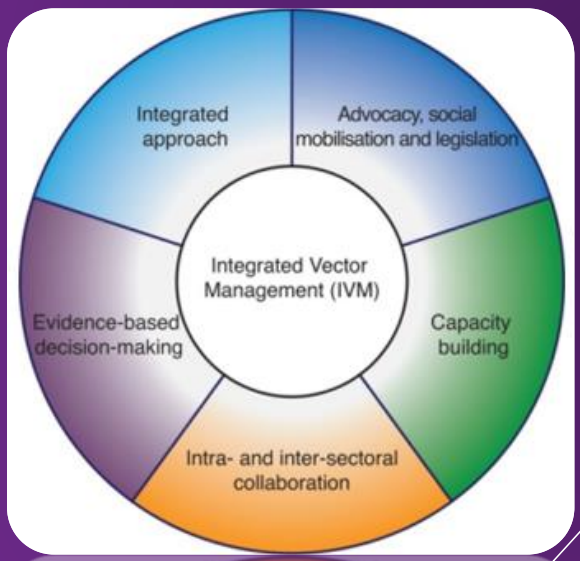
CSIR – National Environmental Engineering Research Institute
Nehru Marg, Nagpur – 440020.

2nd Training Programme Report
(States: Assam, Haryana, Punjab and NCDC Institute)

on

Training of Trainers (ToTs) and pilot testing of modules to promote non-POPs alternatives based IVPM

Date: 17/08/21 to 31/08/2021
Time: 2.30 to 5.30 PM



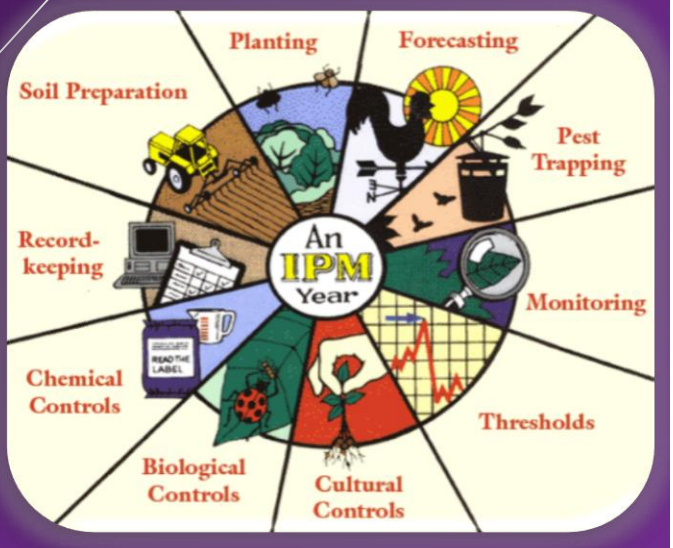


Table of Content

Sl. No.	Sessions	Page No.
1.0.	**Introduction**	**01**
2.0.	**Training Objective**	**03**
3.0.	**Training programme**	**03**
4.0.	**Training schedule**	**05**
5.0.	**Training programme Inauguration Faction**	**08**
6.0.	**Training Sessions**	**10**
	6.1. Training session – 1	10
	6.2. Training session – 2	14
	6.3. Training session – 3	17
	6.4. Training session – 4	20
	6.5. Training session – 5	22
	6.6. Training session – 6	24
	6.7. Training session – 7	26
	6.8. Training session – 8	29
	6.9. Training session – 9	31
	6.10. Training session - 10	33
7.0.	**Feedback from participant trainees on modules**	**36**
8.0.	**Virtual valedictory session**	**36**
9.0.	**Annexure**	**37**
	9.1. List of organizing members	37
	9.2. List of faculties	38
	9.2. List of participants – Assam, Haryana, Punjab and NCDC	39

List of Abbreviations

BCC	Behaviour Change Communication
Bti	*Bacillus thuringiensis var. israelensis*
CCHF	Crimean-Congo Haemorrhagic Fever
CPCB	Central Pollution Control Board
CSIR	Council of Scientific & Industrial Research
DDT	Dichlorodiphenyltrichloroethane
EC	Emulsifiable Concentrate
FFS	Farmer Field School
GEF	Global Environment Facility
GoI	Government of India
HIL	Hindustan Insecticide Limited
ICMR	Indian Council of Medical Research
IEC	Information Education and Communication
IGRs	Insect Growth Regulators
IRS	Indoor Residual Spraying
IVM	Integrated Vector Management
IVPM	Integrated Vector and Pest Management
JE	Japanese Encephalitis
KFD	Kyasanur Forest Disease
LLINs	Long Lasting Insecticidal Nets
MoCF	Ministry of Chemicals and Fertilizers
MoEFCC	Ministry of Environment Forests and Climate Change
MoEFCC	Ministry of Environment, Forest and Climate Change
NEERI	National Environmental Engineering Research Institute
NIP	National Implementation Plan
NVBDCP	National Vector Borne Disease Control Programme
POPs	Persistent Organic Pollutants
RMRIMS	Rajendra Memorial Research Institute of Medical Sciences
RNA	Ribonucleic Acid
RPU	Rational Pesticide Use
SC POPs	Stockholm Convention on Persistent Organic Pollutants
SIT	Sterile Insect Techniques
UNEP	United Nations Environment Programme
VBD	Vector Borne Disease
WDP	Water Dispersible Powder
WHO	World Health Organization
WP	Wettable Powder
ZIKV	Zika Virus

1. Introduction

Stockholm Convention (SC) is an international treaty works for the protection of human health and environment from harmful Persistent Organic Pollutants (POPs). Government of India (GoI) signed the Stockholm Convention on POPs and the Ministry of Environment, Forests and Climate Change (MoEFCC) was assigned as the National Focal Point. India has committed to fulfil its obligations under the Convention, prepared its National Implementation Plan (NIP) and submitted it to the Secretariat of the Stockholm Convention on 21st April 2011. India assured in the NIP, that the development and promotion of non-POPs alternatives to DDT is one of the top priorities that requires immediate action. Accordingly, the project entitled "**Development and promotion of non-POPs alternatives to DDT**" was jointly developed by United Nations Environment Programme (UNEP) and United Nations Industrial Development Organization (UNIDO). The project was approved by Global Environmental Facility (GEF) in April 2015 with two GEF implementing agencies *i.e.,* United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP), which are responsible for supporting delivery of specific project components. Following are the major project components to be implemented under the project:

I. Legislation, policy framework and institutional capacity (UNEP)
II. Alternatives to vector control (UNIDO)
III. Promotion and propagation of new cultivars of Neem (UNIDO)
IV. Development and Promotion of Integrated Vector Pest Management (IVPM)
V. Monitoring and evaluation of results (UNIDO / UNEP)

For components I and IV, MoEFCC has nominated Central Pollution Control Board (CPCB) as a national Executing Agency to look after a partial execution of the project. As per the project document, the other part will be executed by the UNEP Law Division. The components of UNEP prescribe broadly Legislative framework and development, and pilot application of a set of Guidelines for Integrated Vector and Pest Management. UNIDO is working on the development of non-POPs alternatives to DDT viz. Long-Lasting Insecticidal Nets (LLIN), Neem based insecticides, *Bti* based pesticides under its two components.

The Global Environment Facility (GEF) was established to tackle our planet's most pressing environmental problems. The GEF supports countries to build capacity for the implementation of the Stockholm Convention through introduction and demonstration of viable, cost-effective and sustainable alternatives to eliminate dependency on DDT and other POPs chemicals.

The United Nations Environment Programme (UNEP) is the voice for the environment and the primary driving force for international activities related to the sound management of chemicals in the United Nations system. The UNEP promotes chemical safety by providing policy advice, technical guidance and capacity building to the developing countries. UNEP Chemicals Branch has the leadership of the Global Alliance for the Development and Deployment of Alternatives to DDT. As such, UNEP is a well-placed partner with other organizations to phase out current use and avoid future practices of DDT use in India.

The Directorate of NVBDCP, central agency responsible for guidelines, policy for prevention and control of vector borne diseases in India has been implementing the Integrated Vector Pest

Management (IVPM) strategy for effective management of vectors. It recommends Indoor Residual Spray (IRS) and Insecticide Treated Bed Nets (ITNs)/Long lasting Insecticide Net (LLIN) for vector control in rural areas and anti-larval measures in urban areas.

IVPM is a tool for managing vector population to reduce or interrupt transmission of disease. IVPM is a way forward to improve cost-effectiveness, ecological soundness and sustainability of disease vector control. It emphasizes that the insecticides used in the programme must have negligible adverse human health effects, must be effective against the target species, must have minimal effect on non-target species and natural environment and their use must take into account the need to prevent the development of resistance. Key stakeholders involved in the project are the three Ministries viz. Ministry of Environment, Forests and Climate Change (MoEFCC), Ministry of Chemicals and Fertilizers (MoCF), and Ministry of Health and Family Welfare (MoHF&W) whose mandates and roles are given below:

The Ministry of Environment, Forests and Climate Change (MoEFCC) is the nodal ministry for planning, promoting and coordinating environmental programmes including the management of chemical disasters in India. The Ministry is mandated to protect the land, air and water systems and is responsible for the prevention and control of pollution including hazardous substances. MoEFCC is the GEF and Stockholm Convention focal point in the country, which coordinates activities and cooperation between relevant stakeholders of the NIP.

The Ministry of Chemicals and Fertilizers (MoCF) is mandated to control the production and scaling up of alternatives to chemical pesticides. The Department of Chemicals and Petrochemicals of MoCF is entrusted with the responsibility of policy, planning, development and regulations of chemicals and petrochemicals. The public sector named HIL under the MoCF is involved in the production, scaling up and setting up of the facility for industrial production of the alternatives, viz. production of synthetic pyrethroids, production of Long-Lasting Insecticidal Nets (LLINs), neem-based botanical pesticides and *Bti*-based biopesticides.

The MoHF&W mainly performs advisory role for matters related to public health including vector control programme in the country. The Ministry is responsible for the application, assessment and adoption of alternatives in public health activities; the State Health Departments coordinate and implement the project activities at the respective state level for the evaluation and assessment of newer alternatives to DDT in the field on the target pest; the National Vector Borne Disease Control Programme (NVBDCP), National Institute of Malaria Research (NIMR) and the National Centre for Disease Control (NCDC) undertake activities at the national level and make recommendations on the newer alternatives for adoption at the country level.

The Central Pollution Control Board (CPCB) provides technical services to the Ministry of Environment, Forests and Climate Change of the provisions of the Environment (Protection) Act, 1986. Principal functions of the CPCB are a) to promote cleanliness of streams and wells in different areas of the States by prevention, control and abatement of water pollution and b) to improve the quality of air and to prevent, control or abate air pollution in the country. The

United Nations Environment programme (UNEP) identified CPCB as executing agency for the project.

National Environmental Engineering Research Institute (NEERI), Nagpur is a constituent of Council of Scientific & Industrial Research (CSIR), New Delhi and has a nationwide presence with its five zonal laboratories at Chennai, Delhi, Hyderabad, Kolkata and Mumbai. NEERI is engaged in the research and development of better and scientific solid waste management practices, for more than four decades. It has research and development thrust areas viz. Environmental Health and Environmental Impact & Risk Assessment, etc. As CSIR-NEERI is endorsed as a Stockholm Convention Regional Centre (SCRC) on Persistent Organic Pollutants (POPs), it has been identified for implementing the components IV and V of the project. Accordingly, CPCB, the executing agency (EA) sub-contracted the project to the CSIR-NEERI, Nagpur.

2. Training Objective

At the end of the training programme, the participants should be trained to:

- Describe the vectors and their role in Vector-Borne Diseases, the basic information about vector-borne diseases, how vector-borne diseases are transmitted, transmission cycle for respective vector-borne diseases and global distribution as well as the burden of the diseases in India.
- Define the vector, describe the morphological characteristics of adult and immature stages of mosquitoes and about the biology and ecology of vectors.
- Promotions and development of locally safe, effective, affordable and environmentally sound alternatives to DDT, Environment management methods for vector control: Biological control methods, Genetic control methods, Control of vectors by chemical, non-chemical methods, Natural and conventional vector control management strategies.
- Learn the role of Integrated Vector and Pest Management (IVPM), describe different control measures used to control vectors and pests, learn organization and management of IVM in different sectors including FFS and how IVM improves the awareness in the community through BCC.

3. Training Programme

This training programme was conducted for 10 days, the total number of the training sessions were 10 and each session has 3 or 6 training parts. SPOs, DMOs, Zonal Entomologists, M&E Consultants, consultants IEC/BCC, entomologist IDSP and DVBDC were 83 participant trainees from the three selected States and Institute viz. Assam (29), Haryana (25), Punjab (28) and NCDC (1). Dr. L. J. Kanhekar coordinated all the training sessions and Dr. Gujju Gandhi welcomed all the speakers/training experts. The training content covered from Training module-1: DDT and Vector-borne disease, Training module-2: Vector morphology and bionomics, Training module-3: Alternatives to DDT in vector control management and Training module-4: Integrated vector and pest management developed by CSIR-NEERI under the project “Development and promotion of non-POPs alternatives to DDT”.

Training Module-1
DDT and Vector Borne Diseases

Developed under GEF Funded Project on

Development and Promotion of Non-POPs Alternatives to DDT

(GEF Project ID: 4612)

Training Programme on

Integrated Vector Pest Management (IVPM)

Executed by

Central Pollution Control Board (CPCB)
Ministry of Environment, Forest and Climate Change
(MoEFCC)

Developed by

CSIR- National Environmental Engineering Research Institute, Nehru Marg, Nagpur- 440 020, India

2020

Cover page of Training Module-1

Training Module-2
Vector Morphology and Bionomics

Developed under GEF Funded Project on

Development and Promotion of Non-POPs Alternatives to DDT

(GEF Project ID: 4612)

Training Programme on

Integrated Vector Pest Management (IVPM)

Executed by

Central Pollution Control Board (CPCB)
Ministry of Environment, Forest and Climate Change
(MoEFCC)

Developed by

CSIR- National Environmental Engineering Research Institute, Nehru Marg, Nagpur- 440 020, India

2020

Cover page of Training Module-2

Training Module-3
Alternatives to DDT in Vector Control Management

Developed under GEF Funded Project on

Development and Promotion of Non-POPs Alternatives to DDT

(GEF Project ID: 4612)

Training Programme on

Integrated Vector Pest Management (IVPM)

Executed by

Central Pollution Control Board (CPCB)
Ministry of Environment, Forest and Climate Change
(MoEFCC)

Developed by

CSIR- National Environmental Engineering Research Institute, Nehru Marg, Nagpur- 440 020, India

2020

Cover page of Training Module-3

Training Module-4
Integrated Vector and Pest Management

Developed under GEF Funded Project on

Development and Promotion of Non-POPs Alternatives to DDT

(GEF Project ID: 4612)

Training Programme on

Integrated Vector Pest Management (IVPM)

Executed by

Central Pollution Control Board (CPCB)
Ministry of Environment, Forest and Climate Change
(MoEFCC)

Developed by

CSIR- National Environmental Engineering Research Institute, Nehru Marg, Nagpur- 440 020, India

2020

Cover page of Training Module-4

4. Training Schedule

Training of Trainers (TOT) and pilot testing of modules to promote non-POPs alternatives based Integrated Vector Pest Management

Time Table: 10 days online training program to SPO/Entomologists and DMOs

Time	Topic (Lecture discussion)	Faculty
Day 1 (Tuesday) 17/08/2021		
Online Registration shall be accepted prior the schedule training		
1430-1520	**Inaugural Function** **Welcome Address** : **Dr. S. Chandrasekhar**, Director, CSIR-NEERI **About the program** : **Dr. A. N. Vaidya**, Coordinator, Stockholm Convention Regional Centre, CSIR-NEERI **Address by** : **Dr Jitendra Sharma**, UNEP, Geneva **Chief Guest** : **Dr Neeraj Dhingra**, Director, NVBDCP, Delhi **Vote of Thanks** : **Dr. A. Ramesh Kumar**, Sr. Scientist, CSIR-NEERI	
1520-1540	Introduction to DDT and its use in Vector Control	Dr A Ramesh Kumar
1540-1610	Legal perspectives to the Development of IVPM Training Materials	Adv. Sanjay Upadhyay
1610-1630	Introduction to vector borne diseases: Malaria,	Dr R S Sharma / All participant
1630-1645	Leishmaniasis (Kala-azar)	Dr Vijayakumar/ All participant
1645-1710	Introduction to vector borne diseases: Dengue Chikungunya and Zika	Dr Kalpana Baruah/ All participant
1710-1730	Introduction to vector borne diseases: Plague	Dr N Balakrishnan/ All participant
Day 2 (Wednesday) 18/08/2021		
1430-1500	Introduction to vector borne disease: Japanese Encephalitis	Dr P T Joshi/ All participant
1500-1530	Introduction to vector borne diseases: Filariasis	Dr. P K Srivastava / All participant
1530-1600	Introduction to vector borne disease: Scrub Typhus	Dr Ratna Joseph / All participant
1600-1630	Introduction to Crimean Congo Hemorrhagic Fever	Dr. K. Regu / All participant
1630-1730	Introduction to Kyasanur Forest Disease	Dr N Balakrishnan / All participant
Day 3 (Thursday) 19/08/2021		

1430-1500	Morphology of vector mosquito	Dr L J Kanhekar/ All participant
1500-1530	Bionomics of vector mosquitoes	Dr R S Sharma / All participant
1530-1630	Morphology and Bionomics of sandflies	Dr Vijay Kumar / All participant
1630-1730	Morphology and bionomics of Ticks and mites	Dr N Balakrishnan / All participant
Day 4 (Monday) 23/08/2021		
1430-1530	Morphology and bionomics of flies & fleas	Dr Amit Katewa / All participant
1530-1630	Entomological surveillance of VBDs	Dr Himmat Singh/ All participant
1630-1730	Alternatives to DDT in Vector Control Management – Conventional Methods & Environmental Management	Dr R S Sharma / All participant
Day 5 (Tuesday) 24/08/2021		
1430-1530	Entomological parameters and its importance	Dr Himmat Singh/ All participant
1530-1630	Vector control measures/ management: Biological and Genetic	Dr Ratna Joseph / All participant
1630-1730	Vector control measures/ management: Chemical	Dr P. K. Srivastava / All participant
Day 6 (Wednesday) 25/08/2021		
1430-1545	NVBDCP Recommended Insecticide: Larval Source Management and Adult Vector Control	Dr K. Baruah/ All participant
1545-1630	LLIN, its mechanism and distribution	Dr R S Sharma / All participant
1630-1730	Equipment for larviciding and adulticiding	Dr P. K. Srivastava / All participant
Day 7 (Thursday) 26/08/2021		
1430-1515	Neem derived products for vector control	Dr Y P Ramdev/ All participant
1515-1630	Integrated Vector Pest Management: IVM & IPM	Dr P. K. Srivastava / All participant
1630-1700	IVPM: Behavior Change Communication	Dr P T Joshi/ All participant
1700-1730	IVPM: Vector management through Farmer Field School approach	Dr R S Sharma/ All participant
Day 8 (Friday) 27/08/2021		
1430-1500	Planning and implementation of IVPM	Dr R S Sharma/ All participant

1500-1600	Monitoring and evaluation of IVPM	Dr Amit Katewa / All participant
1600-1730	Epidemiological surveillance and parameters	Dr Ratna Joseph / All participant
Day 9 (Monday) 30/08/2021		
1430-1530	Non-POPs alternatives to DDT in vector control	Dr Kalpana Baruah / All participant
1530-1630	Report Preparation: Vector collection and their control	Dr Amit Katewa/ All participant
1630-1730	Observations on Training modules by SPO, Assam and Punjab, and vector control methods in operation in respective States.	Dr R S Sharma/ Dr Gujju Gandhi / All participant
Day 10 (Tuesday) 31/08/2021		
1430-1520	Pilot testing Module – 1 & 2 inputs from participant trainees	Dr R S Sharma/ Dr L J Kanhekar/Participants
1520-1610	Pilot testing Module – 3 & 4 inputs from participant trainees	Dr Ratna Joseph / Dr P T Joshi / Participants
1610-1700	Discussion on FAQs and IEC materials	Dr Ratna Joseph / Dr Amit Katewa/Participant Zonal Entomologists / DVBDCs
1700-1715	Feedback from Participant trainees & instructions	Dr L J Kanhekar/ Dr Gujju Gandhi
1715-1730	**Virtual Valedictory session**	Dr Ramesh Kumar/ Dr L J Kanhekar / Dr Gujju Gandhi

Dr L J Kanhekar
Project Consultant & Training Coordinator
CSIR-NEERI, Nagpur

Copy to: 1. All Participant Trainees from Assam, Haryana and Punjab

2. State Programme Officer from Assam, Haryana and Punjab.

5. Training programme Inaugural Function

Inaugural session of training conducted by Dr. A. Ramesh Kumar, Senior Scientist, CSIR-NEERI and introduced the training programme with its objectives. He welcomed chief guest, all the expert members and the participant trainees (Figure-1 a & b).

Dr. A. N. Vaidya, Coordinator, Stockholm Convention Regional Centre (SCRC), CSIR-NEERI briefed the participant trainees about the online training programme. He gave a brief introduction regarding the Stockholm Convention. He deliberated about the Persistent Organic Pollutants (POPs) and DDT.

Dr. Jitendra Sharma, Programme Management Officer, UNEP, Geneva briefly introduces about the project 'Development and Promotion of Non-POPs Alternatives to DDT in vector control management'. He explained the project objectives and the role of CSIR-NEERI in the project. He also talked about the other objectives of the project and requested participant trainees to participate to have a pilot testing of developed modules.

Dr. Neeraj Dhingra, Director, NVBDCP, Delhi gave an introduction about different Vector-Borne Diseases (VBDs) like Dengue, Malaria, Chikungunya and their prevalence in different states. He explained the role of NVBDCP to control vector borne diseases as well as elimination. While inaugurating he pointed out to phase out DDT, alternative methods or newer insecticide should be introduced and this training shall be useful to test the modules.

Dr. A. Ramesh Kumar proposed the vote of thanks.

Figure – 1 (a): Inaugural function screen shot, platform MS team

Figure – 1 (b): Inaugural function screenshot, platform MS team

6. Training sessions

The total training sessions were 10, each session covered 3 or 6 parts and each part was conducted for approximately 1 hour, the time was managed depending on a questionary discussion at the end of the session. Every session was conducted in the afternoon from 2.30 pm to 5.30 pm.

6.1. Training session-1 (Day – 1 (Tuesday) 17/08/2021)

Training part - 1: Introduction to DDT and its use in vector control

The first lecture of the day was deliberated by Dr. A. Ramesh Kumar. He started with an introduction to DDT and its use in vector control management. He stated the different properties of DDT and the reason for it being persistent. He explained the history and use of DDT with a year-wise supply of DDT in Indian states. He also talked about WHO action plan for a reduction in the use of DDT for disease control. He concluded his deliberation with a brief introduction to the project 'Development and Promotion of Non-POPs Alternatives to DDT in vector control management and CSIR-NEERI's role in the same (Figure-2).

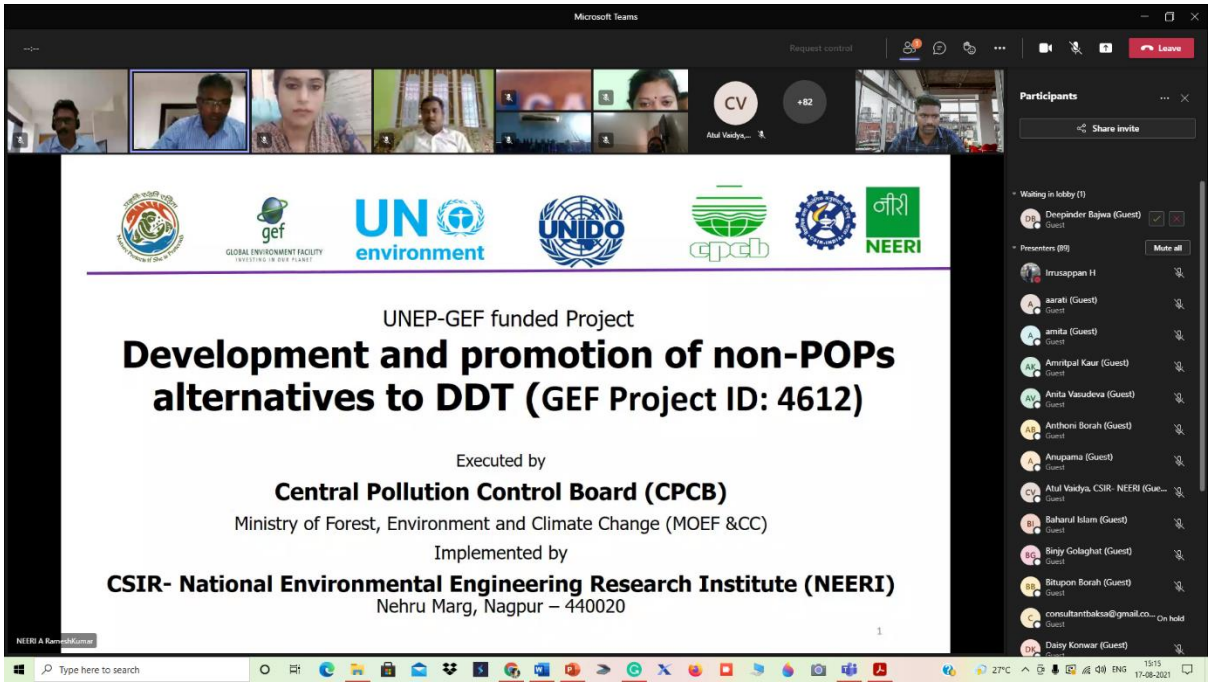


Figure-2: Lecture of Introduction to DDT and its use in vector control management

Training part - 2: Legal perspectives to the development of IVPM training Materials

The second deliberation of the day was scheduled for Adv. Sanjay Upadhyay, but due to some of his prior commitments, he couldn't deliberate. Two of his colleagues from his office, namely Adv. Manasi Bachani and Adv. Fiza conducted the lecture on his behalf. They talked about the legal perspectives to the development of Integrated Vector Pest Management (IVPM) training materials. They highlighted the gaps in the national legal framework for the alternatives to DDT in vector-borne disease control. They also talked about Environmental management, biological control, Chemical control and Genetic control in vector management. They explained the legal framework for Integrated Vector Control (Figure-3).

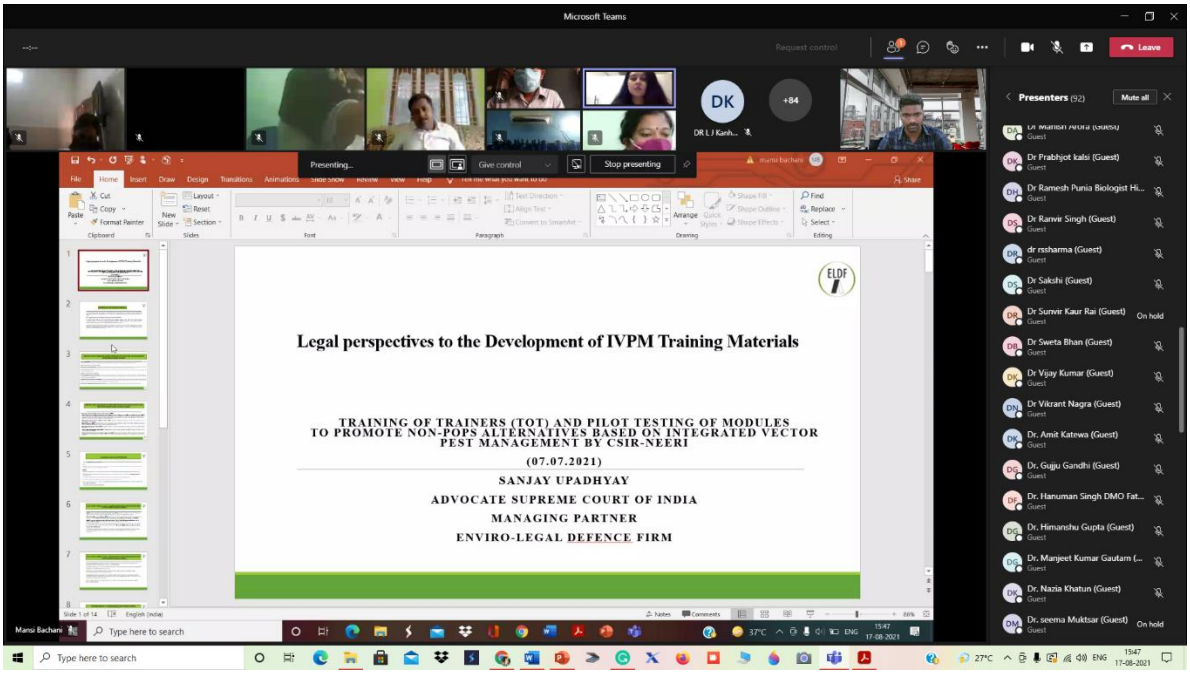


Figure – 3: Lecture of Legal perspectives to the development of IVPM training Materials

Training part - 3: Introduction to vector-borne diseases: Malaria

Dr. R. S. Sharma deliberated on the topic Introduction to vector-borne diseases with a main focus on the disease Malaria. Introduction, causative agents *i.e.* vector and pathogen of Malaria and transmission cycle of the disease inside the mosquito as well as human beings was explained. The six primary and three secondary vector species of the malaria vector were explained in detail along with the diagrams. He stated the global and national burden of the disease. (Figure-4).

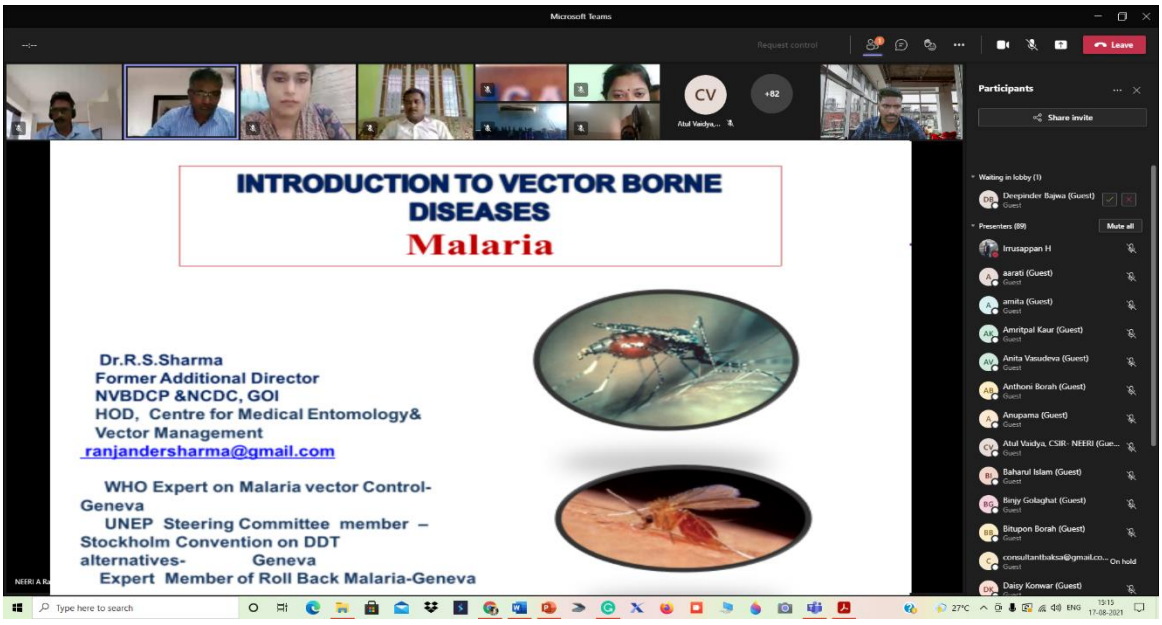


Figure – 4: Lecture of Introduction to vector-borne diseases: Malaria

Training part – 4: Leishmaniasis (Kala Azar)

Dr. Vijay Kumar deliberated on VBD- Leishmaniasis (Kala-Azar). He discussed on the causative agents, vectors of Kala-azar, its transmission cycle, signs and symptoms of Kala-Azar, epidemiology, national burden and global burden. He explained the and gave the example of an outbreak of the disease in the state of Assam (Figure-5).

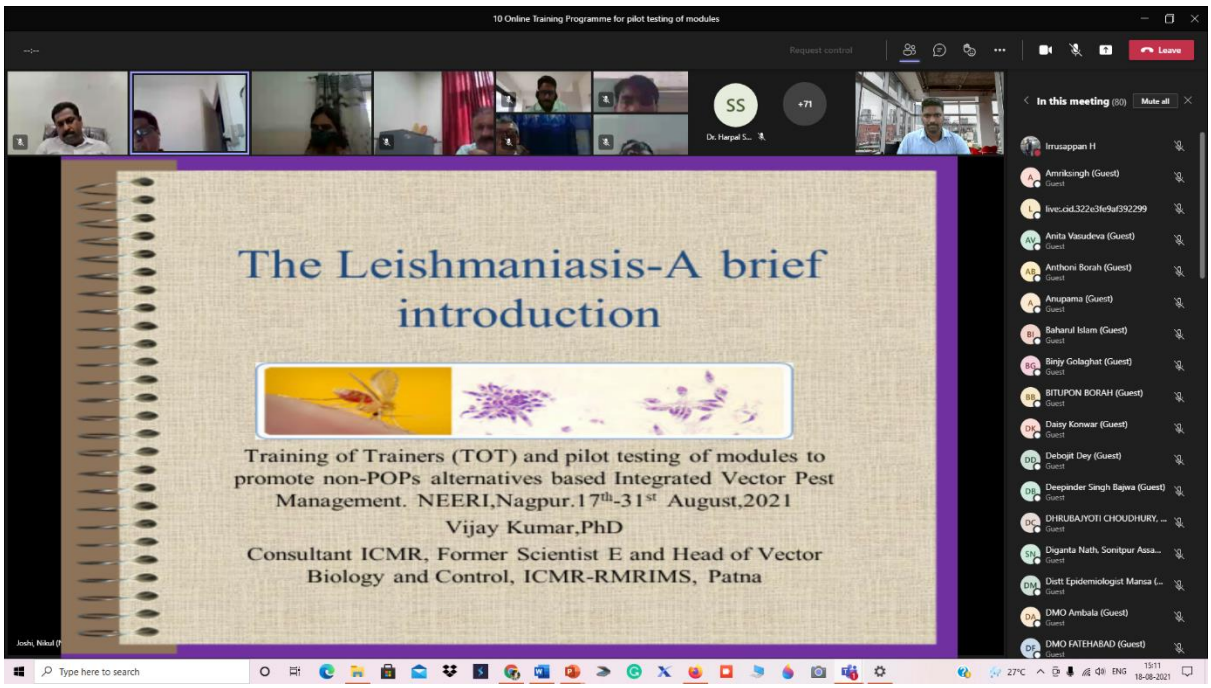


Figure – 5: Lecture of Leishmaniasis (Kala-Azar)

Training part – 5: Introduction to vector-borne diseases: Dengue, Chikungunya and Zika

Dr. Kalpana Baruah deliberated on introduction to vector-borne diseases with the focus on three diseases namely Dengue, Chikungunya and Zika. She explained the causative agents of the three diseases along with the pictorial description of their transmission cycles. Indian burden and global burden of the three diseases were stated graphically (Figure-6).

Suggested:

1. Dengue and Chikungunya data may be updated up to 2021 in the Modules
2. Dengue is two types DF & Severe Dengue fever

Figure – 6: Lecture of Dengue, Chikungunya and Zika

Training part – 6: Introduction to vector-borne diseases: Plague

Dr. N. Balakrishnan lectured on introduction to vector-borne diseases with the focus on the disease Plague. The causative agents *i.e.* vectors and pathogens of the disease, vector reservoirs, susceptible hosts and the bio-groups were explained in detail. Description of the flea species found in India as the vectors of Plague was given in detail. Historical background of Plague was given. The cases and deaths due to human plague were graphically stated. The transmission cycle of the disease was explained elaborately along with the diagram. He made the participants understand the concept of plague surveillance (Figure-7).

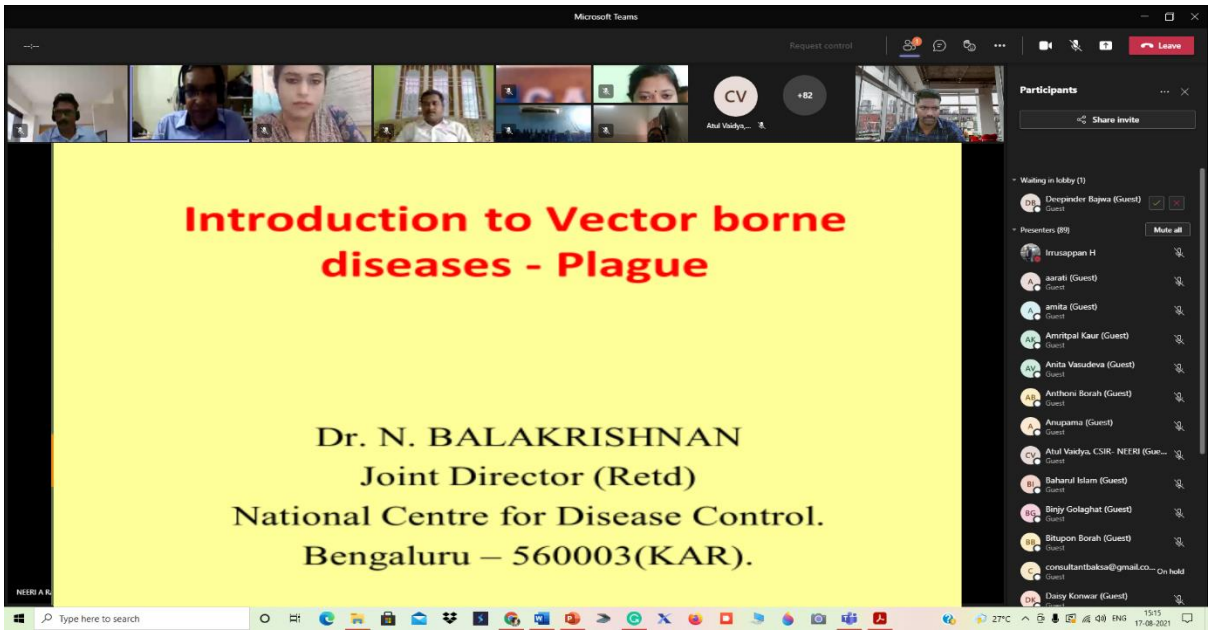


Figure -7: Lecture of Introduction to vector-borne diseases: Plague

Figure – 8: Photograph of end of a first-day training session

6.2. Training session - 2 (Day - 2 (Wednesday) 18/08/2021)

Training Part – 1: Introduction to vector-borne diseases: Japanese Encephalitis

The first session of the day was conducted by Dr. P. T. Joshi on the topic Introduction to vector-borne diseases, with the main focus on the disease Japanese Encephalitis. He explained the causative agents of JE i.e. its pathogen and the vector carrying that pathogen. He deliberated about the global and national history of the disease. He explained the signs and symptoms of the disease and how it affects the host. A graphical representation of the state-wise prevalence of the JE vectors was given. He also discussed the global and national burden of the disease (Figure-9).

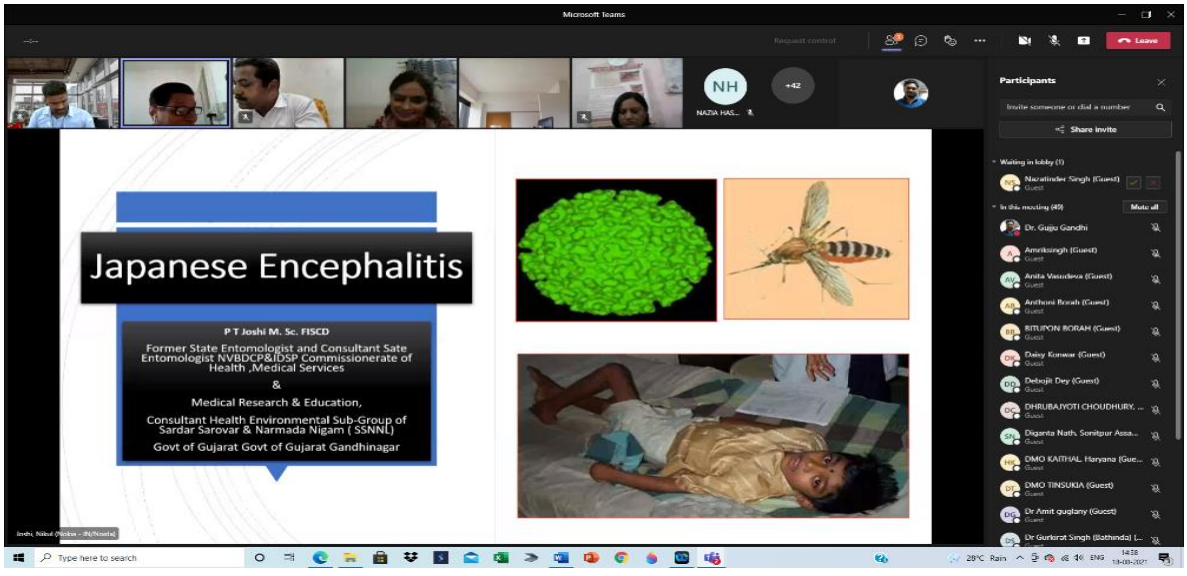


Figure – 9: Lecture of Introduction to vector-borne diseases: Japanese Encephalitis

Training part – 2: Introduction to vector-borne diseases: Filariasis

The second lecture of the day was deliberated by Dr. P. K. Srivastava. The topic of discussion was introduction to vector-borne diseases with the main focus on the disease Filariasis. He started with the introduction to Filariasis. Vector, pathogen and the hosts of Filariasis were discussed. He discussed different vector-borne diseases and the vectors associated with each of them. The transmission cycle of Filariasis in humans, as well as vectors, was explained. The global and Indian burden of the disease was also discussed. A description of the human filarial parasite was given. The current status of Lymphatic Filariasis in India was discussed. Salient features of the vector life cycle and disease transmission cycle were talked about. He explained about the Filarial disease manifestations and Elimination strategy: 1997 onwards (Figure-10).

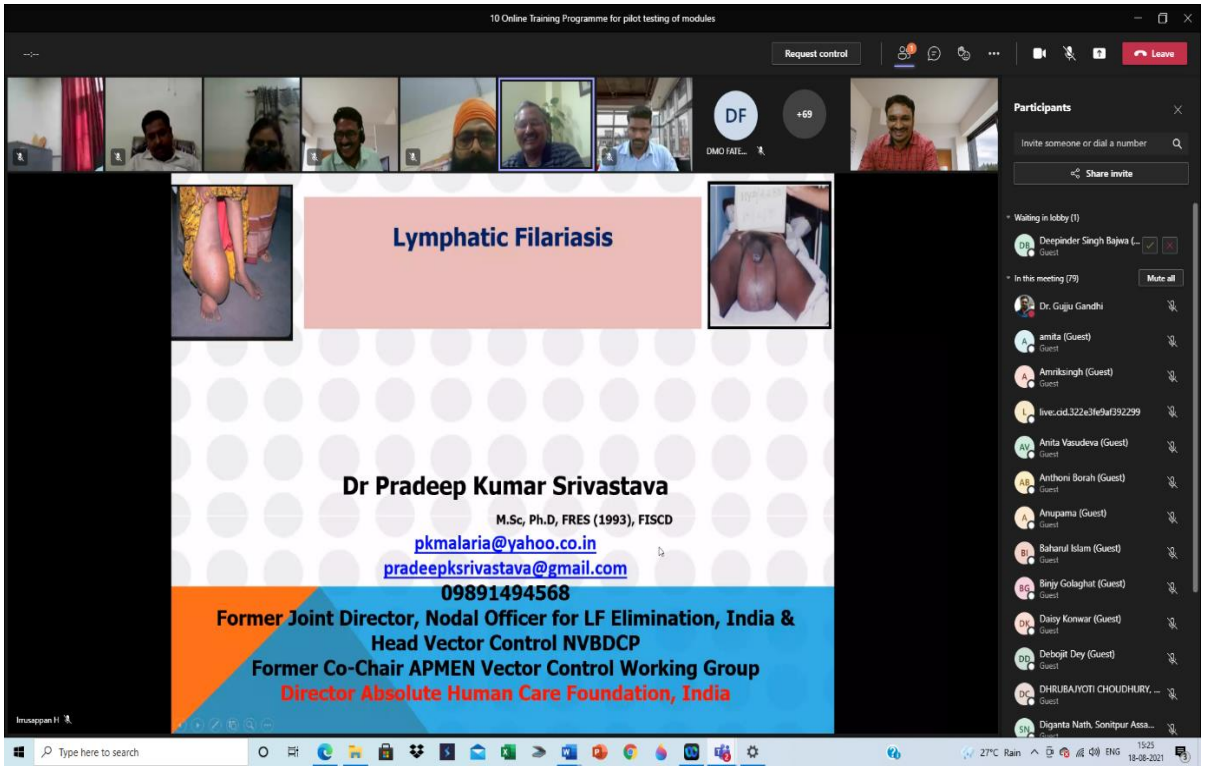


Figure – 10: Lecture of Lymphatic filariasis

Training part – 3: Introduction to vector-borne diseases: Scrub Typhus

The third session was coordinated by Dr. Ratna Joseph on the topic Introduction to vector-borne diseases with the main focus on the disease Scrub Typhus. An introduction to Scrub Typhus was given. Causative agents of the disease *i.e.* the vector and the pathogen were explained. The mode of transmission of the disease and transmission cycle was given. The signs and symptoms of the disease along with the diagnosis and treatment were stated. He stated the national disease burden. Epidemiological control of Scrub Typhus was discussed in detail (Figure-11).

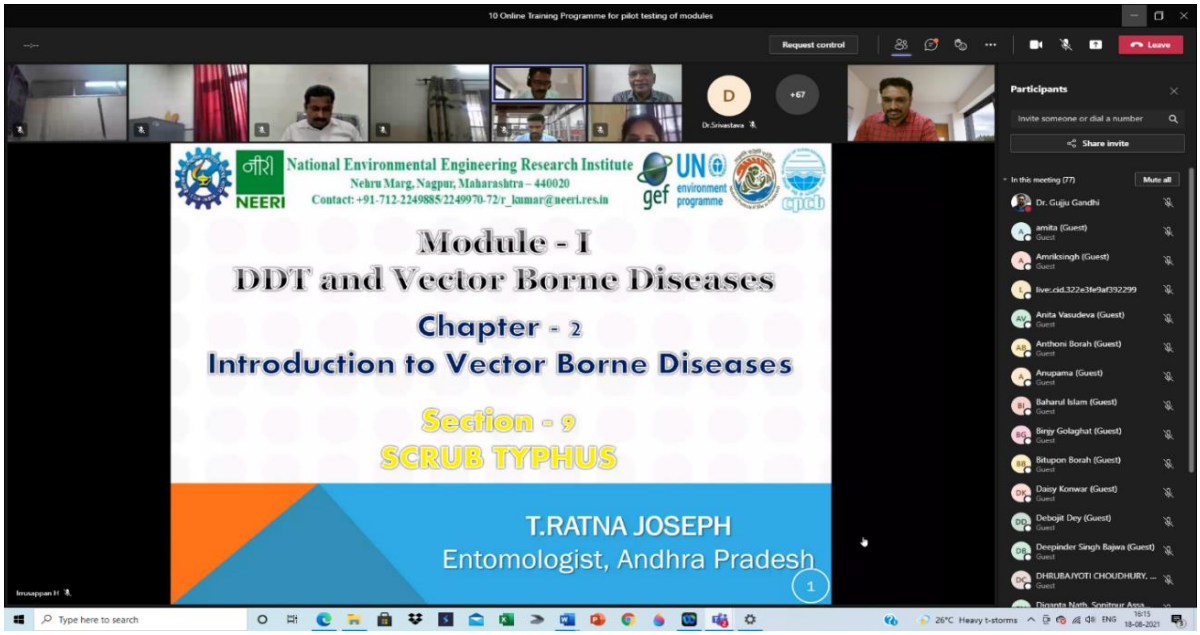


Figure – 11: Lecture of Introduction to vector-borne diseases: Scrub Typhus

Training part – 4: Introduction to Crimean Congo Haemorrhagic Fever

The fourth lecture of the day was deliberated by Dr. K. Regu on the topic of Introduction to vector-borne diseases with the main focus on the disease Crimean Congo Haemorrhagic Fever (CCHF). He gave a brief introduction to CCHF. The vector and pathogen *i.e.* the causative agents of the disease were discussed. The mode of transmission and the transmission cycle of the disease was explained. He discussed the disease epidemiology and the Indian outbreak. The tick life cycle was explained in detail. He also made the participants understand the concepts of one tick hosts and two tick hosts. Clinical manifestations of CCHF were given. He also explained the health concept of tick control (Figure-12).

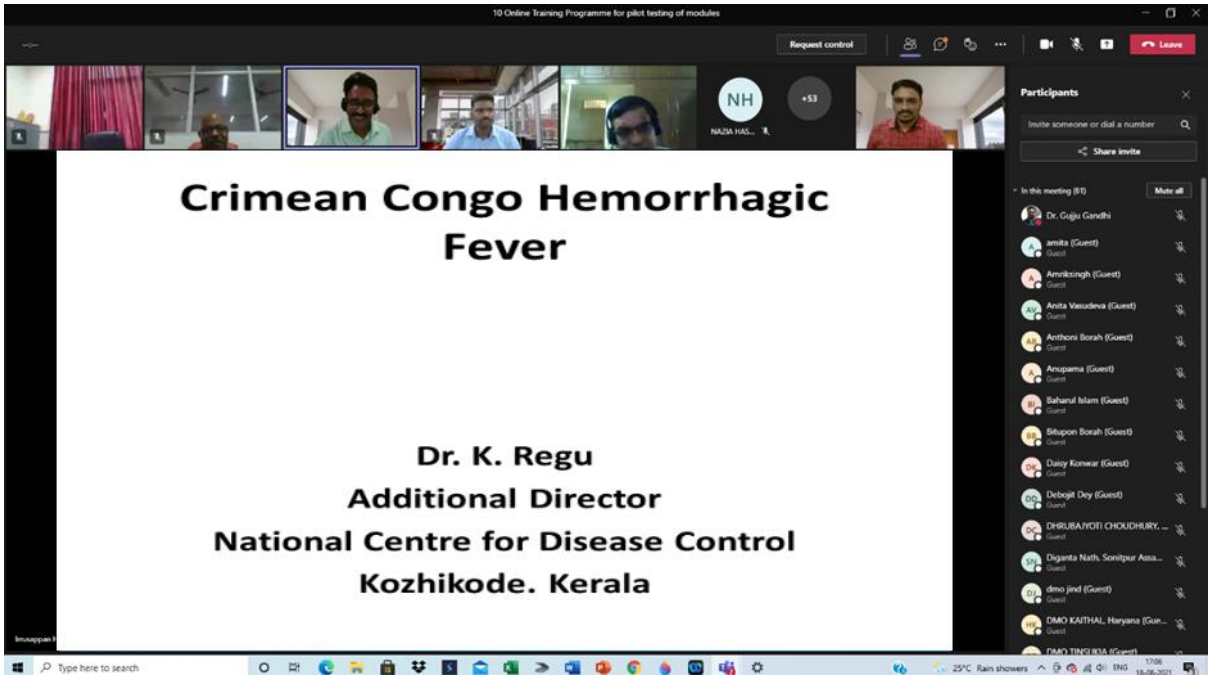


Figure -12: Lecture of Introduction to Crimean Congo Haemorrhagic Fever

Training part – 5: Introduction to Kyasanur Forest Disease

The fifth and the final session of the day was deliberated by Dr. N. Balakrishnan on the topic of Introduction to vector-borne diseases with the main focus on the disease Kyasanur Forest Disease (KFD). Introduction, causative agents and transmission cycle of KFD were explained. The global and national burden of the disease was stated. He discussed about the history of KFD in India and its epidemiological tetrad. He explained in detail about the concepts of vector life cycle and natural cycle of KFD. He also explained about the environmental risk factors for KFD. He discussed about the preventive measures and KFD vaccine (Figure-13).

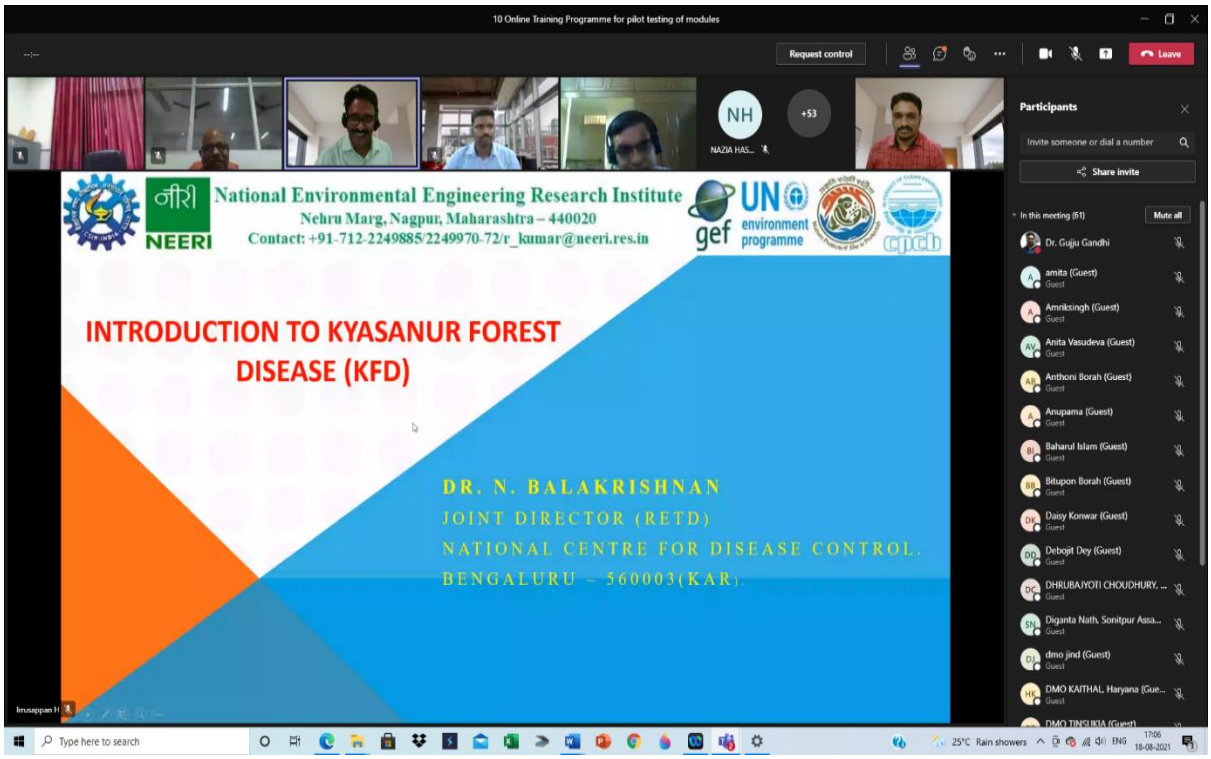


Figure – 13: Lecture of Introduction to Kyasanur Forest Disease

6.3. Training session-3 Day 3 (Thursday) 19/08/2021

Training part - 1: Morphology of vector mosquitoes

On the third day of the training programme, the first lecture of the day was deliberated by Dr. L.J. Kanhekar on the topic Morphology of vector mosquitoes. Training module 2 along with its objectives was explained by Dr. Kanhekar. He gave a detailed introduction to the vector mosquitoes. The classification and external morphology of all the vector mosquito species holding importance as disease vectors was given and explained elaborately by Dr. Kanhekar in his lecture (Figure-14).

Figure – 14: Discussion photograph of lecture Morphology of vector mosquitoes

Training part – 2: Bionomics of vector mosquitoes

The second lecture of the day was deliberated by Dr. R. S. Sharma. His topic was Bionomics of vector mosquitoes. In his lecture, he included different topics like biology and ecology of the vector mosquitoes. The vector bionomics for the vectors of different diseases like Dengue, Chikungunya and Japanese Encephalitis was explained in detail (Figure-15).

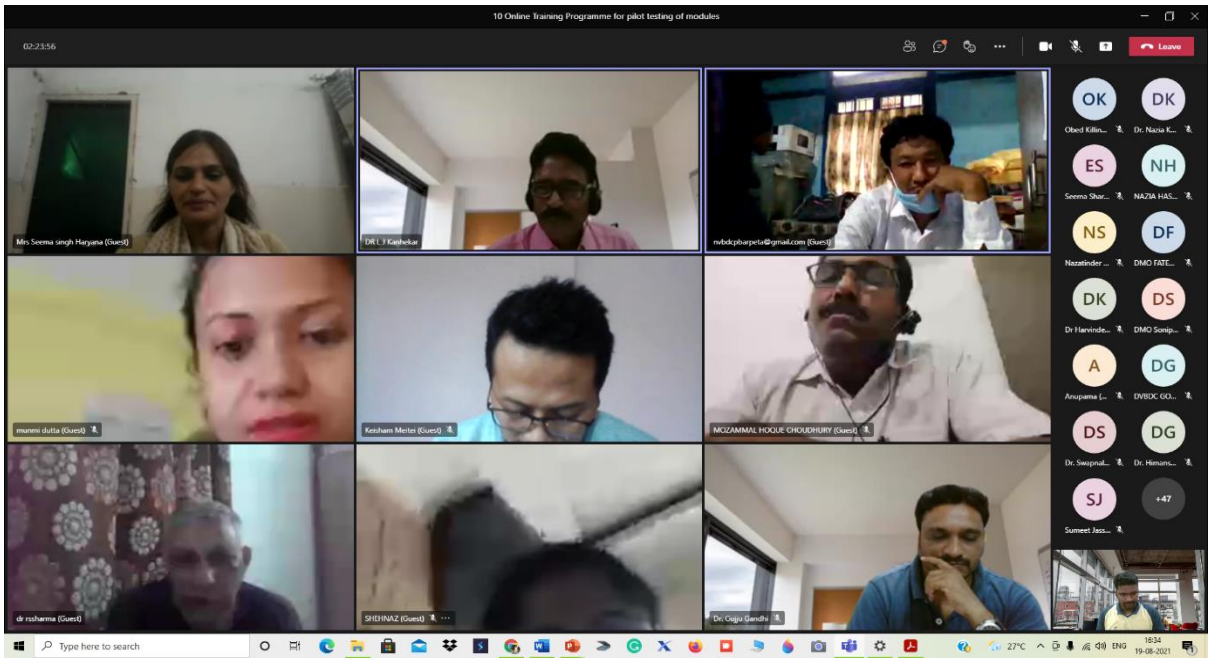


Figure – 15: Discussion photograph of lecture Bionomics of vector mosquitoes

Training part – 3: Morphology and Bionomics of sandflies

The third lecture of the day was deliberated by Dr. Vijay Kumar on the topic of Morphology and bionomics of sandflies. In his lecture, he explained in detail the classification and external morphology of the sandflies. The life cycle of the sandfly including information about egg,

larva, pupa and adult sandfly was explained elaborately. The concepts of vector biology and vector ecology were also explained (Figure-16).

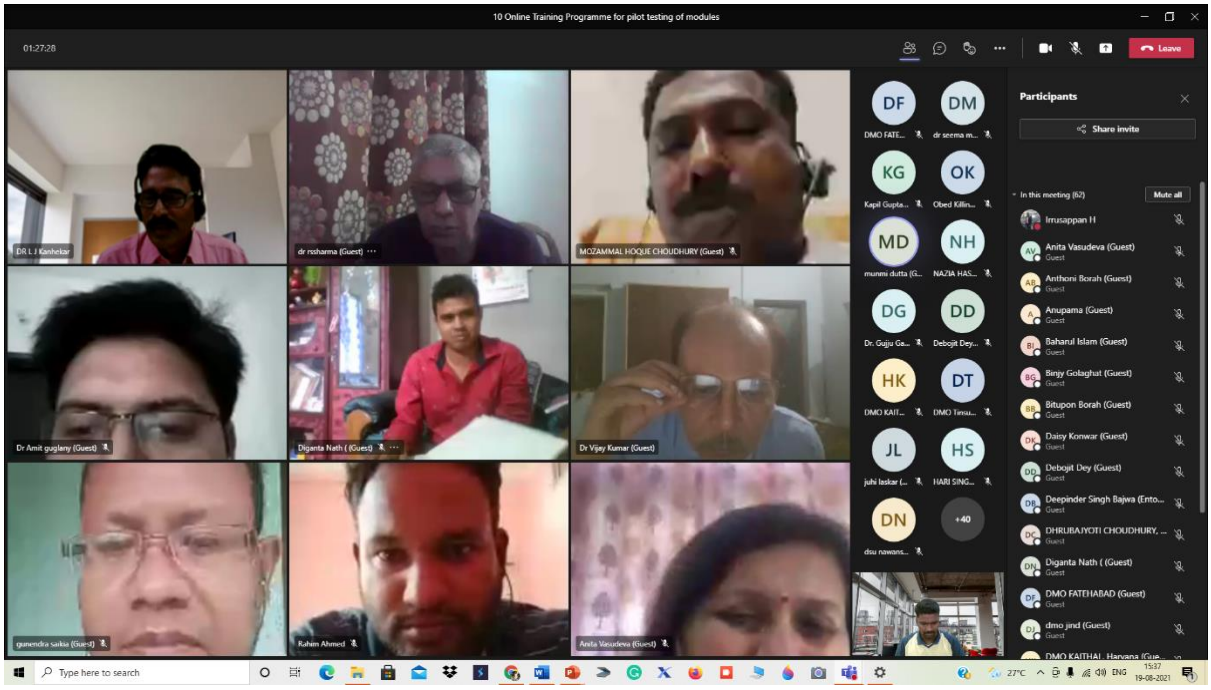


Figure – 16: Discussion photograph of lecture Morphology and Bionomics of sand fly

Training part – 4: Morphology and bionomics of ticks and mites

The fourth and final lecture of the day was conducted by Dr. N. Balakrishnan. He deliberated on the topic of Morphology and bionomics of ticks and mites. External morphology and classification of the ticks and mites were explained in detail. The biology and ecology of ticks and mites were also explained elaborately (Figure-17).

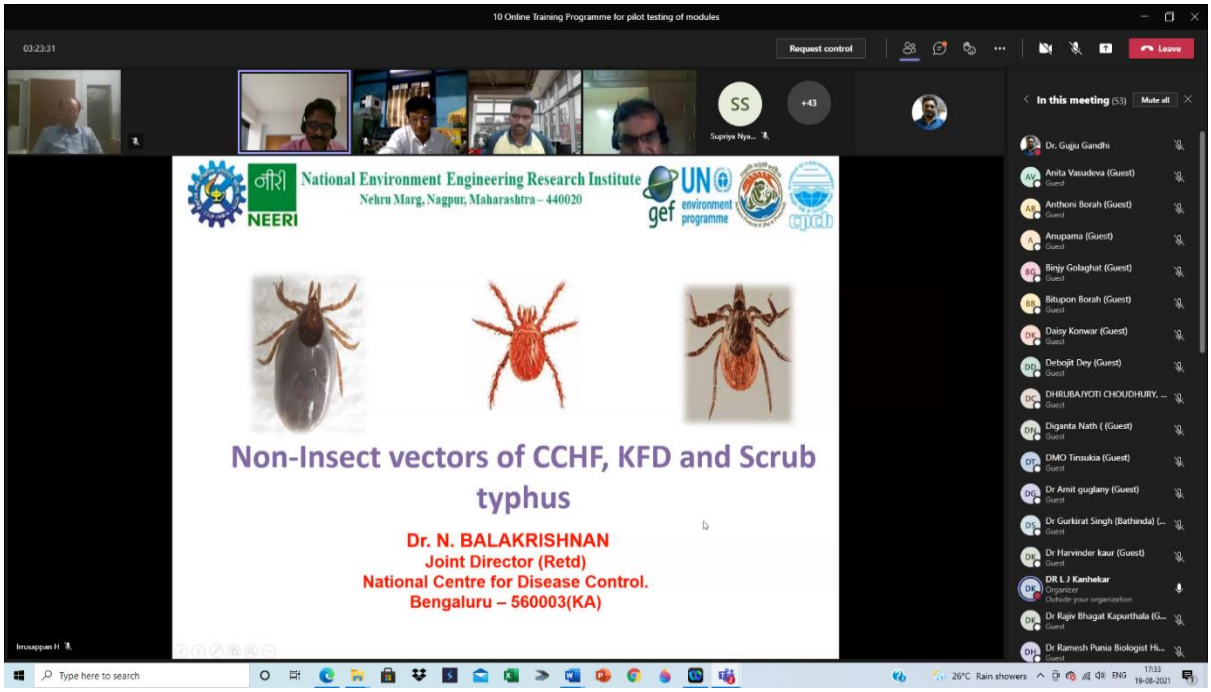


Figure – 17: Lecture of Morphology and Bionomics of Ticks & Mites

6.4. Training session - 4 (Day – 4 (Monday) 23/08/2021

Training part-1: Morphology and Bionomics of flies and fleas

On the 4th day, the first deliberation was by Dr. Amit Katewa, on the topic of Morphology and bionomics of flies and fleas. He started with the introduction of fleas. In the introduction part, he deliberated about the characteristics and distribution of fleas, some of the species specifically occurring in India and the classification of fleas. He talked about fleas regarding Plague. In the morphology part, the head thorax and abdomen of the fleas were briefly explained. The difference between male and female flea was clearly stated regarding its size, antenna and abdomen. The life cycle of the fleas was explained by Dr. Katewa along with the different life stages like egg, larva, pupa and adult. The jumping pattern of the fleas was diagrammatically explained. The next topic covered by him was housefly. Classification of the housefly was stated. External morphology of the house fly along with a detailed explanation of its wings was given. The life cycle of the housefly including its different life stages like egg, larva, pupa and adult was explained. Breeding places of the housefly along with its pictorial representation was given (Figure-17).

Figure – 17: Lecture of Morphology and Bionomics of Ticks & Mites

Training part-2: Entomological surveillance of VBDs

The 2nd lecture of the day was deliberated by Dr. Himmat Singh on the topic of Entomological surveillance of vector-borne diseases. The lecture started with the collection methods of adult sandflies. The importance of data selection was stated by Dr. Singh. He made a point that data should be selected according to the study to be undertaken. The concepts of collection of adult mosquitoes, larval collection, the purpose of collection and types of collection including qualitative and quantitative collection were explained. The basis on which collection is to be done was explained. The next topic was types of adult collection, in which he included devices for collection, the process of collection and spray sheet collection including its objectives, time

required and items required. In the landing collection part, the principle and objectives of collection and collection methods including human collections and animal collections were mentioned. In the trap collection part, the principle and objectives of collection and types of traps including fixed traps, portable traps, mechanical devices, funnel traps, exit traps, Magoon traps and veranda traps were mentioned. He also explained the concepts of tent traps, light traps, vehicle-mounted traps, mosquito traps, sticky traps and ovitraps. Brief information about the outdoor collection was given. The main objectives of larval collection and its methods were stated (Figure-18).

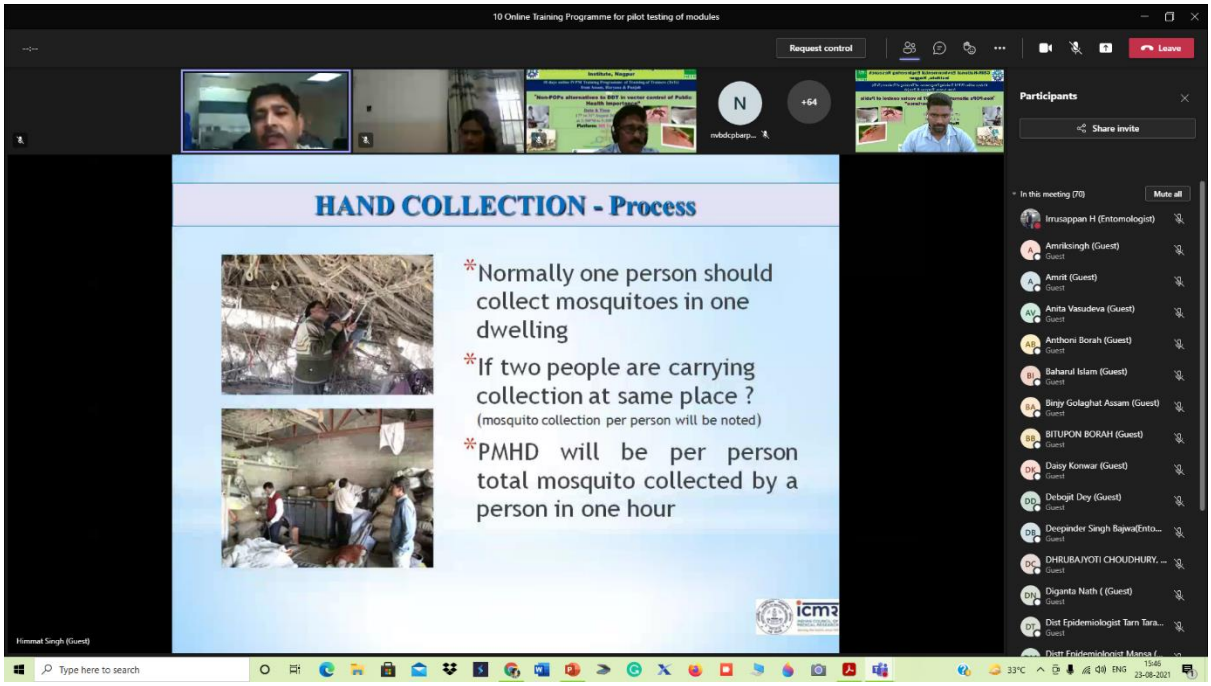


Figure – 18: Lecture of Entomological surveillance of VBDs

Training part – 3: Alternatives to DDT in vector control management- conventional methods and environmental management:

The third lecture of the day was deliberated by Dr. R. S. Sharma. His topic was Alternatives to DDT in vector control management. He started with an introduction to VBDs and novel vector control tools. NVBDCP recommended methods for vector control management were briefly explained. Some of the conventional and long used methods were talked about. The concept of Environmental management including Environmental manipulation and Environmental modification was explained. Environmental Engineering Methods (EEM) were explained; under which source reduction and community-based vector management for different vector species were given special attention. Genesis of EEM in India was graphically explained. After his presentation, Dr. R. S. Sharma asked the participants to share the success stories of their respective states in the reduction of several cases. An example of the Beed and Latur district Chikungunya outbreak, where Dr. R. S. Sharma identified it as a problem of hindered water and electric supply, and not as a public health problem was given. After making the water and electricity supply continuously available for 7 days, a drastic reduction in the number of cases was noticed. By this example, the importance of changes in human habitat and behaviour was highlighted (Figure-19).

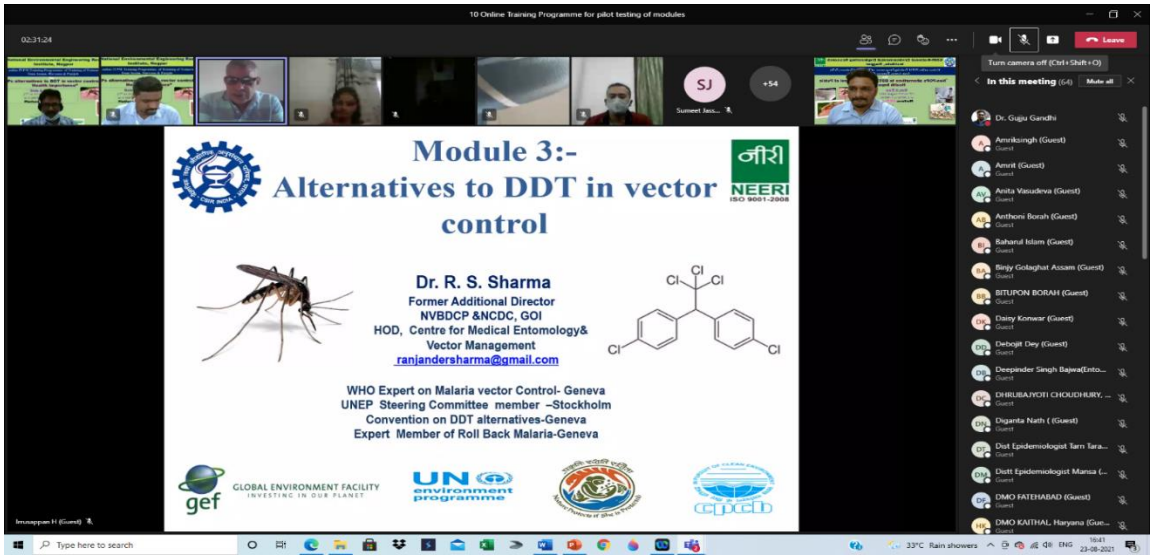


Figure – 19: Lecture of conventional methods and environmental management

6.5. Training session – 5 (Day – 5 (Tuesday) 24/08/2021)

Training part – 1: Entomological parameters and its importance

24th August 2021 was the 5th day of the training programme. The first training session was taken by Dr. Himmat Singh. He deliberated on Entomological parameters and their importance. In the lecture, he talked about the importance of entomological surveillance parameters. Adult vector parameters used in Malaria were discussed. Entomological indices were elaborated. He gave a diagrammatic representation of unfed, fully fed, semi gravid and gravid mosquitoes. Mosquito life expectancy and longevity was discussed. He made the participants understand the concept of parity rates, vectorial capacity and larval survey. The entomological survey of Lymphatic Filariasis was also explained briefly (Figure-20).

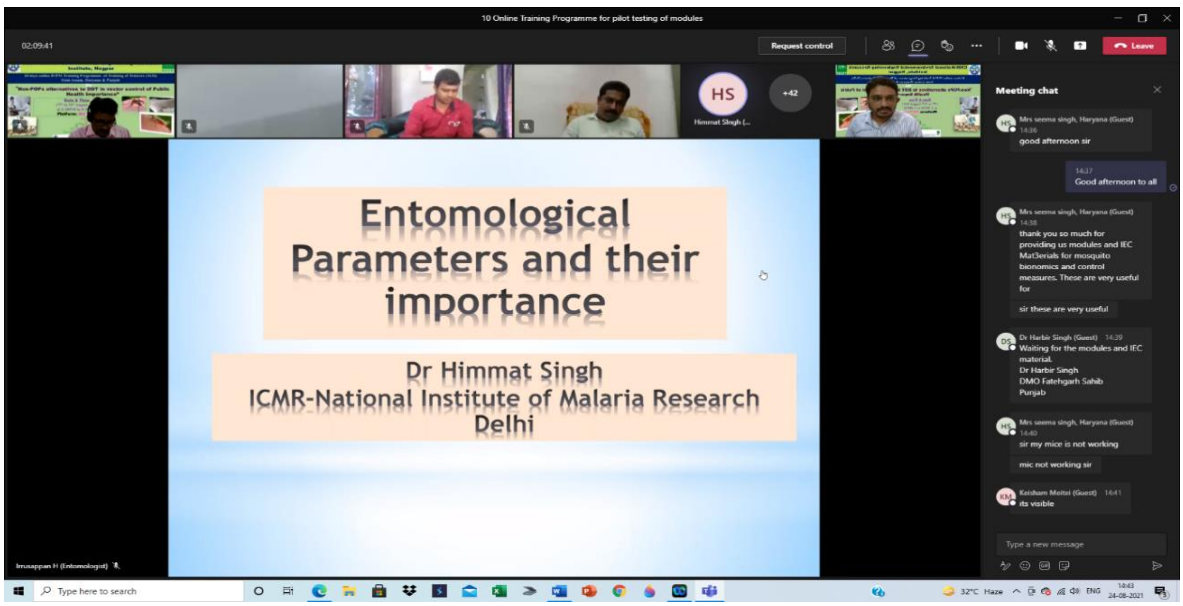


Figure – 20: Lecture of Entomological parameters and its importance

Training part – 2: Vector control measures/management: Biological and Genetic

The second lecture was deliberated by Dr. Ratna T. Joseph on the Biological and Genetic vector control measures. Under biological management, he talked about the advantages of biological control management. Desirable attributes of bio-control agents including Predators, Parasites, Parasitoids and Pathogens like Copepods, Nematodes, Flatworms, Fungi, Invertebrate predators, Anuran predators, Bacteria and Larvivorous fishes including Gambusia, Guppy, Tilapia and Carp were discussed briefly. Under the topic of Genetic control measures, the salient features of genetic control were discussed. He explained how the genetic control management systems work. Different types of genetic controls like Sterilization, Irradiation and Gene modifications were discussed. The advantages and disadvantages of genetic control and Genetically Modified Organisms (GMOs) were stated (Figure-21).

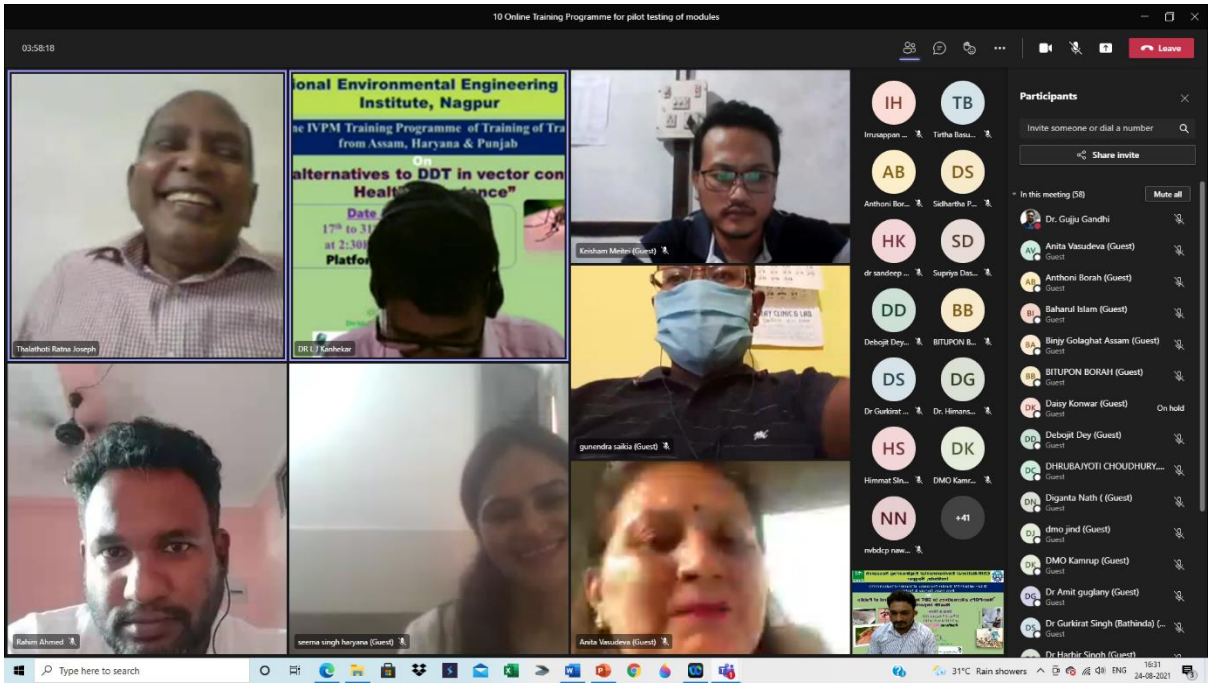


Figure – 21: Discussion photograph of lecture Biological and Genetic of Vector control

Training part – 3: Vector control measures/management: Chemical

The third session was conducted by Dr. P. K. Srivastava on the topic, 'Chemical vector control measures'. Plant products as chemical vector control including Pyrethrum and Neem derived products were discussed. He discussed Synthetic chemicals including organic chemicals, like Organochlorines, Organophosphates, Carbamates and Synthetic pyrethroids. Under the topic of larval source management, Insect Growth Regulators (IGRs) were discussed. He deliberated about the dosages and formulations of different chemical larvicides recommended by NVBDCP. Under Adult vector control, the topics like Indoor Residual Spray (IRS), Long Lasting Insecticidal Nets (LLINs), Indoor space spray and outdoor fogging including thermal fog and cold fog were discussed briefly. He explained about the preparation of ready to use suspensions and applications of insecticides like DDT 50% W.P., Malathion 25% W.P., Deltamethrin 2.5% W.P., Cyfluthrin 10% W.P., Alphacypermethrin 5% W.P., Lambda-cyhalothrin 10% W.P. and Bifenthrin 10% W.P. for IRS, recommended by NVBDCP. He also suggested one correction in Module No. 3 in the same part. In the module, the concentration of

Malathion 25% W.P. was mentioned to be 500 grams; whereas, Dr. srivastava suggested it to be 250 grams (Figure-22).

Figure – 22: Lecture of Vector control measures/management: Chemical

6.6. Training session – 6 (Day – 6 (Wednesday) 25/08/2021)

Training part – 1: NVBDCP Recommended Insecticide: Larval Source Management and Adult Vector Control

The first session of the day was coordinated by Dr. Kalpana Baruah. The topic of the discussion was NVBDCP recommended insecticides for Larval source management and Adult vector control. She started by explaining the concept of Larval Source Management (LSM) and where it is to be performed. The four types of LSM were explained. She emphasized Habitat modification and Habitat manipulation. The use of chemical larvicides and their dosages and formulations recommended by NVBDCP were stated. The use of Mosquito Larvicidal Oils (MLOs) was explained. The concept of Insect Growth Regulators (IGRs) was explained. Different bio-control agents like *Bacillus thuringiensis var israelensis* (Bti), copepods, nematodes, fungi, flatworms, invertebrate predators, Anuran predators and different larvivorous fishes were explained. Under the adult vector control different chemical adulticides, Indoor Residual Spray (IRS), Indoor space spray, Outdoor fogging, thermal fogs, cold fogs and Long-Lasting Insecticidal Nets (LLINs) were elaborated. NVBDCP recommended formulations, preparations and applications; of different synthetic insecticides for IRS were stated in a tabular form (Figure-23).

Suggested: Dracunculiasis, also known as Guinea worm disease (GWD), is an infection caused by the parasite Dracunculus medinensis. Parasite transfer from copepods (Cyclops) that's why India was not recommended to Copepods

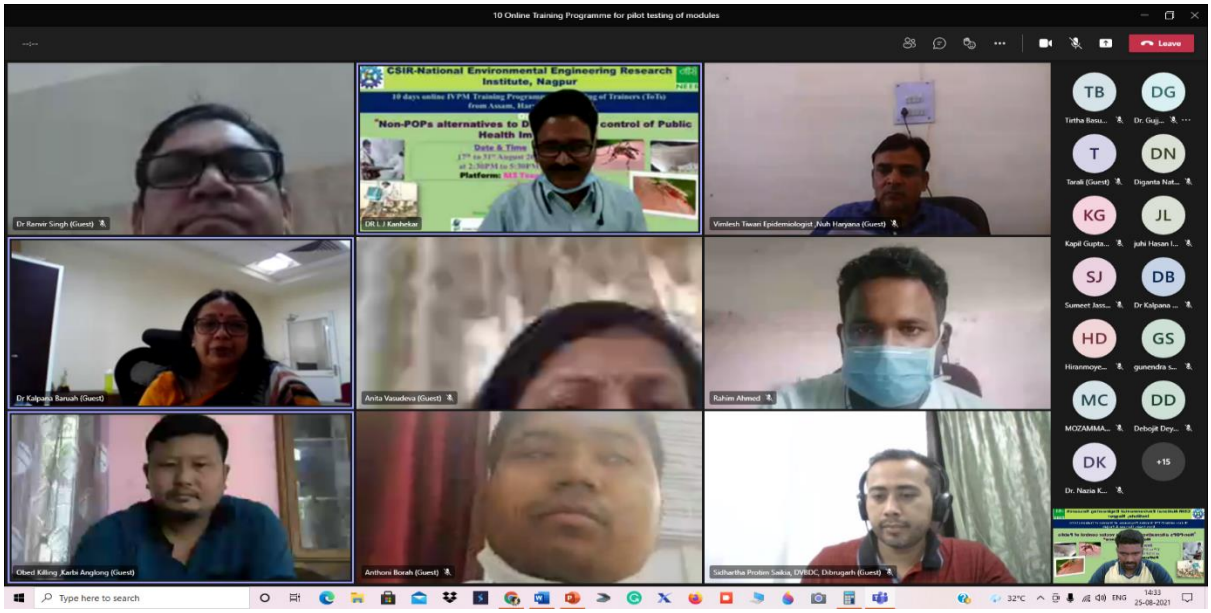


Figure – 23: Discussion photograph of lecture NVBDCP Recommended Insecticide: Larval Source Management and Adult Vector Control

Training part - 2: LLINs: its mechanism and distribution

The second lecture of the day was deliberated by Dr. R. S. Sharma on the topic of Long-Lasting Insecticidal Nets (LLINs), their mechanism and distribution. He started with the types and construction of mosquito nets. He talked about the historical aspects and problems related to ITNs. He explained the 10 steps in insecticide treatment of the nets. The concept of LLINs was explained in detail. He briefed them about their proper usage, maintenance and disposal. He made the participants understand the importance of the Behaviour Change Communication campaign. He threw light on the distribution of LLINs in the COVID-19 situation and what precautions are to be taken for the same. He also deliberated about the entomological aspects and challenges faced regarding the distribution of LLINs. Participants asked about what lifestyle changes are to be adopted under BCC on which he gave his expert inputs (Figure-24).

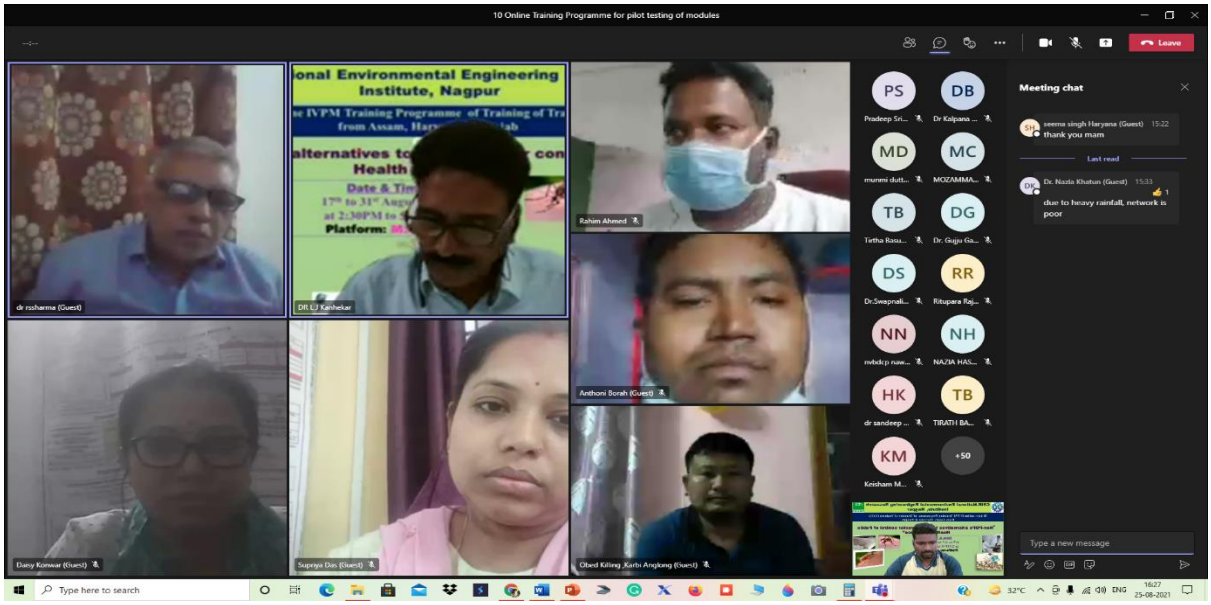


Figure – 24: Discussion photograph of lecture LLINs: its mechanism and distribution

Training part - 3: Equipments for larviciding and adulticiding:

The third and final deliberation of the day was conducted by Dr. P. K. Srivastava on the topic of Equipment used for larviciding and adulticiding. He explained different tools for larval and adult mosquito control like a Knapsack sprayer, a hand compression pump, stirrup pump; different fogging machines like a portable fogging machine, ultra-low volume (ULV), and vehicle-mounted thermal and cold fogging machines. Different types of nozzles used for spraying were explained in detail along with the Control Flow Valves (CFVs). Different sizes of spray particles were diagrammatically explained (Figure-25).

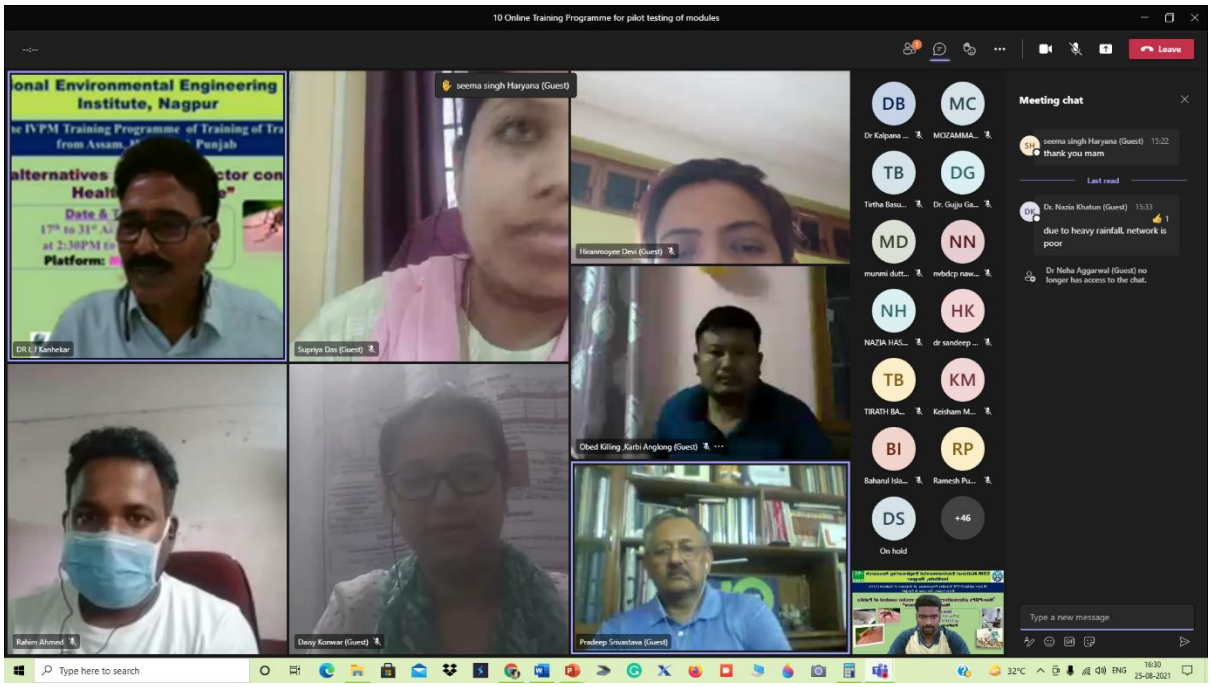


Figure – 25: Discussion photograph of lecture Equipments for larviciding & adulticiding

6.7. Training session – 7 (Day – 7 (Thursday) 26/08/2021)

Training part - 1: Neem derived products for vector control:

The first session of the day was coordinated by Dr. Y. P. Ramdev on the topic Neem derived products for vector control. He started with the introduction to the Stockholm Convention of POPs and its status of ratification. He gave a brief introduction to DDT and its application; and talked about the effective application of pesticides. He deliberated about the objectives and priorities of the National Implementation Plan (NIP). He explained the DDT phase-out strategy. He talked of Neem as a crop protection agent and explained the various uses of Neem in agriculture, cosmetics, medicine and vector control agent. The advantages of Neem based pesticides were explained in detail (Figure-26).

Training part - 2: Integrated Vector Pest Management: IVM and IPM

The second lecture of the day was deliberated by Dr. P.K. Srivastava on the topic Integrated Vector Pest Management (IVPM). He started with the introduction and learning objectives of Integrated Vector Management. The key elements of IVM were described. The features of Integrated Vector Control Methods and their importance were discussed. The collaboration of

various sectors and central as well as state-level was discussed. He explained different types of Integrated Pest Management. The concept of Behaviour Change Communication (BCC) was explained in detail. Pest management through the FFS (Farmer Field Schools) approach was discussed. The introduction and objectives of Planning and Implementation were taught to the participants. Various methods of mosquito sampling and determinants of local diseases along with the selection of vector control methods were described. Later, he covered the IVM implementation strategy and Monitoring and evaluation portion. Techniques of collection of adult sandflies and mosquito larval collection methods were discussed. Entomological surveys of different VBDs were explained along with their epidemiological parameters (Figure-27).

Training part - 3: IVPM: Behaviour Change Communication

The third lecture of the day was held by Dr. P. T. Joshi on the topic IVPM: Behaviour Change Communication. He gave a brief introduction to the concept of BCC, its objectives and tools. The concepts of Farmer Field Schools (FFS), Accredited Social Health Activist (ASHA) and Multi-Purpose Health Workers (MPHW) were explained. He explained the breeding places and life cycles of various mosquitoes important as vectors of different vector-borne diseases. He spread awareness about using the Insecticide Treated Nets (ITNs) along with the different ways to prevent mosquito bites (Figure-28).

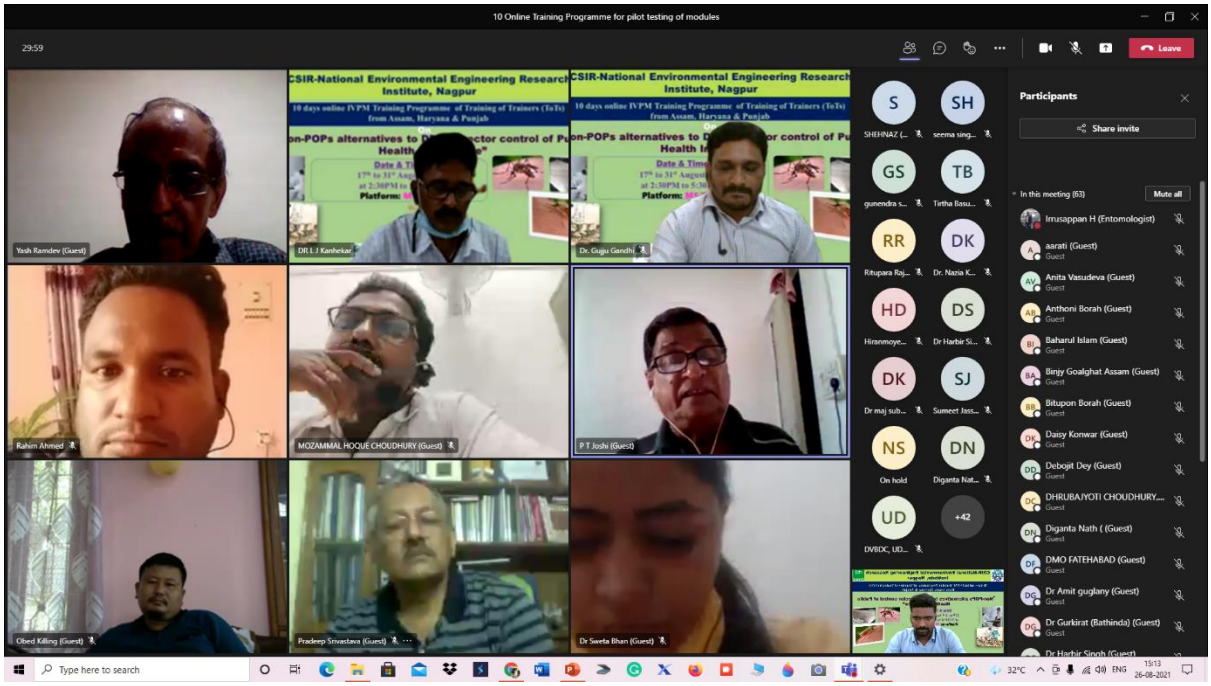


Figure – 26: Discussion photograph of lecture Equipments for larviciding & adulticiding

Training part – 4: IVPM: Vector management through Farmer Field School approach

The last and final lecture of the day was deliberated by Dr. R. S. Sharma on the topic IVPM: Vector management through Farmer Field School approach. The introduction to the concept of IVPM was given. How Farmer Field Schools (FFS) can be used for vector control and the health risks associated with agriculture were discussed. The role of FFS at the field level was explained. The concepts of BCC and IVPM too were explained. He talked about the role of health trainers in coordination between IVM and IPM. He talked about Dr. Ronald Ross, a British doctor and his contribution to the field of Malaria (Figure-29).

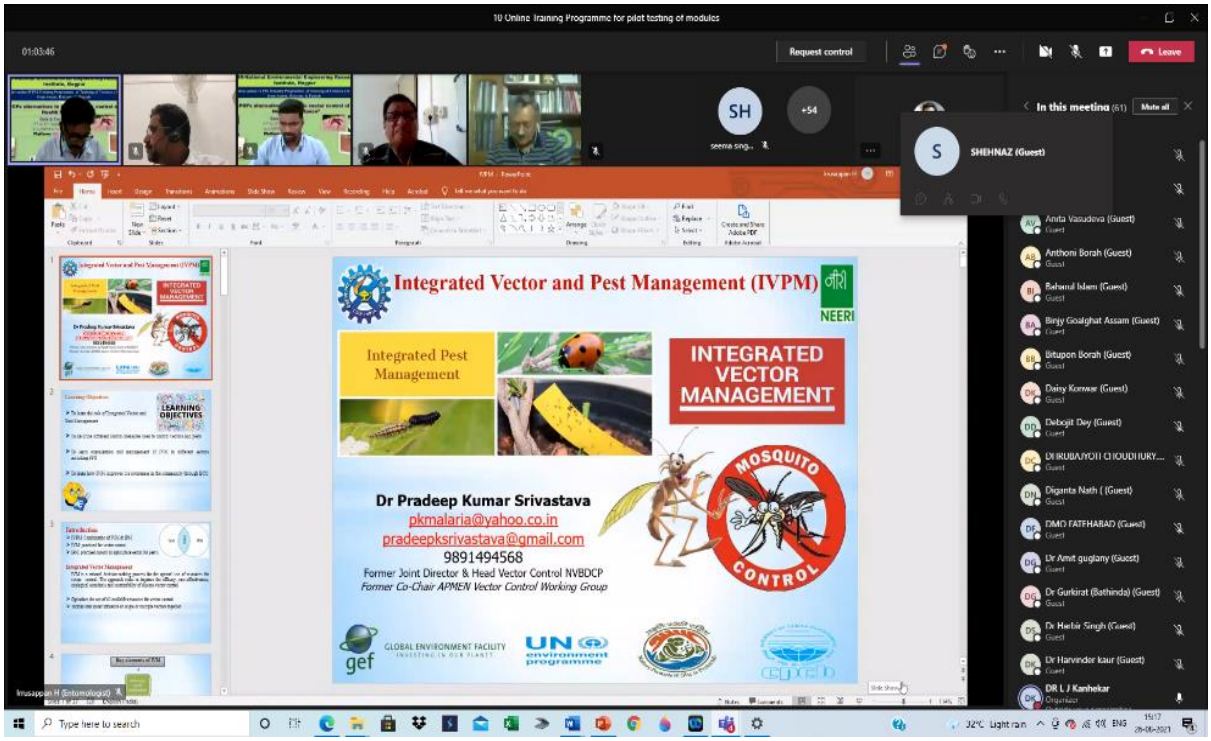


Figure – 27: Discussion photograph of lecture Integrated Vector Pest Management: IVM & IPM

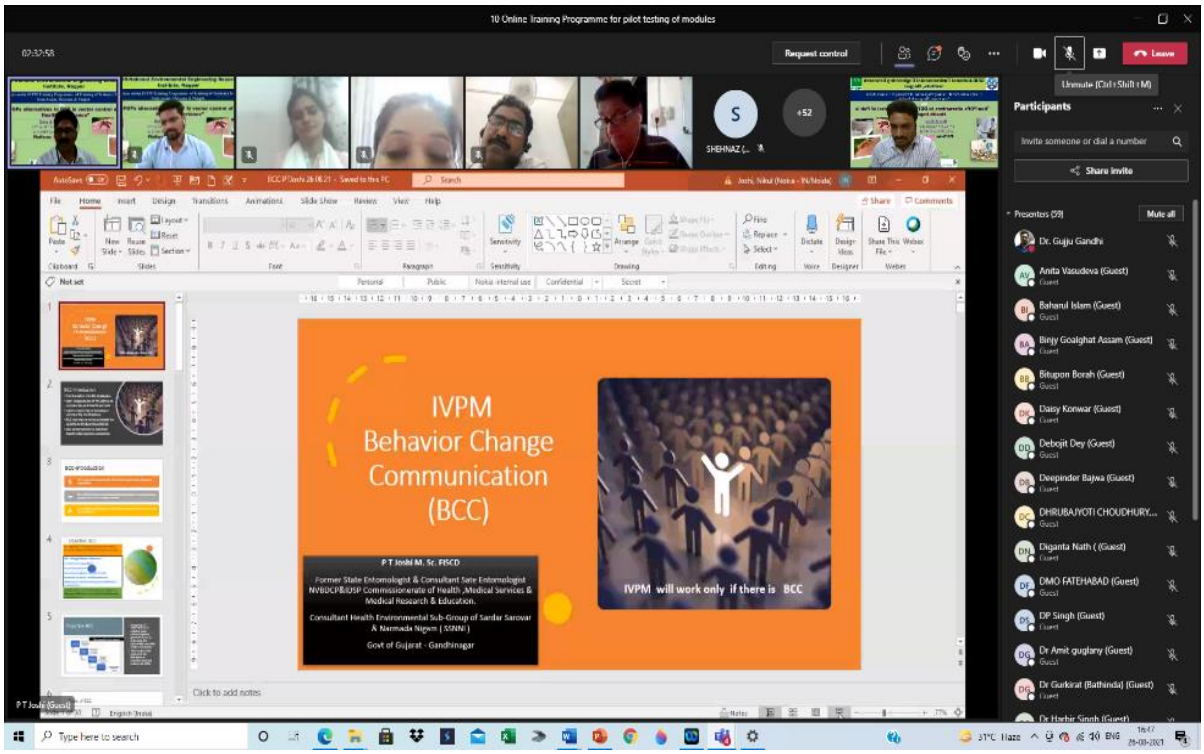


Figure – 28: Discussion photograph of lecture IVPM: Behaviour Change Communication

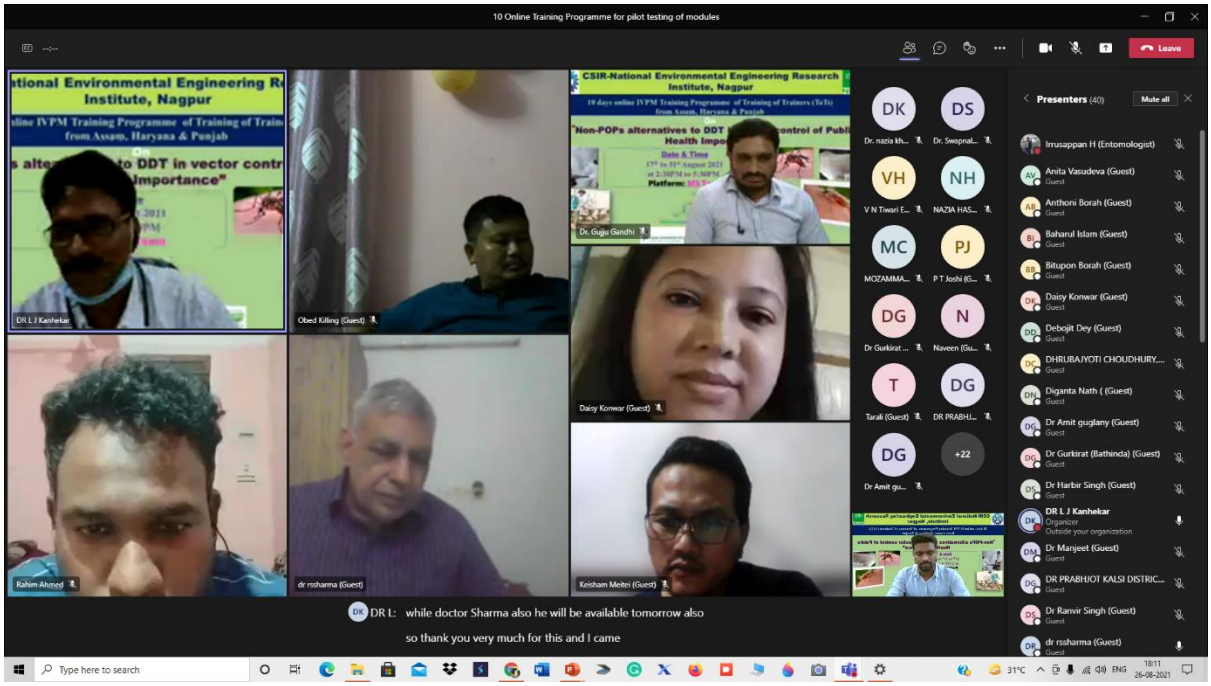


Figure – 29: Discussion photograph of lecture IVPM: Vector management through Farmer Field School approach

6.8. Training session – 8 (Day – 8 (Friday) 27/08/2021

Training part - 1: Planning and Implementation of IVPM

The first lecture of the day was deliberated by Dr. R. S. Sharma on the topic Planning and implementation of IVPM. He started with the learning objectives and introduction to the concept of IVPM. He made the participants understand the importance of entomological parameters and epidemiological assessment. The IVM implementation strategy was discussed along with the roles of various sectors in implementation of IVPM. The success story of IVPM in Sri Lanka was given as an example (Figure-30).

Figure – 30: Photograph of lecture Planning and Implementation of IVPM

Training part - 2: Monitoring and Evaluation of IVPM

The next session was conducted by Dr. Amit Katewa on the topic Monitoring and Evaluation of IVPM. An introduction to the methods of monitoring and evaluation, their outcome indicators, entomological parameters and epidemiological surveillance was given. Organization and management of IVPM, its structure within the health sectors and the indicators to monitor it were explained. Entomological surveillance including adult surveillance, collection of adult mosquitoes, collection of adult sandflies and larval collection methods were explained. Insecticide resistance monitoring through various susceptibility tests was explained. Entomological surveillance techniques for different VBDs were given (Figure-31).

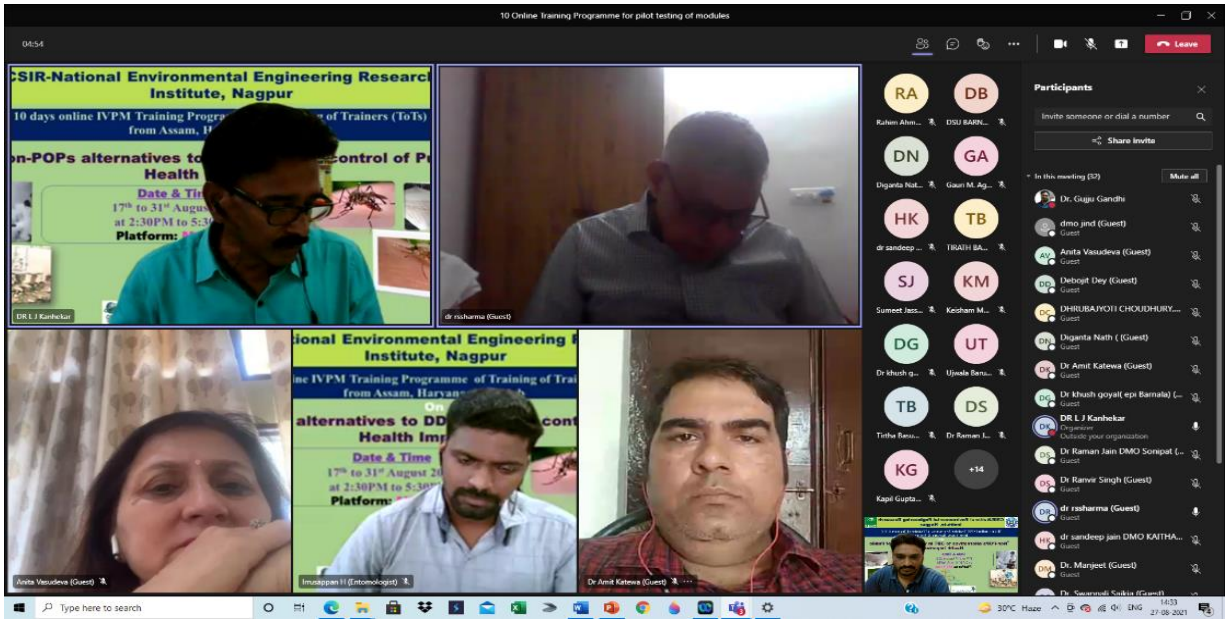


Figure – 31: Discussion photograph of lecture Monitoring and Evaluation of IVPM

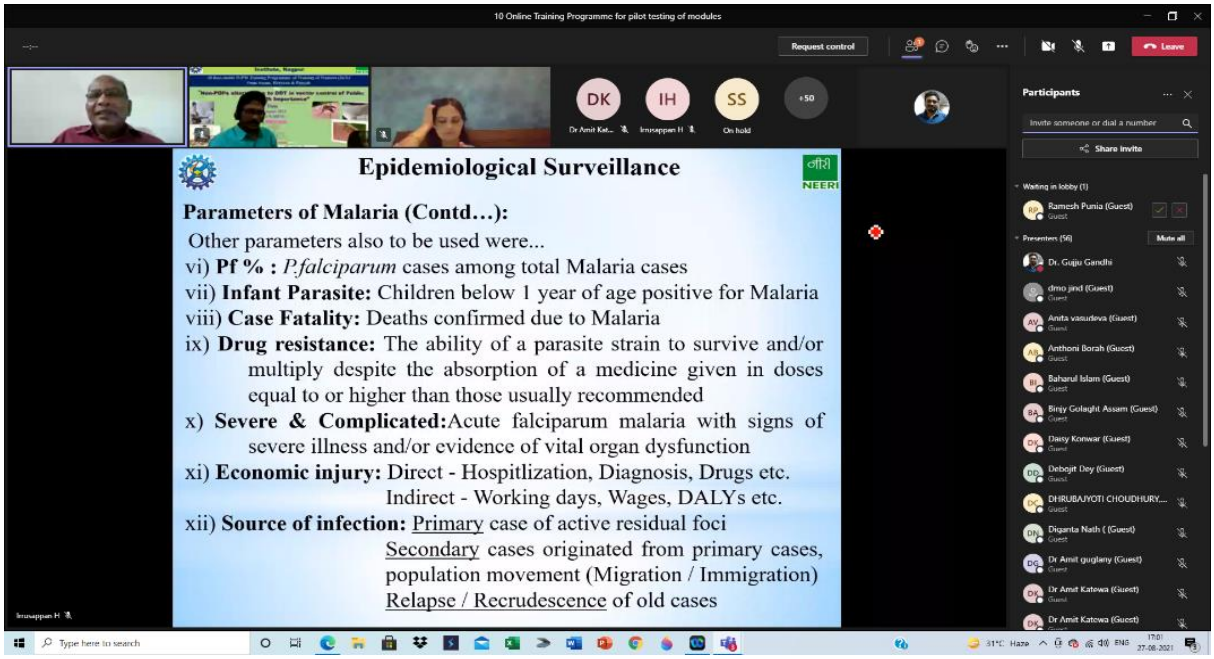


Figure – 32: Lecture of Epidemiological Surveillance

Training part – 3: Epidemiological surveillance parameters:

The third and last lecture of the day was deliberated by Dr. Ratna Joseph on the topic of Epidemiological surveillance parameters. He started with the introduction to the term 'Epidemiology' and its definition. He talked about the epidemiological assessment techniques and the epidemiological triad of VBDs. Different epidemiological surveillance methods like incidence, prevalence along with its types, ABER, API, A*f*I, SPR, S*f*R were discussed. Parameters of Malaria, LF and other VBDs were given (Figure-32).

Training session – 9 (Day – 9 (Monday) 30/08/2021)

Training part – 1: non-POPs alternatives to DDT in vector control management:

Dr. Kalpana Baruah coordinated the first session of the day on Non–POPs alternatives to DDT in vector control management. An introduction to the conventional methods of vector control was given. Environmental management including environmental manipulation and environmental modification was explained. Biological control methods like bacteria, larvivorous fishes and other vector control agents were briefed about. Certain chemical control methods too were explained. Genetic control mechanisms were explained briefly. The UNIDO project for the development of Neem products as alternatives to DDT was explained by Dr. Baruah (Figure-33).

At the end of the session, the questions mailed by participants were addressed. Ms. Ujwala Baruah, DMO, Tinsukia asked, if a person is infected with malaria spp. 'A' and travels to a place (without any medication) where spp. 'B' is prevalent, and if the vector spp. bites him, can he be able to spread the spp. 'A' infection in that area? To which Dr. Kalpana Baruah answered that if the infection is present at the ring stage, spp. 'A' infection cannot be spread; but if gametocytes are present, the transmission of spp. 'A' infection is possible if the vector species 'B' is compatible with carrying infection 'A'. Her next question was that is mixed infection possible if two vectors' mosquitoes carrying two different infections inoculate the same person or the same vector mosquito carrying two different infections bite the same person?

To which she answered that the mixed infection is quite possible in the areas of high endemicity and high vector density. Her third question was whether any genetic factor is involved in the spread of LF or just the multiple infected bites are required to get infected? Dr. Kalpana Baruah answered that there is no genetic factor involved in the spread of LF, and multiple infected bites are the sole reason for the spread of the disease. She also suggested removing 'Copepods' from genetic control measures. Also, a point was made that it should be mentioned that the commercially available Neem products are to be used for personal protection and are not recommended under the programme; and also, SIT and *Wolbachia* are not recommended under the programme and the research is ongoing.

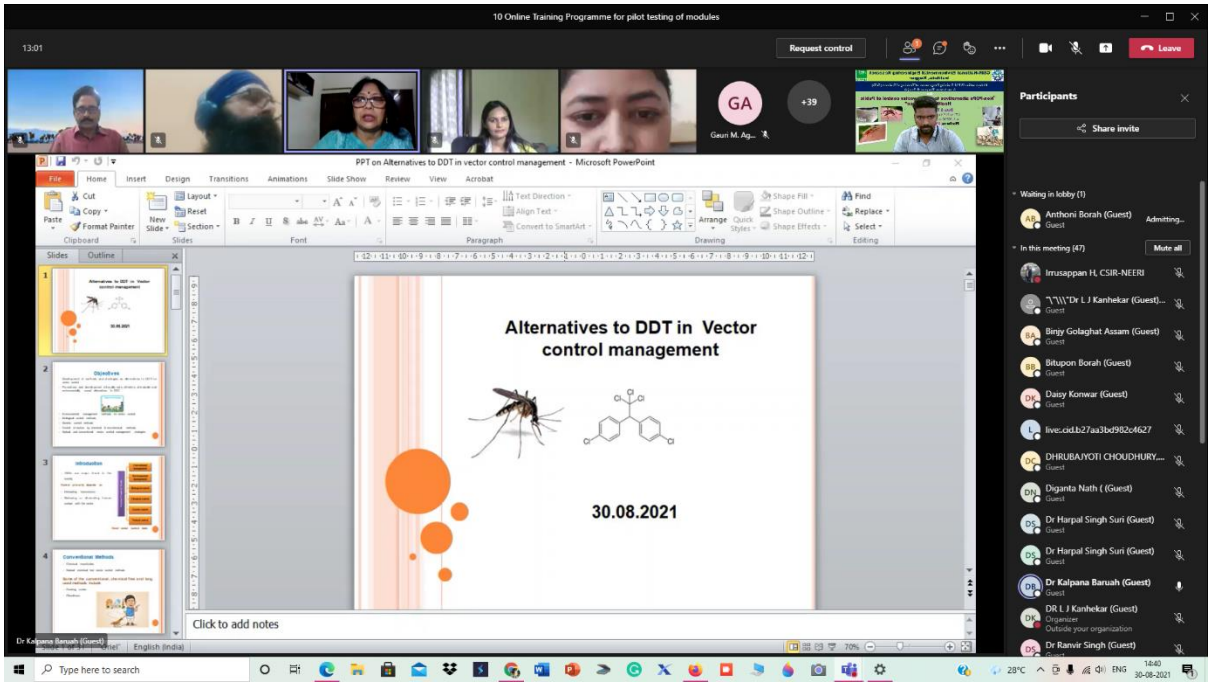


Figure – 33: Lecture of non-POPs alternatives to DDT in vector control management

Training part - 2: Report preparation: vector collection and their control:

Next session was held by Dr. Amit Katewa on the topic Report preparation: vector collection and their control. He made the participants understand the importance of report preparation, why proper annexures have to be attached and the importance of timely submission and maintaining the correct format of reporting. He deliberated about the major contents of the reports. He described some of the reporting formats followed by NVBDCP in his slides. It was conveyed that the uniform format of reporting has to be followed so that the personnel at the State headquarters finds it feasible to compile the data from different places. In the interactive session with the participants, Ms. Daisy Konwar asked what are the parameters and indices during entomological collection to which Dr. Katewa gave a proper explanation (Figure-34).

Training part - 3: Observations on training modules by SPOs of the states Assam, Punjab and Haryana and vector control measures in operation in the respective states:

The final session of the day was conducted by Dr. R. S. Sharma, in which he had an interaction with the participants, the SPOs and VBD consultants about their observations, suggestions and queries regarding the four training modules and the ongoing vector control methods in the respective States. SPO, Assam, Dr. Harpal Singh Suri shared his experience regarding JE vaccination and adult immunization carried out in the endemic block in Assam. He also suggested including some portion for 'Outbreak Management' in the training modules. SPO, Haryana, Dr. Seema Karan Singh stated that the modules are beneficial at the field levels and due to the simple and lucid language used, the people who are new and not from the public health background too, will be able to understand the contents of the modules easily. She also brought to the notice that the most basic concepts like mosquitoes as vectors and their control are included in the modules, which will sensitize the participants about what to do in the field. From Punjab, Dr. Nazatinder Singh said that the modules have been received at the state level and after going through the modules, changes or suggestions will be given to the CSIR-NEERI team (Figure-34).

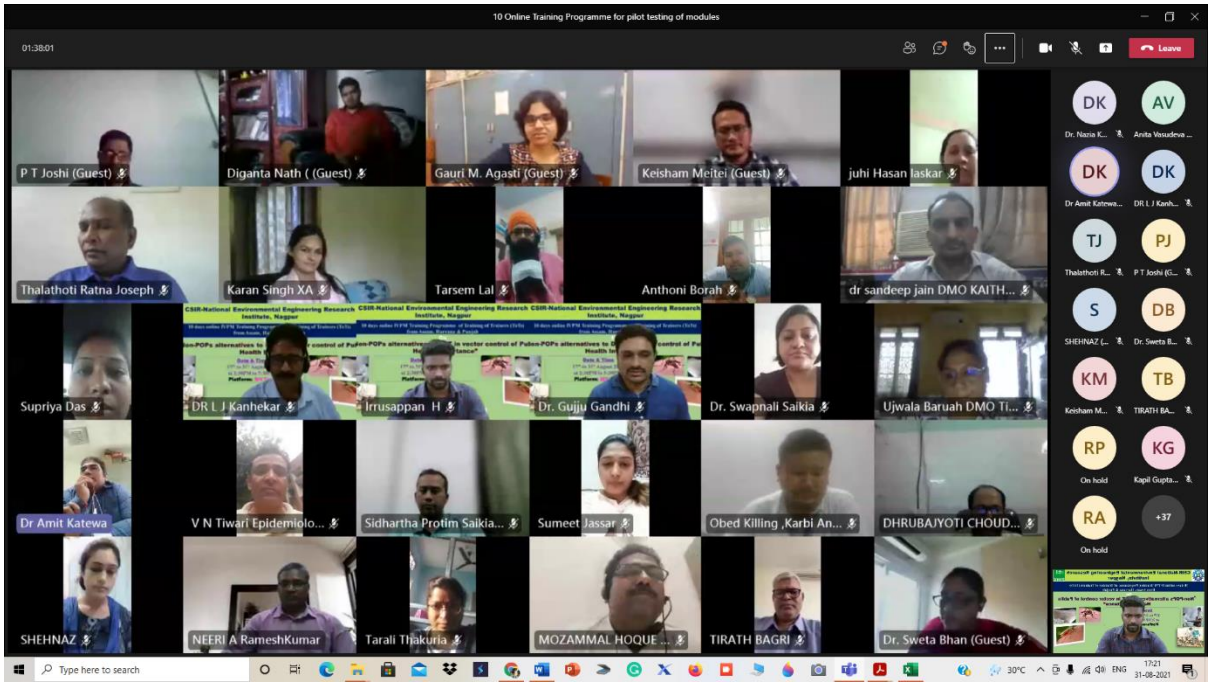


Figure – 34: Screenshot of end of training session-9

Training session – 10 (Day – 10 (Tuesday) 31/082021)

Training part - 1: Pilot Testing of Modules 1 and 2: inputs from participant trainees

On the last day of the training programme, inputs from the participants were seeked regarding the four training modules, the FAQs and the IEC material. All the modules were reviewed page by page in the meeting. Dr. L. J. Kanhekar explained that the inputs from the participants are very important because their changes and suggestions will be reviewed by the experts and the modules will be edited accordingly. Dr. Obed Killing found the modules perfect to carry on and he said that the modules are compiled in such a way that the wide range of topics has been covered including the ticks and mites as well. Dr. Sweta Bhan suggested that in Table no. 1, one more column can be added mentioning the year in which the chemicals came into use. She also suggested adding a paragraph stating the effects of DDT poisoning on the environment, humans and animals. She questioned regarding the term 'causative agent' as according to her, vector is not the causative agent of the disease; to which Dr. Sharma answered that in Malariology, the term 'causative agent' is used in the broad sense covering the pathogen as well as the vector (Figure-35).

Dr. Sandeep Jain, DMO, mentioned that the modules seem monotonous and that the bi-column styling should be used instead of mono-column styling to make the modules attractive. He also suggested changing the font style and using more colours in the modules. Dr. R. S. Sharma suggested mentioning the incubation interval in Malaria Transmission Cycle. Dr. Nazia Hassan suggested incorporating the portion of 'Outbreak Management' in the modules and also mentioning the success stories of some countries that brought down the disease cases using IVPM in Module no. 4.

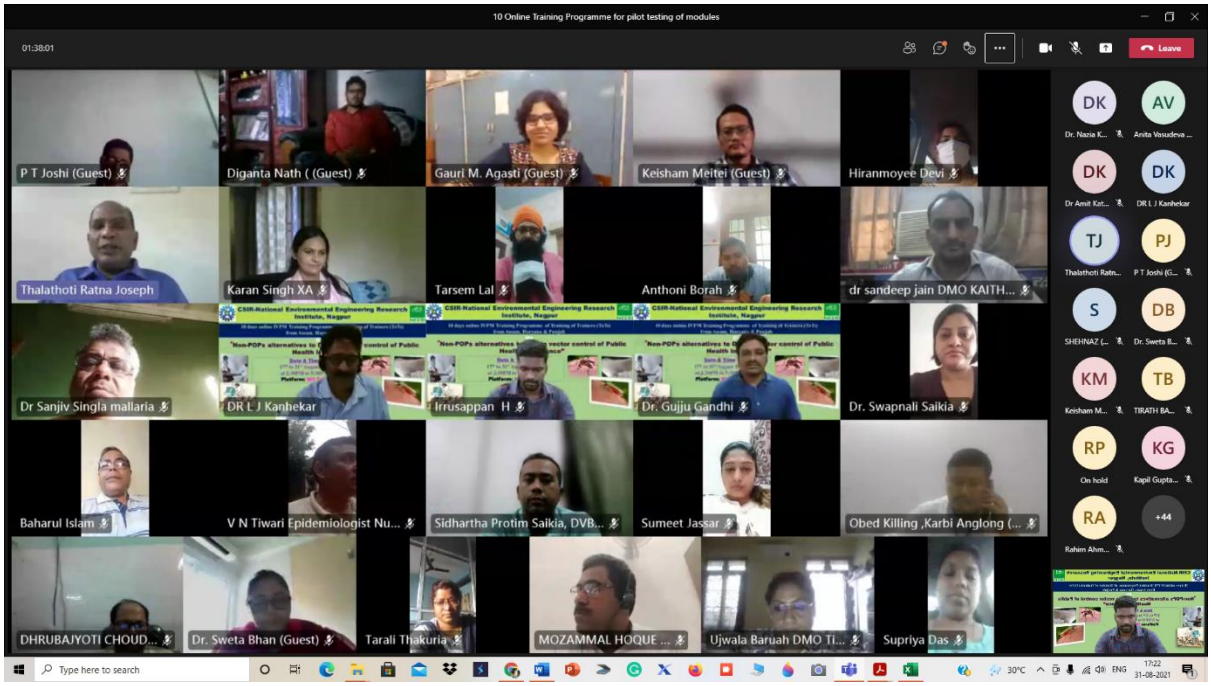


Figure – 35: Screenshot of discussion on Pilot Testing of Modules 1 and 2: inputs from participant trainees

Training part - 2: Topic: Pilot Testing of Modules 3 and 4: inputs from participant trainees:

Dr. Ratna Joseph coordinated the next session in which inputs regarding modules 3 and 4 were seeked from the participants. He explained that the main focus of the modules is on the phasing out of DDT and not the medical aspects of the VBDs like signs, symptoms, diagnosis and treatment. He briefed about all the contents covered in module no. 3 and 4 and also stated that the reviews can be critical and of focused agenda. Dr. Seema Karan Singh, Haryana, mentioned that the basic as well as the technical knowledge has been covered in the modules.

All the participants stated that even the community doesn't want to use DDT and eeds alternatives to DDT. Dr. Shehnaz asked whether the intersectoral collaboration is important in vector control management, while giving an example of intersectoral collaboration in rural areas for dengue control; to which Dr. Joseph replied that any department and any sector can be linked with vector control management. Dr. Sweta Bhan, seeked clarification on LLNs and HIL; to which, Dr. Kalpana Baruah replied that LLNs are the Long-Lasting Nets produced and marketed by Hindustan Insecticides Limited (HIL) (Figure-36).

Introduction to the contents of Module no. 4 was given by Dr. P.T. Joshi. He stated that this module is very important in the operational point of view. Dr. Nazatinder Singh suggested adding one table regarding the droplet sizes of the nozzles. He also commented on the nozzle discharge pattern.

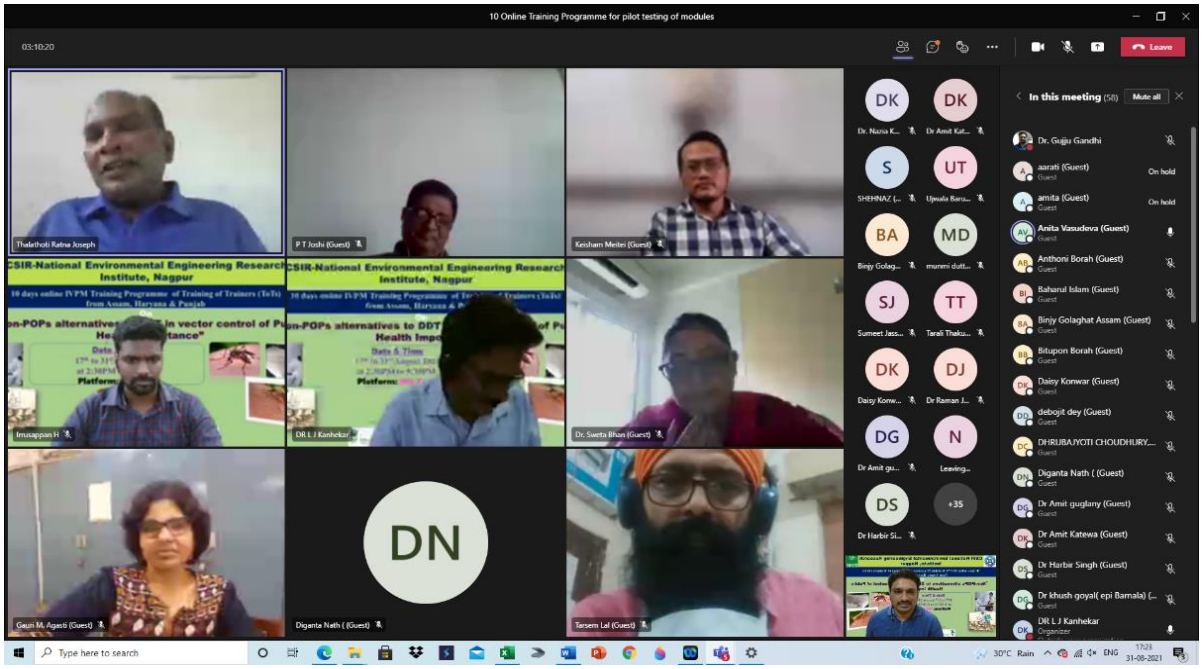


Figure – 36: Screenshot of discussion on Pilot Testing of Modules 3 and 4: inputs from participant trainees

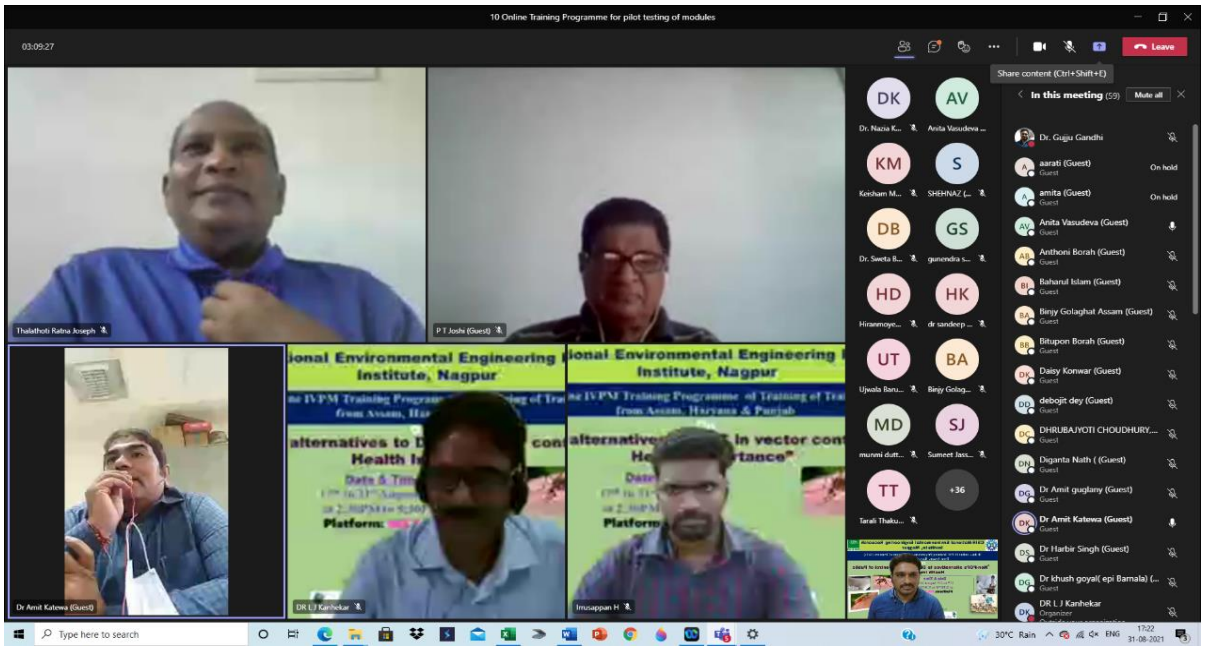


Figure – 37: Screenshot of discussion on FAQs and IEC material

Training part – 3: Discussion on FAQs and IEC material:

Dr. Amit Katewa and Dr. Ratna Joseph conducted a discussion on the FAQs and the IEC material prepared. Dr. Joseph explained that the FAQs are general questions providing the basic introduction to the subject for common people and people outside the health departments. Participant trainees seeked clarifications from the experts regarding the topics like Malaria transmission cycle and mosquitogenic conditions. Dr. Baruah suggestion removing the terms Haemorrhagic Fever (HF) and Dengue Shock Syndrome (DSS) as these terms are no longer in use. Dr. sweta Bhan suggested adding number of vector species prevalent in India in the

Mosquito FAQs. Dr. Amit Katewa suggested translation the IEC material in local languages so that it will be easy for common people to understand. Dr. Joseph suggested editing the term 'Mosquito- The killer' in one of the posters. In the poster of ABCD against Malaria, Dr. Swapnali Saikia suggested pasting a picture of people sleeping under the bed nets and not of the mosquito spray.

7.0. Feedback from participant trainees and instructions:

Dr. L. J. Kanhekar highlighted the importance of participants' feedback on the training programme conducted and requested the participants to fill the feedback forms. Dr. Gujju Gandhi explained the procedure of filling and sending the feedback forms through e-mail.

8.0. Virtual valedictory session

At the end of the training programme, Dr. A. Ramesh Kumar conveyed the vote of thanks and requested the participants to go through the training modules and mail the CSIR-NEERI team regarding their suggestions and changes to be incorporated in the modules.

9.0. Annexures

10.1. List of organizing members

1. **Dr. A. N. Vaidya,**
   Coordinator, Stockholm Convention Regional Centre,
   HOD, Chemical and Hazardous Waste Management Division,
   CSIR – National Environmental Engineering Research Institute.

2. **Dr. A. Ramesh Kumar,**
   Sr. Scientist, (Project Leader)
   CSIR – National Environmental Engineering Research Institute.

3. **Dr. L. J. Kanhekar,**
   Project Consultant & Training Co-ordinator,
   CSIR – National Environmental Engineering Research Institute.

4. **Dr. Gujju Gandhi,**
   Project Research Associate II,
   CSIR – National Environmental Engineering Research Institute.

5. **Mr. Irrusapann. H,**
   Project Associate-II (Entomology)
   CSIR – National Environmental Engineering Research Institute.

6. **Ms. Gauri Agasti,**
   Project Associate-I
   CSIR – National Environmental Engineering Research Institute.

10.2. List of faculties

1. **Dr. R. S. Sharma,**
   Ex. Additional Director,
   National Centre for Disease Control

2. **Dr. P. K. Srivastava**
   Ex-Joint Director,
   Directorate of National Vector Borne Disease Control Programme

3. **Dr. Kalpana Baruah**
   Addl. Director,
   Directorate of National Vector Borne Disease Control Programme

4. **Dr. Amit Katewa,**
   National Consultant,
   Directorate of National Vector Borne Disease Control Programme.

5. **Dr. Himmat Singh,**
   Scientist – D,
   ICMR - National Institute of Malaria Research.

6. **Dr. Vijay Kumar,**
   ICMR- Consultant, (Ex- Scientist E),
   ICMR-Rajendra Memorial Research Institute of Medical Sciences.

7. **Dr. N. Balakrishnan,**
   Ex-Joint Director,
   National Centre for Disease Control.

8. **Dr. P. T. Joshi,**
   Ex- State Entomologist, Gujarat state.

9. **Dr. T. Ratna Joseph,**
   Ex-Deputy Director,
   Government of Andhra Pradesh.

10. **Dr. Y.P. Ram dev,**
    National Technical Adviser,
    United National Industrial Development Organization.

11. **Dr. Regu**
    Joint Director,
    National Centre for Disease Control.

10.3. List of Participants – Meghalaya, Mizoram and Tripura

Training of Trainers (TOT) and pilot testing of modules to promote non-POP alternatives based Integrated Vector Pest Management

Training dates :17-08-2021 to 31-08-2021 (2.30PM to 5.30 PM)

Assam		
S.No	**Name**	**Designation**
1	Dr. Harpal Singh Suri	Jt. DHS (Malaria) cum SPO NVBDCP, Assam
2	Dr. Rabindra Nath Talukdar,	Assistant Director of Health Services (Entomology)
3	Mr. Gunendra Saikia	(DVBDC)
4	Mr. Tirtha Basumatary	AMO
5	Dhrubajyoti Choudhuri	DVBDC
6	Juhi Hasan Laskar	DVBDC
7	Mr. Mozammal Hoque Choudhury	DVBDC, NVBDCP
8	Rahim Ali Ahmed,	DVBDC
9	Sri Anthoni Borah	DVBDC
10	Dr. Nazia Khatun	DVBDC
11	Sri.Sidhartha Protim Saikia	DVBDC
12	Dr. Keisham Vivekananda Meitei,	DVBDC
13	Tarali Thakuria	DVBOC, NVBDCP
14	Mrs. Bijjy Yasmin Rahman	
15	Nurjahan Begum Laskar	DVBDC
16	Munmi Dutta	VBD Consultant, NVBDCP
17	Smti Swapnali Saikia,	DVBDC
18	Shri Rituparna Rajkumar,	District Malaria Officer,
19	Mr. Obed Killing,	DVBDC
20	Debajit Dey	DVBDC,
21	Mr. Baharul Islam,	District VBD Consultant,
22	Dr. Bitupon Borah,	DVBDC
23	Ms. Supriya Das	DMO
24	Mrs. Shehnaz Begum	District V.B.D. Consultant
25	Hiranmoyee Devi,	DVBDC
26	Mrs. Daisy Knowar,	DVBDC
27	Mr. Diganta Nath	DVBDC
28	Mrs. Ujwala Boruah	DMO
29	Nazia Hassan	DVBDC

Punjab		
S.No	**Name**	**Designation**
1	Dr. Gagandeep Singh Grover	SPO. NVBDCP
2	Dr. Preeti Thaware	M.O. NVBDCP
3	Mr. Nazatinder Singh	State Entomologist, NVBDCP
4	Mr. Deepinder Singh	Entomologist, ZMO Ferozepur
5	Mrs. Amritpal Kaur	Entomologist, ZMO Patiala
6	Ms. Sumeet Jassar	Entomologist, ZMO Jalandhar
7	Dr. Madan Mohan	Epidemiologist
8	Dr Munish	Epidemiologist
9	Dr. Gurkirat Singh	Epidemiologist
10	Dr. Harbir Singh	Epidemiologist
11	Dr.Amit Guglany	Epidemiologist
12	Dr. Harinder Singh	Epidemiologist
13	Dr. Harjot Kaur	Epidemiologist
14	Dr. Prabhjot Kaur	Epidemiologist
15	Dr. Davinderpal Singh	Epidemiologist
16	Dr. Aditya Pal	Epidemiologist
17	Dr. Rajiv Bhagat	Epidemiologist
18	Dr. Ramesh Kumar	Epidemiologist
19	Dr. Arshdeep Singh	Epidemiologist
20	Dr. Manish Arora	Epidemiologist
21	Dr. Seema Goyal	Epidemiologist
22	Dr. Sumeet Singh	Epidemiologist
23	Dr. Mohit Sharma	Epidemiologist
24	Dr. Vikrant Nagra	Epidemiologist
25	Dr. Jagdeep Sing	Epidemiologist
26	Dr. Sunvir Rai	Epidemiologist
27	Dr. Sakshi	Epidemiologist
28	Dr. Neha Agarwal	Epidemiologist

Haryana		
S.No	**Name**	**Designation**
1	Dr. Sanjeev Singla,	DMO
2	Sh. Naveen Kumar	Biologist
3	Dr Dheeraj Yadav,	DMO
4	Dr. P K Arora,	Biologist
5	Dr. Hanuman Singh,	DMO
6	Dr. Sudha Garg,	DMO
7	Sh. Ramesh,	Biologist

8	Dr Ranvir Sing,	DMO
9	Dr.JK Maan,	DMO
10	Dr. Sandeep,	DMO
11	Mrs. Pinki,	Biologist
12	Dr.Sudesh Kumar ,	DMO
13	Sh. Vimlesh,	District Epidemiologist
14	Dr. Parmananad,	Biologist
15	Sh. Manjit,	District Epidemiologist
16	Mrs. Anita vasudeva,	Biologist
17	Mrs. Tanuja,	District Epidemiologist
18	Dr Vishal Rao,	DMO
19	Dr Anupama,	DMO
20	Dr Harsimran,	DMO
21	Dr. Raman Jain	DMO
22	Mrs. Amita,	Zonal Entomologist
23	Dr. Rakesh Saini,	DD (VBD)
24	Mrs. Seema Singh,	State Entomologist
25	Mrs. Arti,	Zonal Entomologist

NCDC		
S.No	**Name**	**Designation**
1	Dr Sweta Bhan	Dy. Assistant. Director