.edu
123	Prashantfulbright	prashantfulbright@gmail.com
124	Mrigankar Das	mrigankar99@gmail.com
125	Vinod Kumar	vinodkumar04031993@gmail.com
126	Nikunjoy Basumatary	nikval1027@gmail.com
127	Adrija Bhowal	adrijabhowal100@gmail.com
128	Samadrita Das Barman	sumitavivo@gmail.com
129	Abhay Kumar Yadav	abhaybbdnitm01@gmail.com
130	Lalit Upadhyaya	lalitupgyan16@gmail.com
131	Manikanta Nerella	manikantanerella77@gmail.com
132	Dawanhika Rympei	dawanhikarympei@gmail.com
133	Prafull	ahire.prafull111@gmail.com
134	Trocylin Chyne	trochyne92@gmail.com
135	Yamini Pandey	pandeyyamini14@gmail.com
136	Badakordor Diengdoh	badakordor2122@gmail.com

137	Ankita Borah	ankitaborah41@gmail.com
138	Tarun Anand	tarunanand.mu@gmail.com
139	Gagan Bihari	gagansinghrajput941@gmail.com
140	Prof.Dr.I.Manavalan Ilakkuvan	imanavalan56@gmail.com
141	Angshuman Changmai	angshumanchangmai08@gmail.com
142	Manjay Kumar	manjay1077@gmail.com
143	Anuraj Basumatary	anurajbasumatary1234@gmail.com
144	Naidu	tsuchitranaidu@gmail.com
145	Maibam Donald	donaldmaibam@gmail.com
146	ARPANA THAKUR	arpana.thakur02@gmail.com
147	Abdul Baqi	baqiamu@rediffmail.com
148	Gripseng Momin	gripsengmomin@gmail.com
149	Wandy E. H. Lamin	wandyhakin@gmail.com
150	Tojeli Sangma	sangmatojeli@gmail.com
151	Partha Pratim Gogoi	pg15@iitbbs.ac.in
152	Nipen Singha	nipensingha2023@gmail.com
153	Tushar	tushardagade1@gmail.com
154	Interesting Dkhar	dkhar83interest@gmail.com
155	Vamshi Krishna Reddy	vamshiavkreddy@gmail.com
156	MALAY ROY	malay660@gmail.com
157	Valley Rose Narzary	valleyrose.nzy26@gmail.com
158	AMIT	amitparab27@rediffmail.com
159	Avnish verma	avnishv55@gmail.com
160	Nafisa Yeshmin Ahmed	nafiyahmed9@gmail.com
161	senkadhir dasan	senkadhirdasan85@gmail.com
162	Vijeta Thingalaya	quality.ymch@yenepoya.edu.in
163	Pramod Kumar	pk243689@gmail.com
164	Arvind Chauhan	arvindchauhan.chauhan081@gmail.com
165	Dr. Waseema Yaseen	waseema.yaseen3000@gmail.com
166	Prashant Ilamkar	ptilamkar@gmail.com
167	Sneha Das	snehadas9434048774@gmail.com
168	Iasylloklang Rynjah	irynjah06@gmail.com
169	Monalisha Baruah	monalishabaruah5@gmail.com
170	Subhash Jaryal	badalakash5@gmail.com
171	Vanita Biswal	vanitabiswal@gmail.com
172	TAPAS RANJAN PARIDA	tapas.aju@gmail.com
173	Deevena	deevenajemima@gmail.com
174	Nokinsangla	nokinimchen4277@gmail.com
175	Ms Tejaswini Lade	ladehtejaswini@gmail.com
176	Mrinal Pathak	mrinalpathak2@gmail.com
177	Dr. Zonuna	ascasdir@gmail.com
178	SEVEN DAR DKHAR	sevenk4k@gmail.com
179	Emida oo paya Sumer	esumer.academic@gmail.com
180	Siddhartha Bhuyan	siddhartha.bhuyan86@gmail.com
181	Jigneshbhai Sanghani	sanghanijk@gmail.com
182	Anjali Gade	gadeanjali9@gmail.com

183	Simrandeep Kaur Sudan	simransudan5@gmail.com
184	Mayankkumar Jayantibhai Patel	mp2891992@gmail.com
185	MURALI	c.murali3@licindia.com
186	Lakshmi Kant	lkant4u@aol.com
187	Rekha Gogoi	rekha.bharali06@gmail.com
188	Sovik Mukherjee	sovik1992@gmail.com
189	Ajaya Kumar Sahoo	aks9439@hotmail.com
190	Biswajit Chakraborty	biswajit.tkl@gmail.com
191	V Morgenstern Wann	morgensternw@gmail.com
192	Priyanka Hansa	hansapriyanka9858@gmail.com
193	Sougata Karmakar	karmakar.sougata@gmail.com
194	Ritambhara Upadhyay	ritambharaku@gmail.com
195	Lebaini Rymbai	lebainir@gmail.com
196	Ananya Gogoi	aanya8077@gmail.com
197	Firuz Akter Barbhuiya	firudz77@gmail.com
198	SWATI SHARMA	swati.sharma.1982@gmail.com
199	Nishtha Goswami	nishtha.goswami7835@gmail.com
200	Sneha Verma	nancydr7474@gmail.com
201	Satish Pandey	satishpandey174@gmail.com
202	1666229425	madonnajdsz@gmail.com
203	Rashmi Pandey	rashmitmeet82@gmail.com
204	Sanyogita Khude	sanyogita.khude@gmail.com
205	RAVINDRA REDDY M	ravindraoudepts@gmail.com
206	Aparna Talukdar	aparnatalukdar111@gmail.com
207	Dr.S.Vaijayanthi	vijjukadambi@gmail.com
208	Princess Joy Relator	relatorprincessjoy@gmail.com
209	Ledakani Pastieh	ledakanipastieh@gmail.com
210	IBORMITRE PASSAH	ibormitre.passah@gmail.com
211	AVDESH BHARDAWAJ	avdeshiitd@gmail.com
212	Abhay Chhibber	abhaychhibber03@gmail.com
213	Mamta Jain	mmtjn2@gmail.com
214	A R Choure	ardurguniversity@gmail.com
215	AMIT KUMAR	amit.kumar@eil.co.in
216	Shabnam Makrari	shabnam.makrari@gmail.com
217	P Rama keishna murthy	polukal.rkm@gmail.com
218	Ajay Gupta	ajaygupta.mnc@gmail.com
219	LAKSHMI NARAYANA NAGISETTY	grcnln@gmail.com
220	Gorakh Bhausheb Bhagat	gorakhbhagat01@gmail.com
221	Ratamali Machahary	machahary.ratamali@gmail.com
222	Evashisha Wanniang	evawanniang9@gmail.com
223	Runa hazarika	runahazarika1234@gmail.com
224	SP	sasjnu@yahoo.com
225	Dr. Dakyntuhimi G. Lyngdoh	dakyntuhimi@gmail.com
226	Malsawm Kimi	sawmkimi814@gmail.com
227	Arpita kumara	arpitakumari7252@gmail.com
228	MAMTA KUMARI	babylado.1411@gmail.com

229	Ilungpeule Rangkau	peurangkau@gmail.com
230	ARIJIT GUPTA	ami_arijit2003@yahoo.co.in
231	Nikhil Kumar Singh	nikhil Singhgeology@gmail.com
232	Dr. Anurag Iswarary	dr.omfs2k5@gmail.com
233	Dr Laldinpuia	dinpuiageo@gmail.com
234	Jyothi Krishnan, DM dept, Loyola College, TVM.	jyothikr07@gmail.com
235	Indukala P K	indu.kpk@gmail.com
236	Neera Chhetry	chhetryneera@gmail.com
237	Larihun Jeengaph	01lari06@gmail.com
238	Jyoti Singh	jyt9116@gmail.com
239	Dr Sumeet Agrawal	hellosumeet@yahoo.com
240	DAMEWANMI SUCHIANG	dsuchiang7@gmail.com
241	Apurba Sarma	apurbaasarma@gmail.com
242	Sonikaphd	sonikaphd@gmail.com
243	Ramneek Singh	rsdhami0016@gmail.com
244	Doddi Ghnyana Sekhar	shekharpami@gmail.com
245	Dr. C.L. Dewangan	registrar@durguniversity.ac.in
246	SOURAV KUMAR	sourav.kumar@iitg.ac.in
247	Krishan Mohan Jha	kmjha4u@gmail.com
248	O j Abu-Libda	abulibda.o@gmail.com
249	Rohit Kesarwani	rohitkes1995@gmail.com
250	Remalia Dkhar	remaliadkhar071215@gmail.com
251	Ramamohanrao Pannem	ramamohanrao71@gmail.com
252	Mukta Ingtipi	muktaingtipi@gmail.com
253	Dr. B.SRIDEVI	bsridevi.mula@gmail.com
254	Aparna	aparnadeb331@gmail.com
255	Lucky Takhellambam	luckytakhel99@gmail.com
256	Amit Sharma	amitkush49@gmail.com
257	Sumit Singh	sumitjnv10@gmail.com
258	Aneesha A. Kharpor	aneesha.kharpor12@gmail.com
259	mithu bora	jugalkumar.bora22@gmail.com
260	Paominlun Guite	pahellguite@gmail.com
261	Juna Probha Devi	junapdevi@iitg.ac.in
262	RAKESH KUMAR MISHRA	rkshindian@gmail.com
263	B JAIN A R TONY	jaintonyb@gmail.com
264	Daisy Bhuyan	bhuyan.daisy123@gmail.com
265	Er. NISHANT MISRA	nmishra.pratapgarh@gmail.com
266	Aayush kumar Shah	aayushkumaraks75851@gmail.com
267	Karthi Suressh	lpkandasamy@gmail.com
268	John Thanglianding Guite	johnddguite@gmail.com
269	Prof. Pawan Kumar Sharma	talk2pawan@gmail.com
270	Dr. M. Pradhap Asst.Prof. Dept of Zoo, AAGAC,NKL, AU	pradhapm@aagacnkl.edu.in
271	Niraj Bhuyan	nirajbhuyan111@gmail.com
272	Abhayaa Y Fumiko	karthisuressh@gmail.com

273	Hemant Suman	hemant.s@iimbg.ac.in
274	Dr.Vazeem iqbal	iqbalafly@gmail.com
275	Polynia Kharbuli	polyniakharbuli@thonys.ac.in
276	Saurabh Baruah	saurabhb_23@yahoo.com
277	Bharti Rana	bhartirana2006@gmail.com
278	Ajanta Sarma	ajanta_sarma@rediffmail.com
279	MANISH SAXENA	worldjpr@yahoo.com
280	PENUMETCHA NARASA RAJU	plnraju@gmail.com
281	DERRICK SHANPRU	derrickdms2014@yahoo.com
282	Wanrimaya Kharmawshun	wanri.kms@gmail.com
283	Ammar Taher Saleh Zubaiyen	ammartaher1@yahoo.com
284	Manish Sonowal	manishsonowal1@gmail.com
285	ASHISH JAMBHE	avj@dgfasli.nic.in
286	BALADIANGHUNLANG KHONGKAI	baladiangk77@gmail.com
287	Saivi Shetty	saivishetty@gmail.com
288	Vikram Joshi	sumit.cooper@gmail.com
289	Ginora Jala Kharbhih	ginorajala@gmail.com
290	Ganapathy Pattukandan	seismogans@yahoo.com
291	Surendran S	surendranpharma@gmail.com
292	Hafiz Mohammod Nasir Ghani Haider	nasirgani20@gmail.com
293	DR.RAJESHKUMAR KISHORKUMAR PANCHAL	rkpanchal@nau.in
294	SHARVAN DEO PRAKASH	sharvan2296@gmail.com
295	Harbakhsh Singh	hs.civildefence@gmail.com
296	Test user	mahantadeepjyoti96@gmail.com
297	Manoj Kumar Sharma	mksharma4986@gmail.com
298	Natalya Lyngdoh	natalyalyndoh@gmail.com
299	Duvvada Mallikarjuna Rao	mallikarjun_environ@yahoo.com
300	181232 181232	pavibalar233@gmail.com
301	Kavita Singh	ksinghevs@gmail.com
302	Ayush Kumar Shrivastava	shrivastava.ayush11@gmail.com
303	Ebormi S Langshiang	lyngchiangbormi@gmail.com
304	YUVRAJ SHIRALKAR	yuvshri13@gmail.com
305	Shatabdi Kristi Borgohain	shatabdikristi@gmail.com
306	Farhina Choudhury	farhinac57@gmail.com
307	Dr Kamal Joshi	drkamaljoshipt@gmail.com
308	Ritu S	ritulprason001@gmail.com
309	DUSHYANT KUMAR UPADHYAY	dk.upadhyay@eil.co.in
310	Ratan Das	ratandasdjn91@gmail.com
311	GOPAL SHARMA	gopal.sharma@nesac.gov.in
312	RASHMI RANJAN MOHAPATRA	mohapatrar@gmail.com
313	Vishal Verma	vermavishal1908@gmail.com
314	UTSA ROY	uroy@ymail.com
315	Karan Nayak	karannayak203@gmail.com
316	Kesterlee Syiemiong	kester.syiemiong@gmail.com
317	Kesar Chand	kesar82@yahoo.com

318	Fr. Joby Joseph sdb Ph D	jobymj@hotmail.com
319	SAIMA MIRZA	mirzasaima96@gmail.com
320	PARAG PHUKON	pp016@gauhati.ac.in
321	Digaekliu Gonmei	123digaekliu@gmail.com
322	Priya Verma	priyaverma3119@gmail.com
323	Nisha Chettri	nishachettri@anthonys.ac.in
324	Krishna Kumar Singh	kksinghgw1@gmail.com
325	MIVANN LAMIN GAYANG	mivanngayang01@gmail.com
326	Steve Luke	mca552@rajagiri.edu
327	Dr. Alok Kumar Singh	draloksinghlko@gmail.com
328	BALAJI A	bputhiran@gmail.com
329	Preeti Soni	preetisoni4@gmail.com
330	Malobika Deb	debmalobika27@gmail.com

Concept Note and Agenda



Webinar on

“Use of Science and Technology in Early Warning of Disaster in North Eastern Region of India”

20May 2021 | 3:00 Pm – 5:30 Pm

Organised by

India University and Institution Network on Disaster Risk Reduction (IUINDRR-NIDM)

National Institute of Disaster Management (NIDM)

Ministry of Home Affairs (MHA), Govt. of India

in collaboration with

North Eastern Space Applications Centre (NE-SAC),
Department of Geology, St. Anthony's College, Shillong, Meghalaya



Overview

The world continues to experience the onslaught of natural calamities at regular interval and with increasing frequency as the days go by leading to the loss of countless lives of people and livestock and the destruction of property amounting to billions of rupees. India has unfortunately not been able to escape such onslaughts. In the recent past it has felt the might and force of natural phenomenon such as the “*fani*” Cyclone in 2019; the Kerala floods, Cyclone Titli and Gaza in 2018, and; the Kedarnath floods, Chennai flood, Phyllin and Hudhud 2013 Cyclones, to name but a few. In response to such disastrous events that have occurred around the world, the Global issues on Climate Change Adaptation (CCA), Sendai Framework for Disaster Risk Reduction (2015-2030), and Sustainable Development Goals (SDG) have initiated various steps to reduce the destructive impact of such events on life and property by 2030. In this regard, the Government of India, more specifically the Honourable Prime Minister, guided by the 10 points and 6 points agenda, has chosen to focus on the role of higher education institutions/universities for promoting education, innovative technology and research, facilitate capacity development, and their contribution to the decision-making for addressing local risks from natural calamities to reduce the risk of disasters in India. Therefore, the IUIN was established by the NIDM with the vision to build nation and communities which are safe and resilient to disasters, through education, knowledge creation, research, technology and dissemination.

Science and technology provide synoptic observations of natural disasters at regular intervals that help in better planning and management of disasters. India is prone to many natural disasters like floods, landslides, cyclones, forest fires, earthquakes, drought, and the North-eastern region is especially prone to landslides and earthquake which makes this region more vulnerable in terms of disaster-related risk. To deepen our understanding of the risks due to such disasters, it is necessary to integrate science and technology by scientific institutions and field-based research through higher education, which is important in the endeavour towards risk reduction of disaster. Communication and navigation systems also play an important role in disaster management with improved technological options.

About the Webinar

The **National Institute of Disaster Management (NIDM)**, *Ministry of Home Affairs, Government of India* collaboration with the North Eastern Space Applications Centre (NESAC) and Department of Geology and of St. Anthony’s College, Shillong is organizing a Webinar on “**Use of science and Technology in Early Warning Sign of Disaster**” on **20th May 2021** from 3:00 pm to 5:30 pm to deliberate on the actions and strategies that are required in minimizing the disaster risk.

The objectives of this webinar are as follows:

- To address the emerging challenges faced due to regional disasters issues
- To adopt a holistic framework of action for response and recovery through science and technology innovations
- To sensitize the different stakeholder on Disaster Risk Reduction as per region
- To discuss and come up with innovative solutions to recover the losses of disaster in the North-East Region.

Organizing Committee

Patrons

- ***Major General Manoj Kumar Bindal***
Executive Director, NIDM
- ***Rev. Br. Albert Longley Dkhar SDB,***
Principal, St. Anthony's College Shillong
- ***Dr. P.L.N.Raju, Director,***
North Eastern Space Applications Centre (NE-SAC),

Guidance

- ***Prof. Santosh Kumar,Head, GiDRR, NIDM, MHA,GOI***
- ***Shri. Shekhar Chaturvedi, Assistant Professor, NIDM, MHA,GOI***

Convenor and Coordinator

- ***Dr. Preeti Soni, Senior Programme Consultant, IUINDRR-NIDM***

Co-convenor

- ***Asst. Prof. Nisha Chettri,Department of Geology, St. Anthony College, Shillong,***
Nodal officer, IUINDRR-NIDM

IT Support

- ***NIDM IT Team***

Experts

1. Dr. Saurabh Baruah, Scientist G, CSIR-NEIST, Jorhat
2. Dr. Parag Phukon, Professor, Gauhati University Department of Geological Sciences
3. Dr. Gopal Sharma, Scientist SD, North Eastern Space Applications Centre (NESAC)
4. Prof. Santosh Kumar, Head, GiDRR, NIDM, MHA,GOI
5. Dr. Preeti Soni, SPC,IUINDRR,NIDM,MHA,GOI

Webinar Platform

The webinar would be conducted over the WebEx Platform. The link for the webinar would be sent individually to the email addresses of the participants. Those who are interested may register for the program through NIDM Training Portal at <https://training.nidm.gov.in>.

Webinar Programme Flowchart

Time	Topic	Resource Person/Experts
3:00 — 03:05	<i>Welcome Address</i> <i>About the programme</i>	Dr. Preeti Soni, SPC, IUINDRR-NIDM Sh. Shekher Chaturvedi, Assistant Professor, NIDM,MHA
03:05- 03: 10	<i>Special Address (Prayer by Fr.)</i>	Fr. Joby Joseph SDB, St. Anthony's College, Shillong
03:10-03:15	<i>Address by Chairman</i>	Rev. Br. Albert Longley Dkhar SDB, Principal, St. Anthony's College Shillong
03: 15- 03:20	<i>Keynote Address</i>	Major General Manoj Kumar Bindal, Executive Director, NIDM
03.20-3.25	<i>Special Keynote Address</i>	Dr. P.L.N.Raju, Director, North Eastern Space Applications Centre (NE-SAC),
03.25-03.50	<i>Regional Issues of Natural Disaster in NE region of India</i>	Prof. Santosh Kumar, Head, GDRR Division, NIDM,MHA
03.50-04.05-	<i>Prime Minister's 10 points and Agenda 6 : Role of Higher Education in Disaster Risk Reduction</i>	Dr. Preeti Soni, SPC, IUINDRR-NIDM,MHA
04.05-4.35	<i>Seismic hazard of Meghalaya Plateau and its vulnerability: Use of Science & Technology for dissemination of early warning</i>	Dr. Saurabh Baruah, Scientist G, CSIR-NEIST, Jorhat
4.35-5.05	<i>Landslides in the NE Region of India: Causes and Consequences</i>	Dr. Parag Phukon, Professor, Gauhati University Department of Geological Sciences

05.05-5.25	<i>Earthquake Precursors detection by Space Technology Inputs: Some Success Stories and Early Results</i>	Dr. Gopal Sharma, Scientist SD, North Eastern Space Applications Centre (NESAC)
05.25—05.30	<i>Vote of Thanks</i>	Asst. Professor Nisha Chettri, Department of Geology, St. Anthony College, Shillong, Nodal officer, IUINDRR-NIDM