



TRAINING REPORT

Three Days Online Training Program on

Technologies in Disaster Management

**Jointly Organized by National Institute of Disaster Management
and**

SRM Institute of Science and Technology

Dates: 28.03.2022 to 30.03.2022

Online Platform: Zoom

Technologies in Disasters Management

March 28th - 30th, 2022

Context

Disaster Management occupies an important place in India's policy framework. Disaster management is the discipline of dealing with, and thus avoiding any sort of risk – particularly of the natural variety. It is a discipline that involves a number of things, chiefly: preparing, supporting, and rebuilding society when natural or human-made disasters occur. The emergence of new technologies and constant developments in disruptive technology has proven to be one of the primary engines of growth in current times. The rapid spread of digitalisation, promotion of digital infrastructure, and increasing levels of technological know-how amongst every individual across the world is creating an ecosystem that allows a deeper integration of technology in our daily lives

Innovations in drone technology, robotics, etc. are transforming disaster management. These technologies are also aiding with quick and easy communication, improving predictions for disasters as well as warning systems, and enhancing methods of damage assessment. The first documented instance of aerial drones being used in disaster management was after the wreckage of Hurricane Katrina in the United States in 2005.¹ Ever since, as digitalisation and big data is permeating countries across the world, the opportunities for emerging technology in disaster management have only grown. And while there are a number of ways in which we as a society can prepare and mitigate natural disasters, it's clear that the role of technology can have an instrumental affect in the disaster management cycle.

Role of Technology

Technology has the potential to transform disaster management, especially if one can successfully integrate emerging technology with existing infrastructure. As technologies such as Artificial Intelligence, Internet of Things (IoT), Big Data and block chain become even more sophisticated, they can help drastically improve India's disaster response and relief capabilities. When powerful ideas and sophisticated machinery come together, they create new advances in disaster management. In addition to drone technology, the following technologies find applications in disaster management:

1. Big Data

With increasing digitalization coupled with the growing proliferation of Smartphone's across various demographics, the amount of data generated has risen at a meteoric pace. This data has the potential to provide powerful insights when analyzed intelligently. This opportunity has led to the growth of Big Data analytics.

This has a role to play in disaster management too. Monitoring data such as social media communications, financial transactions, and mobile phone activity during and after a disaster can help track people movement and deliver help effectively.

2. Artificial Intelligence

AI-based algorithms can be used in predictive analytics to help forecast disasters and hasten recovery and response times. AI-powered image recognition can enable the identification of damaged buildings and roads, flooding, etc. It can also generate heat maps by integrating different streams of data. AI-based chat bots or voice response systems can also help deal with high call volumes to emergency hotlines to deliver more effective outcomes.

3. Internet of Things

The advent of cloud computing technology with broadband has enabled the emergence of a sophisticated system known as the Internet of Things (IoT). IoT-based sensors can help detect potentially dangerous situations, earth movements, detect forest fires by measuring carbon dioxide levels, moisture and temperature. They can also enable monitoring of river levels to detect flooding.

4. Robotics

With innovations in computing technology, robots today are extremely advanced and equipped to better support and complement human actors or rescue animals. These can be extremely valuable for NDRF units especially in challenging terrain and life-threatening operational environments. Robots can potentially help save victims' lives without endangering rescuers' lives.

5. Block chain

During relief efforts, organizations often face challenges around the lack of trust, transparency, and measurability of the relief efforts and ensuring resources are used for the intended purposes. In such instances, misinformation can often derail efforts and cause danger.

Block chain technology can help mitigate these concerns and enable rapid collection and management of reliable data. Smart contracting systems that exploit the higher reliability of block chain-encoded data can automate routine decision-making in high-pressure disaster environments. This can accelerate decisions and relieve pressure on strained rescuers.

These emerging technologies offer tremendous potential to help build sophisticated disaster management systems in India. With greater investment in emerging technology, India can exemplify the gold standard of disaster management for the world

Program Objectives

1. To enhance the Technological interventions in Disaster Management
2. To provide knowledge on transdisciplinary informed strategic response to emergencies and disasters
3. To emphasize the importance of capacity building for disaster and emergency response management strategy.

Methods and Mode of Delivery

Mode of delivery adopted is online.

Venue

Course IT Platform (ZOOM) provided by SPH, SRMIST, Chennai

The timings of the Program will be for two hours daily i.e., from 14:00 hrs. to 16:00 hrs. on each day.

Nomination/Participation

Nominations will be arranged by SPH SRMIST, Chennai.

Evaluation of the Program

Feedback of the participants would be the evaluation of the course.

Team

Overall Guidance

Shri.Taj Hasan IPS

Executive Director

NIDM, New Delhi

Prof. Padma Venkat

Dean, SRM SPH

SRM IST, Chennai

Organizing Team

Dr.Sushma Guleria

Assistant Professor

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Dr. K. S. Vignesh

Assistant Professor

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Day	No. of Participants	Zoom ink	You Tube
28.03.2022	600	https://zoom.us/j/92064101860? pwd=aDE4bXNYbE1WS2wz SHpINXY3WXhKUT09	https://youtu.be/SLGukClahJU
29.03.2022			https://youtu.be/bhEACmJwMZk
30.03.2022			https://youtu.be/SmWUIOkP4_k, SRM IST YouTube Channel SRMIST -afqg-utr1-p54k-659h-67gx

SCHEDULE FOR THREE DAYS TRAINING PROGRAMME:





Day	Time	Sessions Topic	Resource Topic
Day -1 28.03.2022	2:00 - 2.20 PM	Welcome Address	Dr. K S Vignesh , Asst. Prof., SPH SRMIST
		About the Program	Dr.SushmaGuleria Asst. Prof., NIDM
		Keynote Guest Address	Dr Padma Venkat The Dean, SRM SPH
		Chief Guest Address	Dr Anandha Kumar District Revenue Officer Govt of TN
	2:20 - 2.55 PM	Space and ICT for Disaster Management	Dr.P.G. Diwakar , Former Director and ISRO Chair Professor NAIS
Day 2 29.03.2022	2.55pm -3.45pm	IoT and Allied Technologies for DM	Dr. Kayal Vizhi , Assoc. Prof CSE, SRMIST
	3.45pm -4.00pm	Q & A Session	Panellists & Participants
	2.00 - 2.20 PM	Technological Interventions	Dr.Vignesh, SRM SPH
Day 2 29.03.2022	2.20 - 3.00 PM	Role of Technology	Dr Rajnish Ranjan Senior Consultant NIDM,
	3.00pm - 3.45pm	Web GIS based decision support system in DM	Dr. Yuvaraj Eswaran Senior Consultant, Taru Leading Edge Pvt. Limited
		Q & A Session	Panellists& Participants
Day 3 30.03.2022	2.15pm - 2.45pm	Statistics Related with DM	Dr.H.Gladius Jennifer Assoc. Prof.,SPH, SRMIST
	2.45pm - 3.20pm	Bigdata in DM Recovery	Prof. E. Poovammal , Dept. Of Computing Technologies, SRMIST
	3.20pm - 3.45pm	Epidemiological Surveillance	Dr. Alex Joseph , Assoc. Prof.,SPH, SRMIS
	3.45pm - 4.00pm	Q & A Session	Panellists & Participants
Vote of Thanks		Dr.Vignesh , SRM SPH	

TECHNOLOGIES IN DISASTER MANAGEMENT

TRAINING REPORT

DAY-WISE SUMMARY

Day 1 (28-03-2022)

	<p>Dr.K.S.Vignesh Assistant Professor, SPH SRMIST, Extended his greeting and delivered the welcome address to all the esteemed dignitaries, key speakers, and participants of the training program. Then he explained about the whole program to all the participants.</p>
	<p>Dr.Sushma Guleria, Assistant professor, NIDM delivered her warm greetings and briefly explained the whole program to the participants. She highlighted some of the technologies related with disaster management such as GIS, GPS and IoT. Then she evoked some of the points about real time disaster response planning.</p>
	<p>MS Aradhna Moktan, Young Professional, National Institute of Disaster Management commenced the program with a warm welcome for the guests and for entire participants of the training program.</p>
	<p>Prof. Padma Venkat (Chief Parton), SPH SRMIST, shared and evoked some of the key points related with the Technologies in Disaster Management. She talked about the disaster management, vulnerable areas, and current scenario associated with Disaster management in India. She also discussed about the Technologies which are well known. She exchanged her views on how to utilize those technologies during a disaster. Also she talks through some of the key concepts of Geographical Information System, IOT and Artificial Intelligence.</p>



Dr. AnandhaKumar(chief guest), District Revenue officer, Gov. of Tamil Nadu demonstrated the disaster management in words of simple laymen. Then he illustrated the points about GIS, GPS, AI, and IoT. He illustrate that in general Preparedness, mitigation, response and recovery are the four phases of disaster management, The wide spectrum of technologies used in all four phases of disaster management are remote sensing, Geographical Information System, Global Positioning System (GPS), Satellite navigation system, Satellite communication, Artificial Intelligence, Internet of Things (IoT) and Big Data. With these innovations in computing technology, robots today are extremely advanced and equipped to better support and complement human actors or rescue animals and can be extremely valuable for NDRF (National Disaster Response Force) units especially in challenging terrain and life-threatening operational environments. He also highlights some key points about Robots; they can potentially help save victims' lives without endangering rescuers' lives also Aerial robotics, including unmanned aerial vehicles (UAVs), aka drones, show tremendous potential to transform humanitarian aid.



DR.P.G. Diwakar (chief guest)former director & ISRO professor explained a brief concept of space& ICT for disaster management. He discussed the points about Imaging technology (1988), three – tier imaging. Then gave a brief demonstration of Indian earth observation capabilities for disaster management which incorporates satellite communication and broadcasting, satellite navigation (NAVIC) (GAGAN) followed by model of GIS for fisherman like how it is useful and what kind of source it gets for them. He evoked the NAVIC for fisherman community that gives location based information, weather & sea state, delivered in multi-language. He also delivered some information about BHUVAN – NAVIC mobile app, also about the BHUVAN portal. He talks through EO data analytics ecosystem in today’s scenario and exchange views on the disaster management support during (2013-2015) flood, cyclone, forest fire, landslides and earth quake. He elucidate the role of Indian satellites for cyclone and forest fire by explaining the concept if 3D analysis of landslides, NADAM (Natural Agricultural Drought Assessment& Monitoring system), Activefire location maps and for flood using Microwave Remote Sensing .he simplified a deep learning about the BHUVAN geoportal, National geoportal, 3D city model, and real life image textures.



DR. Kayal Vizhi Associate professor CSE, SRMIST who spoke about the Internet of Things & Allied Technologies for Disaster Management. At first she defined what are Disaster, Disaster Management, and Natural Disaster around the globe. Then elaborates 3 main things of technologies, those are IoT, Machine learning and Artificial Intelligence. She explained hoe the sensors and satellites predict a disaster; whom does it delivers (from first National level sector to municipality); and about the FEMA, NASA, NOAA and NDMA. She clarified how IoT helps in disaster management, what are all the benefits from IoT. Then she highlighted some key points about LORAWAN (Low Power Wide Area Network). She talks through the Bio/Nature inspired algorithms such as Ant colony algorithm, Fire Flies algorithm. Then she puts a view on research dimensions that is deterministic, non-deterministic and also about ACO in disaster management.

Day 2 (29-03-2022)



DR. Rajinish Ranjan Sr. Consultant (e-Learning) NIFM, MHM, GoI talks through the key concepts of Internet of Thing. With more than 7 billion connected IoT devices today, experts are expecting this number to grow to 10 billion by 2020 and 22 billion by 2025. He gave an explanation about satellite based technology in Disaster Risk Management and weather broadcasting. Then expound about IoT based Data Intelligence on AWS network, crop sensors, lightning sensor, network air quality, Monitoring network. He illustrates some points about proposed Air Quality Monitoring Parameter, Air Quality Index and also demonstrates how to measure Rainfall, Weather, Temperature, Model Forecast, and Rainfall Parameters.



DR. Yuvaraj Eswaran Sr. consultant Taru learning Edge Private Limited, explained about the Web-GIS based decision support system in Disaster Management. He showed how Taru Learning Edge delivers the services related with Disaster Management He makes clear about what is Decision support system and why it is used; a tool made up of information system that supports organizational decision making activities and it provides number of information in very less time, to plan the resources for preparedness and response activities. Then he elucidates the points about Big Data analysis, Artificial Intelligence, Mobile Applications and Internet of Things. He demonstrated about the Real Time Data Web-GIS based on decision support system for cyclone and shelter monitoring; based on Rainfall monitoring; based on automated – Disaster Risk Forecast and based on risk communication platforms. Then he talks through preparedness & response planning that involves resources information in spatial map and emergency contact data base. He highlighted some key concepts of population & vulnerable group at ward level, response planning. Then he talks about the Taru's experience and case studies in existing Decision support system for pandemic. He demonstrated the use of Mobile apps such as Arogya Setu, Covid19 app, Cowin app for vaccination.

Day 3 (30-03-2022)



Dr. Gladius Jennifer, Associate Professor, SPH SRMIST discussed the concepts of statistics and explained how it is related with disaster management. She defined the disaster and its types, then talks through the preparedness, mitigation, recovery and response. She briefly demonstrated the qualitative and quantitative data, Test of hypothesis and level of significance. She illustrated the key points of statistical tool. She elucidate some of the models such as predictive model, Time series model in disaster management, Auto-regression, ARIMA and SARIMA model. Then she discussed some of the case studies related with statistics in disaster management.

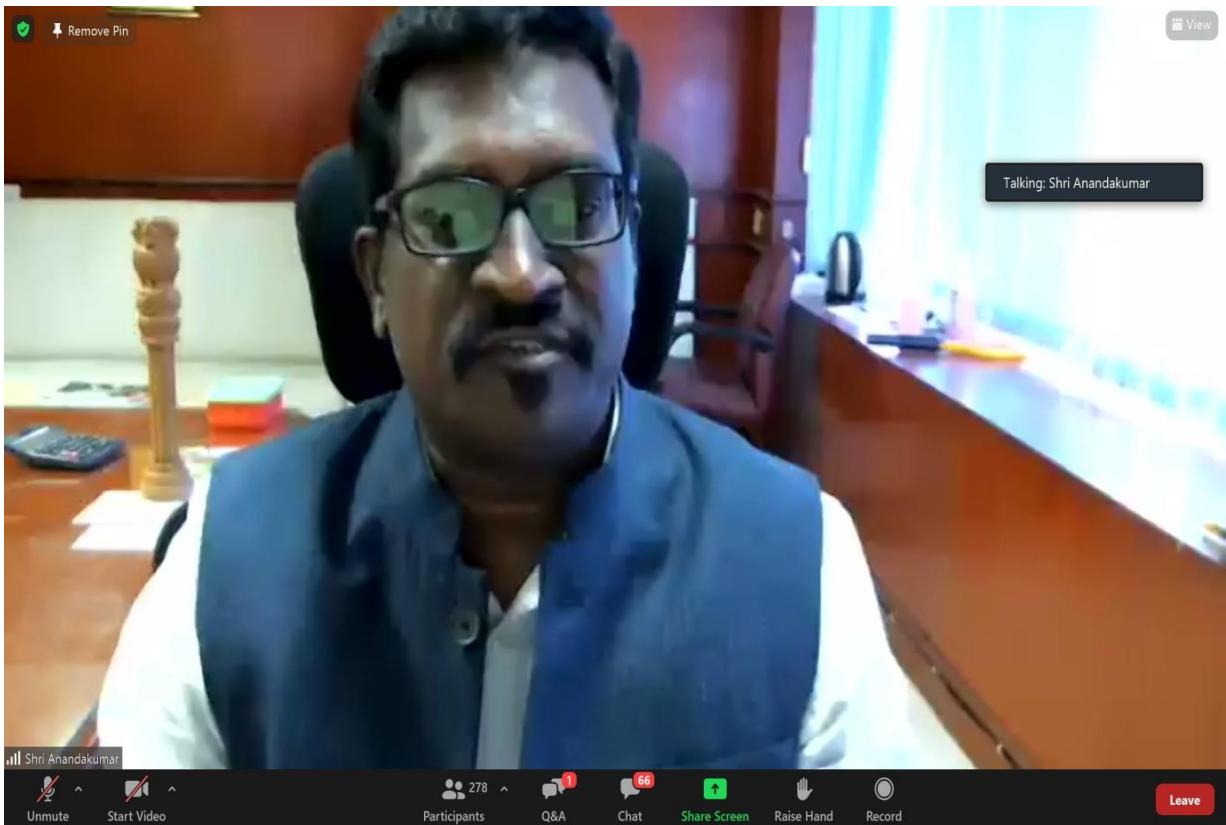


Prof. E. Poovammal, Department of computing Technologies, SRMIST explained the core concepts of role of data in Disaster Management. She highlighted the points on GIS mapping, bringing people together, and preparing for emergency situation. She mentioned about the emergency management followed by effectiveness of emergency and Disaster Management and enhancement of disaster recovery which connects people before and after disaster. She described brief about connecting missing people during a disaster through social media and other online system. She listed out some concepts of crisis response, social media mining and disaster prediction. Then she relates the current scenario of Russia-Ukraine war as disaster and how social media and other online system help through it.



Dr. Alex Joseph, Associate Professor, SPH SRMIST discussed widely about Epidemiological surveillance. He illustrated the concept of ICTs for Public Health. Information and communication technologies play a significant role in disaster prevention, mitigation, response and recovery. Also he highlighted the points in ICTs for Disaster Management which includes multi-hazard, multi-technology, multi-phased, multi-stake holder. Then he demonstrated the public health surveillance and also evoked about Arogya Setu mobile application like how it work, information available on Arogya Setu. It gives information about the status of active covid19 cases, quarantine guidelines, contact sourcing to notify, and we can learn about the various safety guidelines, that you should follow to avoid infection.

PHOTOGRAPHS OF SESSIONS



A screenshot of a Zoom meeting titled "Weather Forecasting". The meeting is being recorded and is live on YouTube. The participants listed at the top are Dr. Alex Joseph, SRMIST KTR, Dr. Rajnish Ranjan, and Dr. K.S.Vignesh. The main content area displays a list of weather forecasting types:

- **Nowcasting** – hourly forecast (using Lightning Sensor, Doppler Radar and Sat Images)
- **Short Term Forecast** – 3 to 5-7 days (80% accuracy)
- **Medium Term Forecast** – 15 days (60 to 80 % accuracy)
- **Long Term Forecast** – 30 to 45 days (Trends only)
- **Seasonal Forecast** – Monsoon Forecast

The bottom toolbar shows options for Unmute, Start Video, Participants (255), Q&A, Chat, Share Screen, Raise Hand, Record, and a Leave button.

A screenshot of a Zoom meeting titled "DISASTER & TYPES". The meeting is being recorded and is live on YouTube. The participants listed at the top are Dr. K.S.Vignesh, Dr. Alex Joseph, Dr. Gladius Jenn..., and Dr. Poovammal E. The main content area displays the following text:

DISASTER & TYPES

- ❖ Any Natural or human made calamities that causes severe damage to the livelihood is termed as a disaster.
- ❖ We cannot prevent the occurrence of a natural disaster but we can reduce the after effects caused by the disaster by means of proper management.
- ❖ In simple words Disaster management is the way of dealing with human, material and economic impact of the said disaster.

Types of disaster:

- ❖ **Natural Disaster** – Earthquake, Floods, Landslide, Volcano eruption, cyclone
- ❖ **Manmade Disaster** – Biological, Chemical and Nuclear disasters

The bottom toolbar shows options for Unmute, Start Video, Participants (210), Q&A, Chat (14), Share Screen, Raise Hand, Apps, More, and an End button.

Dr. K.S.Vignesh | Dr. Alex Joseph | Dr.Gladius Jenn... | Dr.Poovammal E

Recording... LIVE on YouTube

EX: ARIMA MODEL-COVID 19



❖ To monitor the spread of COVID-19 disease both at national- and regional levels based on epidemiological data. The model predicts the final epidemic size at national level to be around 5,020,359–25,669,294 cases.

❖ By observing exponential growth in the series, it is expected that the hypothetic inflection point of the cumulative number of COVID-19 confirmed cases may be reached at least after 23 April 2021 at the national level. However, state-level data confirm AP, MH, KR and TN need 72, 182, 183 and 82 days to reach inflection point, respectively, which does not provide a relative approximation.

❖ This study has significant implications for all types of industries including health.

From Mahadev D M to Everyone
nice presentation

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Participants 259 | Q&A | Chat | Share Screen | Raise Hand | Apps | More | End

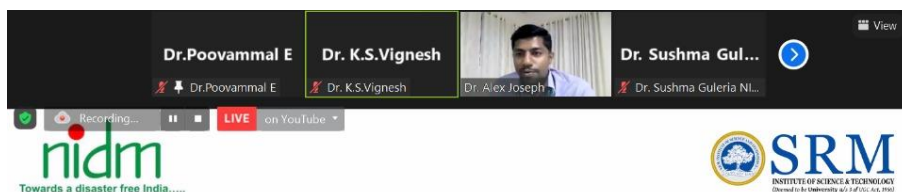
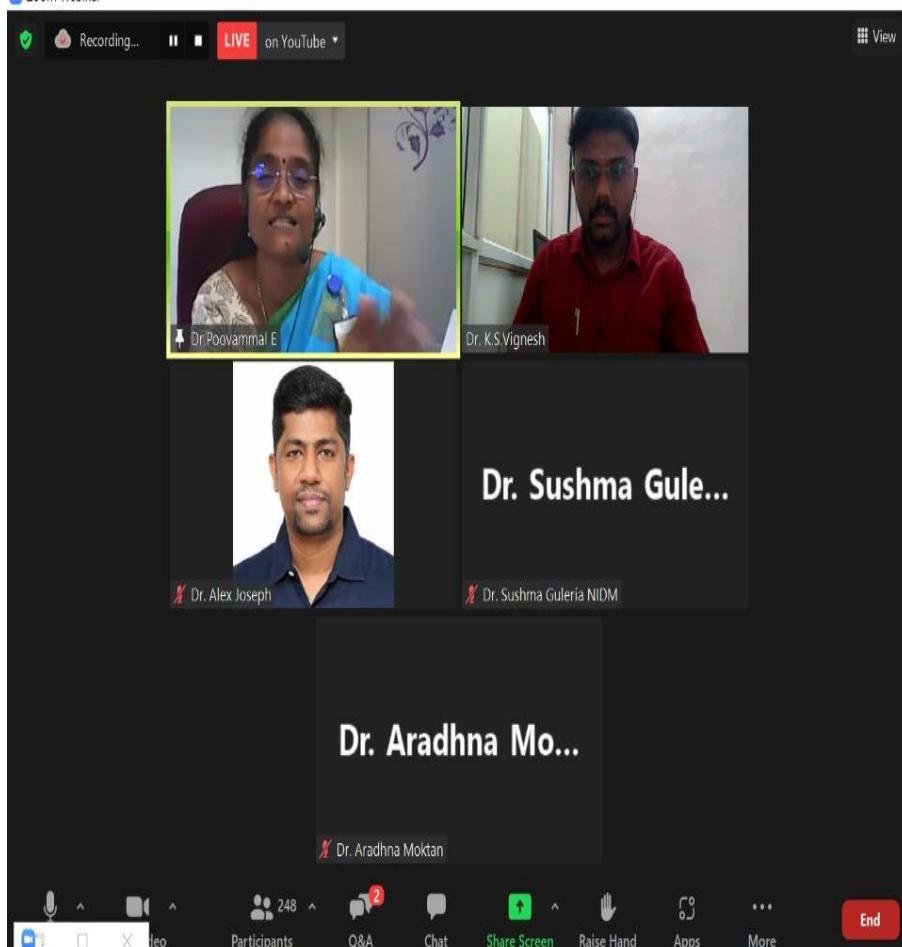
INTRODUCTION

View

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Unmute | Start Video | Participants 253 | Q&A | Chat | Share Screen | Raise Hand | Apps | More | End



3-Days Webinar
'Role of Technologies in Disaster Management'

Epidemiological Surveillance

Dr Alex Joseph
Associate Professor
Division of Epidemiology
SRM School of Public Health, SRMIST



Zoom Webinar

You are viewing Dr. Alex Joseph's screen View Options

Dr. Poovammal E Dr. K.S.Vignesh Dr. Alex Joseph Dr. Sushma Gul...

Recording... LIVE on YouTube

Drones to deliver COVID-19 Vaccine

- 31 kms in 15 Minutes
- 3-4 hours by road
- Indian Council of Medical Research's Drone Response and Outreach in North East (i-Drone) delivered 900 doses of COVID-19 vaccine from Old DC Complex in Bishnupur district in Manipur to Karang Primary Health Centre (PHC),

Drones delivered 900 doses of COVID-19 vaccine to Karang PHC. COVID-19 vaccines being packed to boxes.

Unmute Start Video Participants 231 Q&A Chat Share Screen Raise Hand Apps More End

Recording... LIVE on YouTube

Dr. Poovammal E Dr. K.S.Vignesh Dr. Alex Joseph Dr. Aradhna Moktan

Dr. Sushma Gule...

Dr. Sushma Guleria NIDM

Mute Stop Video Participants 201 Q&A Chat 23 Share Screen Raise Hand Apps More End

