



# WEBINAR PROCEEDINGS



on

## “STRATEGICAL PREPAREDNESS TO MITIGATE TRANSBOUNDARY AND ZONOTIC DISEASES IN NORTH-EAST INDIA”

**27th April, 2021**



**Organised by**  
**DBT ADMaC, Core Lab-1**  
**College of Veterinary Science,**  
**Assam Agricultural University**  
**Khanapara, Guwahati-781022, Assam**

**2021**

## OBJECTIVE OF THE PROGRAMME

The ongoing COVID19 pandemic has brought home with great clarity the devastating human health, social and financial impacts of zoonotic infectious diseases on the world. The preparedness on zoonotic emergence is a far better strategy to contain the outbreak. The Northeast Region (NER) of India is a hotspot for many exotic emerging and re-emerging transboundary diseases as it has unique biodiversity, ethnographic and agriculture practices. Additionally, the region shares porous international boundaries with many neighbouring countries. However, the region lacks robust disease diagnosis infrastructure and trained manpower at peripheral laboratory to handle emerging and trans-boundary disease outbreaks.

Keeping parity with ‘**Azadi Ka Amrit Mahotsav**’ India@75 being celebrated by the country and inaugurated by Hon’ble Prime Minister Shri Narendra Modi on 12 March 2021, a series of events are being organized by the Government of India to commemorate the 75<sup>th</sup> Anniversary of India’s Independence. In this regard, DBT-NERBPMC, New Delhi requested the Core Lab I to organize “*Awareness and sensitization workshop on the outbreak of zoonotic diseases in NER*” from April to June 2021, targeting students, scientists and Veterinarians across all the eight NER states as part of the DBT-ADMaC Phase-II project. Accordingly, this programme has been organized to sensitize and develop core competence of human resources at the institute as well as at field Animal Husbandry and Veterinary Department to address emerging infectious diseases.

## ORGANIZING COMMITTEE

<b>Patron</b>	Dr. B.C Deka, Hon'ble VC, AAU Dr. B.NSaikia, Dean, Faculty of Veterinary Science
<b>Chairman</b>	Dr. Niranjan Kalita, Director of Research (Veterinary)
<b>Co-Chairman</b>	Dr. G.KSaikia, I/C Head of Department, Microbiology
<b>Organizing Secy</b>	Dr. N.N Barman, Professor, Department of Veterinary Microbiology
<b>Co-Organizing Secy</b>	Dr. Pankaj Deka, Assistant Professor, Department of Veterinary Microbiology Dr. LukumoniBuragohain, Assistant Professor, Department of Animal Biotechnology
<b>Invited Speakers</b>	Dr. R.K Singh, Former Director ICAR-IVRI, Bareilly, UP. Dr. Subeer Mazumdar, Director, NIAB, Hyderabad. Dr. Anamika Mishra, Sr. Scientist, NIHSAD, Bhopal.

## PROGRAMME OF ACTIVITIES

1. Welcome address : Dr. N. Kalita, Director of Research (Vety), AAU & Chairman, Organizing Committee, **10:30 AM**
2. Inaugural Remarks by Dr. B. N. Saikia, Dean, FVSc, AAU, Khanpara, **10:35 AM**
3. Address by Dr. B. C. Deka, Hon'ble Vice-Chancellor, AAU, **10:40 AM**
4. Address by Dr. Vaishali Panjabi, **10:50 AM**
5. *Over view on Disease diagnosis network in NER, Dr. N. N. Barman* **10:55 AM**
6. *Emerging and re-emerging zoonotic infections: Preparedness for Veterinary core competency in NER, Dr. R. K. Singh* **11:10 AM**
7. *Strategic planning, organization and mitigation of EID outbreaks*  
*Dr. Subeer S. Mazumdar* **11:35 AM**
8. *Strategy to investigate possible disease emergence and unknown pathogens in the biodiverse northeast India, Dr. Anamika Mishra* **12:00 PM**
7. *Closing Remarks by Dr Amab Sen, Principal Scientist, Division of Animal Health, ICAR Research Complex for NEH, Barapani, Meghalaya* **12:25 PM**
9. *Vote of Thanks, Dr. Pankaj Deka* **12:35 PM**

## FORE WORDS

As part of ‘**Azadi Ka Amrit Mahotsav**’ India@75, the Core Lab I, DBT-ADMaC, College of Veterinary Science has organized “*Awareness and sensitization workshop on the outbreak of zoonotic diseases in NER*” on 27<sup>th</sup> April 2021. A total of 92 (M 62, F 30) online and 24 (M 16, F 8) off line participated in the webinar. It was a brain nourishing programme and participants were highly benefited from the discussion. Organizing committee expresses their gratitude to the Department of Bio-Technology, Ministry of Science and Technology, New Delhi for assigning the responsibility to organize such a sensitization programme on “Strategical Preparedness to Mitigate Transboundary and Zoonotic Diseases in North-East India” which was very much appropriate for the Students, Scientists and Veterinary officers working in this region. The entire programme was possible to organize in a befitting manner because of the generous gesture and support rendered by Dr. B.C Deka, Hon’ble Vice- Chancellor, Assam Agricultural University, Jorhat, Dr. B. N Saikia, Dean, Faculty of Veterinary Science and Dr Niranjan Kalita, Director of Resarch (Vety), AAU, Khanapara. The organizers of the Webinar express their deep sense of gratitude to all of them. The organizers also acknowledge sharing of scientific knowledge and experience by the learned speakers namely Dr. R.K Singh, Former Director ICAR-IVRI, Bareilly, UP, Dr. Subeer Majumdar, Director, NIAB, Hyderabad. Dr. Anamika Mishra, Sr. Scientist, NIHSAD, Bhopal. In addition, the organizing committee also thankful to Dr. Tapan Dutta, Professor, Central Agricultural University, Mizoram for summarizing the scientific discussion. The main theme of the Webinar was to sensitize our field veterinary officers, students and scientists of NER. Organizing committee expresses thanks and gratitude to all Directors, Disease Investigating Officers, Veterinary Officers of all eight states for their instant response and active participation. Thanks are due to members of the faculty who are directly and indirectly associated in successfully organizing this programme.

## HIGHLIGHTS OF THE WEBINAR

### Welcome address:

**Dr Niranjan Kalita**, Director of Research (Vety), Assam Agricultural University, Khanapara, has delivered the welcome address for the webinar on “**Strategical preparedness to mitigate transboundary and zoonotic diseases in North-East India**”



and he has rightly mentioned that in continuation of Honourable PM’s Azadi Ka Amrit Mahotsav the topic of the webinar is very much relevant to the region and the need of the hour. He referred about recent outbreak of ASF that has already affected piggery sector in NE region of India and caused colossal economic losses in terms of the mortality and trade. He also mentioned that the first phase of DBT-ADMaC has developed many diagnostics but we need early warning system using artificial intelligence to deterring new emerging diseases well ahead. The involvement of wildlife, livestock and human beings in one plate form for zoonotic study is very much needed.

### Inaugural remarks:

**Dr B. N. Saikia**, Dean, FVSc, Khanapara has given the inaugural remarks and pointed out that the topic of the webinar is the need of the hour and appropriate in context of the NE region that sharing the international boundaries with China, Nepal, Bhutan, Myanmar, Bangladesh. So there is a



constant threat for incursion of transboundary and emerging zoonotic disease into this region. He has also mentioned that the transboundary or zoonotic diseases are vector borne, may cross the geographical boundaries at any time point. Dean, FVSc stated that the NE region is the ‘hot spot’ for biodiversity and there is every possibility for evolving of new pathogen from this region and spread to main land.

Dean, Faculty of Veterinary Science, shared the best wished expressed by the Hon’ble Vice-Chancellor, Dr B C Deka for success of the scientific discussion and hoped that today’s discussion would pave a road map to understand and control emerging zoonotic diseases in this region of the country.



## TECHNICAL SESSION

### **A. Disease Diagnosis Network of NE States: How to Bridge Gap?**

**Dr N. N. Barman**, coordinator, DBT-ADMaC phase II has delivered his talk on **Disease Diagnosis Network of NE States**. Dr Barman has pointed out that the 263,000 Sq. Km area of NE region sharing the international borders and these international borders are porous through which several pathogens have infiltrated into our country and resulted into disease outbreak like Rinder pest during mid of 18<sup>th</sup> Century, Avian influenza in 2008-09, PRRS in 2013, Circovirus in 2011- 2017, ASF in 2020 and LSD in 2020. The NE region has recorded several spill over in the past and in the present. Very recently, few months back, the PPR has reported in the Deer in the State Zoo, Guwahati. Dr Barman informed that different states although have several diagnostics laboratories but

labs are not fully equipped and no sufficient trained man power. So it is earnestly required to strengthen of these laboratories. Further to vigil on incursion of emerging pathogens there should have proper sampling plan at the porous international borders, more labs facilities should be created at the international borders. The DBT-ADMaC in their first phase of the project (2014-2019)

helped in creating infrastructure at different core labs and other field labs of NER. The ADMaC has trained the personal in the first phase of the project, several diagnostics kits have also been



developed which are in validation phase. Again, several pathogens (including Viruses, bacteria and parasites) have been isolated from domestic and wild animals. Dr Barman has stated about the strengthening of the repository and pool genes amplicons and clones. He has analyzed the gaps in the diagnostics facilities and emphasis on limited infrastructure, lack of human resources, lack of inter-state communications and insufficient training institute. He has listed the possible ways how to overcome the above situations by improvement of lab facilities, creation of man power, application of mobile apps and development of early warning system. Development of bio-repository can be an important initiate to study new pathogens evolving in this biologically hotspot region. Dr Barman has emphasized on the tripartite collaboration between national, regional and state institutes that can be an ideal plate form to develop competency in the region to handle emerging zoonotic diseases.



## **B. Emerging & Re-emerging Zoonotic Infections - Preparedness for Veterinary Core Competencies**

**Dr. R.K Singh**, former Vice Chancellor, ICAR-IVRI highlighted various causes on the emergence of infectious diseases (EIDs) that includes Human demographics & behaviour, Technology & Industry, Economic development and land use, International travel and commerce, Microbial adaptation & change, and Breakdown of public health Measures. Out of 1,415 human pathogens, 868 number of pathogens are zoonotic in nature. Dr Singh pointed out three factors are responsible for evolution of pathogens namely high transmission rates, immune-deficient hosts and indiscriminate antibiotic use. Therefore, veterinarians are to be trained so that they can integrate specific and generic competencies in professional practices. Integrated competency framework for veterinary Professionals consists of 16 competencies organized in 7 domains viz. Veterinary expertise, Communication Collaboration, Entrepreneurship, Health & Welfare, Scholarship and personal development. Seven core competencies that form career readiness can be critical thinking/problem solving, oral/written communications, teamwork/collaboration, information technology application, leadership, professionalism/work ethic, career management. For capacity enhancement, the following areas to be developed under Human Resource such as the Vets, Paravets, CAHWs, Lab Technicians etc are to be trained. Under infrastructure development the hospitals, animal breeding farms, bull mother farms (biosecurity-compliant) and laboratories – (R&D Labs, Diagnostic, Semen, AI, Animal Food Safety Labs, etc.) are to be developed. In addition, a strong national EIDs Surveillance Network (HH/AH/WLH/EcoH), national EIDs reporting system (better than NADRS, NADRES), linkage with contemporary stakeholders (Wildlife, Medical, Agriculture, Commerce, Eco) are to be built. Fore-warning system is required for early preparedness. He identified some priority areas to be given due emphasis such as animal disease surveillance including the wild animals, risk assessment, and urgent need for accelerated R&D for development of diagnostic assays/kits for mass-

scale clinical surveillance, vaccination monitoring, & environmental surveillance. Besides, genomic sequencing for pathogen surveillance and development of genetically engineered vaccines, therapeutical devices are essential. Dr Singh stated that the animal vaccines can have multi-step benefits such as these lead to improvement of health of animals that invariably reduce the use of pharmaceuticals and hormonal products and thereby blocking their entry into the human food chain and ultimately reduce in use of antibiotics leading eventually suppress the development of antimicrobial resistance. He emphasised the practical adoption of one health paradigm such as Cross-sector communication, collaboration and knowledge exchange. To address these needs the “One Health Surveillance

Codex” (OHS Codex) was established to provide a framework for the One Health community to continuously share practical solutions applicable for national and international stakeholders from different One Health Surveillance sectors.

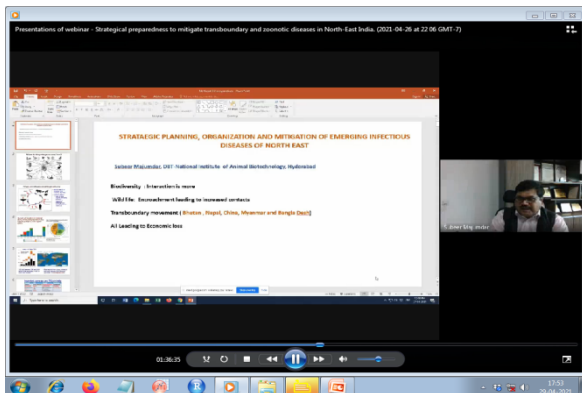


Dr. Subeer Mazumdar raised a query regarding establishment of a harmonious platform for sharing of advanced technologies with the neighbouring countries which have borders with NE India so that they can also be protected in the event of any outbreak of zoonotic and TADs. As a response this query, Dr. Singh replied that there are many international agencies that are responsible for one health approach across the globe. He suggested a few immediate measures to be taken for NE

region in the direction of prevention of emerging infectious diseases (EIDs) such as Capacity and competency strengthening, Upgrading of microbiological laboratories in institutions, Networking with regional Centres/Labs, BSL-3 Lab-on-Wheels, Regional Bioinformatics Infrastructure – a repository of data, Regional Repository for Biosamples (Microbes, Clinical samples, Serum, etc.) and stressed on Regional Biosecurity Bill and Regional Biosecurity Authority.

### **C. Strategic planning, organization and mitigation of EID outbreaks**

**Dr. Subeer Mazumdar**, Director NIAB highlighted different factors contributing pathogen spill over such as agricultural practices, socio-economic factors, international travels, cultural practices, ecosystem and urbanization. The indirect effect of these is loss food, income, works etc. These leads to zoonotic secondary infections opening the gates for other infections. The focus also should be on aquatic animals and plants. In addition, the soil health can also contribute to emergence of EIDs. There are reports of 335 EIDs between 1930s to 2004 out of 60.3% were zoonotic. But most of the EIDs have been reported from Europe and America not from tropical countries. So, it is needed to develop proper reporting system in our country.



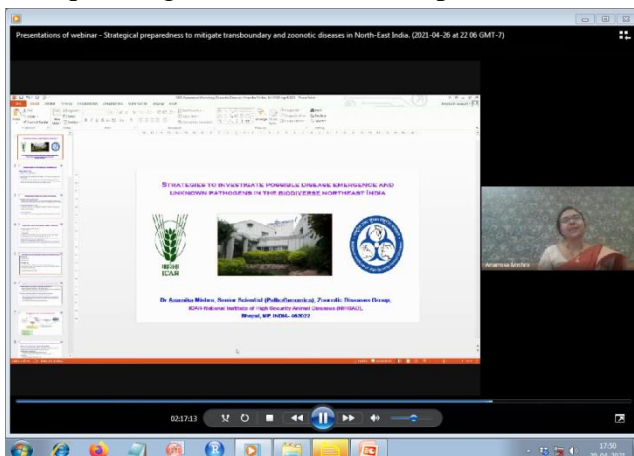
Dr Mazumdar stressed on development of animal model such transgenic mice for studying the pathogenesis of emerging infectious diseases. The platform should be available for making monoclonal antibodies for rapid detection of diseases. He recommended the use of mobile diagnostic bioassay labs for collecting the field samples of

animals and humans. He and his co-worker selected the 10 zoonotic diseases and 5 TADs in collaboration with 12 centres from other states, 7 centres from NE region and 8 disease investigation units (1 in each NE state) for nationwide simultaneous study on zoonotic diseases.

#### **D. Strategies to investigate possible disease emergence and unknown pathogens in the biodiverse northeast India**

**Dr. Anamika Mishra**, discussed about the strategies to investigate possible disease emergence and unknown pathogens in the northeast India. She discussed about the strategies for pathogen detection that included multiplex PCR (in a single reaction, multiple pathogens can be detected), DNA microarray (many pathogens can be detected) and unbiased high throughput sequencing. The issue of multiple PCR is that there is limit to

number of pathogens that can be detected. Triplex nucleic acid lateral flow assay has been used for detection of many important viruses such as NIPAH, Ebola, MERS. This does not require



running of gel. The RT-PCR array involves doing PCR in different tubes at a time. Six animals can be screened for 12 different diseases at a time. The microarrays that were initially developed for gene expression now used also for diagnosis. It works well with human diseases. But in case of animal samples, the genome details are not available that limits its use. The unbiased high throughput sequencing allows efficient discovery of pathogens. The omics concept is developed recently such as genomics, metagenomics, metaviromics etc. The metagenomics and metaviromics involves the characterization of viruses without isolation of pathogens. The metagenomics approach was used by the speaker for detection of

pathogens in migratory birds in NE region. She highlighted the bottle necks in genome based disease diagnosis such as Cost of HTS data generation is high, bioinformatics and genomics analysis require powerful computers, large data storage and high throughput analyses, lack of high performance computing facilities, limitation of high-speed internet for sharing data and accessing bioinformatics databases and repositories. This hinders the application of cloud-based web services which could have circumvented the need for local high-performance computing facilities, sequencing facilities and therefore resort to sequencing with service providers. Such collaborations often result in delay in diagnosis and compromise the quality of data. She recommended the provision of trained manpower in the field of omics based techniques and sufficient funds to carry out these diagnostics procedures.

## **Summary of presentation**

**Dr. Tapan Dutta**, thanked the speakers for the informative presentation. In the COVID situation, the scientists of various institutes and Government should come out with the good proposals for animal welfare. He mentioned that new collaboration between wild life institutions, veterinary institution and other non-veterinary institutions is needed to make good proposals for containment of TADs and zoonotic diseases.

## **Recommendations:**

The North eastern region of India is surrounded by porous international borders with China, Nepal, Bhutan, Myanmar and Bangladesh. The entire region may act as port of entry for various life threatening diseases of human and animals without any preventive measures. Following measures may be taken to prevent incursion of transboundary zoonotic diseases as recommended by the experts during the deliberations.

1. Strengthening of disease diagnosis infrastructure in peripheral labs particularly at international border specific locations.
2. Upgradation of all microbiological laboratories in the institutes of NER to BSL2+ level facility, creation of BSL3/4 laboratories in the strategic locations and BSL lab on wheel close to the International border areas.
3. Strengthening of all core labs of NER to the Regional Centre for Research on EID to study on infectious disease dynamics, epidemiology and to support for self reliant on innovative diagnostics and preventive tools to address any incursion of emerging infectious diseases.
4. Strengthening of capacity and competency of human resource at all levels should be done as CVE through regional institutes in collaboration with national institutes.
5. Development of a strong disease surveillance network for regular screening of clinical and environmental samples in the inter face of domestic animals-wild animals-human.

6. There should be risk analysis, assessment and mitigation using artificial intelligence system and development of region specific early warning system.
7. Development of dedicated regional Bio-repository for microbial isolates, tissues, sera and other valuable biologicals.
8. Creation of regional bio-informatics infrastructure for data repository linking to the national bio-informatics centre.
9. Establishment of Regional multipathogens genome sequencing facility in the NER of India.
10. Development of a strong Regional Biosecurity Authority and implementation of Regional Biosecurity Bill in letter and spirit at all level including at interstate and international border areas.



**COMMEMORATING 75 YEARS OF INDEPENDENCE**  
**Azadi Ka Amrit Mahaotsav**



**NATIONAL WEBINAR**

# Strategical preparedness to mitigate transboundary and zoonotic diseases in North-East India

**27<sup>th</sup> April, 2021**  
**Time: 10:30 AM onwards**

## Speakers & Topic



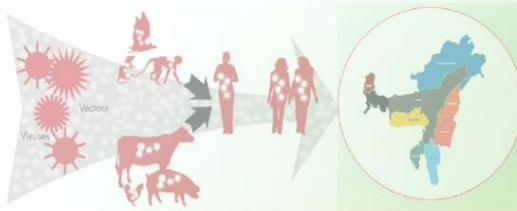
**Dr. N. N. Barman**  
 Professor, Dept. of Microbiology, CVSc, Khanapara  
*Over view on Disease diagnosis network in NER*



**Dr. R. K. Singh Former Director,**  
**ICAR-IVRI, Bareilly, UP**  
*Emerging and re-emerging zoonotic infections: Preparedness for Veterinary core competency in NER*



**Dr. Anamika Mishra**  
 Senior Scientist, NIHSAD, Bhopal  
*Strategy to investigate possible disease emergence and unknown pathogens in the biodiverse northeast India*



**Dr. Subeer S. Mazumdar**  
 Director NIAB, Hyderabad  
*Strategic planning, organization and mitigation of EID outbreaks*

**Patron**

Dr. B. C. Deka Hon'ble VC, AAU      Dr. B. N. Saikia Dean, CVSc, Khanapara

**Chairman**

Dr. N. Kalita Director of Research (Vety.) AAU, Khanapara

**Organizing Secy.**

Dr. N. N. Barman Professor & Head Dept. of Microbiology

**Co- Organizing Secy.**

Dr. Pankaj Deka Dr. Lukumoni Buragohian Asstt. Professor

Link for Registration: <https://forms.gle/nP7ScvX3mUkLnJ7K7>  
 Webinar access link: <https://meet.google.com/fsu-bdfi-hjx>  
 [E-Certificate will be provided to all the registered participants]

**Organized by:**

**DBT ADMaC, Core Lab - I**  
**College of Veterinary Science, Assam Agricultural University**  
**Khanapara, Guwahati- 781022, Assam**

**Under aegis of Department of Biotechnology, Ministry of Science & Technology, Government of India**