CSIR – National Environmental Engineering Research Institute, Nagpur

10th Training Programme Report

On

Five days offline Training Programme for Pilot testing of Modules and ToT (SPO/ Entomologists/FCO/Biologists and VBD Consultants from Uttar Pradesh) to promote non-POPs alternatives to DDT based on Integrated Vector Pest Management

Venue: ***Hotel Comfort Inn, Gomti Nagar, Lucknow***

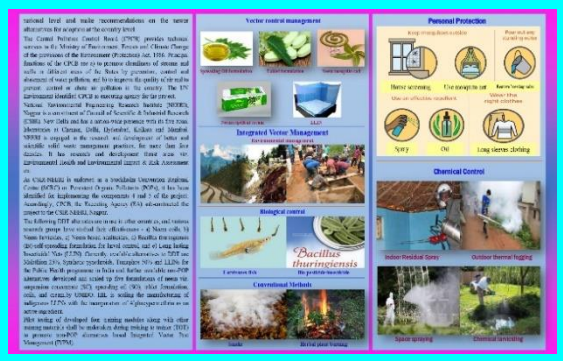
Date: 18/07/2022 to 22/07/2022

Time: 09:30 AM to 05:30 PM


TRAINING OF TRAINERS AND PILOT TESTING OF MODULES TO PROMOTE NON-POP ALTERNATIVES BASED INTEGRATED VECTOR PEST MANAGEMENT

Development and promotion of non-POPs alternatives to DDT

CSIR-National Environmental Engineering Research Institute



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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
RNA	Ribonucleic Acid
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

1.0 Introduction

Stockholm Convention (SC) is an international treaty for the protection of human health and the environment from harmful Persistent Organic Pollutants (POPs). The 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 fulfilling its obligations under the Convention, prepared its National Implementation Plan (NIP) and submitted it to the Secretariat of the Stockholm Convention on 21 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 require 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 NCVBDC, 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 Centre for Vector Borne Disease Control (NCVBDC), 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.

2.0 Training Objectives

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, vector-borne diseases transmission, 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.

3.0 Training Programme

This training programme was conducted for 05 days from 18/07//2022 to 22/07/2022, the total number of the training sessions were 05 and each session has 6-10 training parts. 27 participants from Uttar Pradesh were selected including SPO, State Entomologists, FCOs, Biologists and VBDC participated in the training programme. Dr. L. J. Kanhekar, Project Consultant, coordinated all the training sessions. The training contents were from CSIR-NEERI developed 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 as a part of pilot testing under the project "Development and promotion of non-POPs alternatives to DDT."

3.1 Registration

On 18th July 2022 09.00 AM twenty-six participant trainees were registered and training materials *viz.* four training modules, four training booklets, FAQs book, IEC materials, 64 GB pen drive, bag and stationery were provided to them.

3.2 Inaugural Function-Welcome Address

Inaugural function of the 10th five-day training programme for Training of Trainers (ToT) and pilot testing of modules to promote non-POPs alternatives to DDT based on Integrated Vector and Pest Management (IVPM) was held on 18th July 2022 at Hotel Comfort Inn, Gomti Nagar,

Lucknow, Uttar Pradesh. Dr. A. Ramesh Kumar (Project Leader and Senior Scientist, CHWMD, CSIR-NEERI) on behalf of Dr. A. N. Vaidya, Director, CSIR-NEERI warmly welcomed Dr. A. K. Singh (Chief Guest), Director, Communicable & VBD, DHS, Lucknow, U.P.; Dr. R. C. Pandey (Guest of honour), Addl. Director, & SPO (VBD), DHS, U.P.; Dr. A. K. Yadav, Joint Director & SPO (Malaria), DHS, U.P.; Dr. R.S. Sharma, Former Addl. Director, NCVBDC & NCDC; Dr. PT Joshi, Former Entomologist, Gujarat State; Dr. Ramesh Chandra, former State Entomologist, U.P., and all the participant trainees. Dr. A. Ramesh Kumar delivered an introductory speech and briefly introduced about the training programme under the project "Development & promotion of non- Persistent Organic Pollutants (PoPs) alternative to DDT". The project is being funded by GEF-UNEP. India is the sole manufacture of DDT at M/s HIL(India) Ltd. at Rasayani, Dist. Raigad, Maharashtra. DDT has been used in vector control programme, due to the adverse effect of DDT on environment as well as human health various International Agencies like-WHO, UNEP etc. working towards replacing DDT in public health programme with some alternatives. CSIR-NEERI has developed four training modules and several training materials for pilot testing & capacity building of state vector control officials. This is the 10th training programme. So far, CSIR- NEERI has completed nine (09) training programmes in total 18 States including 01 U.T. (08 of them in online mode due to Covid-19 restrictions and 01 training programme in offline mode). We have the best expert faculty with us, so with their vast knowledge ensure that all the participants will get more exposures on VBDs as well as various control measures and the alternatives that are being developed under this project for the use of vector control. In this training programme your valuable interaction with experts to further improve the training modules shall be helpful.

Dr. A. K. Yadav, Joint Director & SPO(Malaria), DHS, U.P. welcomed all the renowned dignitaries and participants for taking keen interest in this training programme. As the State is heading towards malaria elimination to achieve this, we bring down to zero indigenous cases by 2027 and sustain it for the next 3 years, as the deadline is 2030 for malaria elimination, so this kind of training will be beneficial for the trainees to achieve our goal of malaria elimination as well as other VBDs. I hope that you all will be enriched with knowledge after completion of this 5 days event and thanked CSIR-NEERI to conduct this training programme in the State.

Dr. R. C. Pandey (Guest of honour)**,** Addl. Director, & SPO (VBD), DHS, U.P. has inaugurated this training programme by releasing the training modules to promote non-POPs alternatives based on IVPM **(Exhibit-1)**. He also welcomed all the dignitaries, all the participant trainees and thanked to being part of this training programme. As you all are aware that our U.P. State

is contributing to the resolution of malaria elimination programme started by the Govt. of India and other VBDs also. This training programme is conducted for the development and promotion of non-PoPs alternatives to DDT. Like other countries, India is also looking forward and work hard to completely phaseout DDT use in our VBDs control programme as early as possible. I hope all the participant trainees will learn new aspects from this training programme and utilize it in their respect districts. At the end, he thanked and conveyed best wishes to all the participants in this training programme.

Dr. R. S. Sharma, Former Addl. Director (NCVBDC & NCDC) welcomed the Chief guest, SPO (Malaria), Officers from DHS, Lucknow, and all the participant trainees of U.P. State. Uttar Pradesh State has been facing three VBDs as Malaria, Kala-azar, Lymphatic filariasis. He praised all the DMOs, SPOs, & Entomologists of U.P. for their continued hard work and efforts to eliminate VBDs and hope that they will achieve success with this approach. He recommended strengthening active surveillance of any VBDs and abiotic factors which is a challenging task. He also congratulates CSIR-NEERI for their hard work and efforts in the preparation of four training modules. He thanked all the participants to join this training and suggested to share their knowledge and input with us to make these modules more feasible and understandable.

Dr. Sudesh Kumar, State Entomologists, U.P. has welcomed all the guests and participant trainees of the Uttar Pradesh State and conveyed thanks to Dr. R.S. Sharma & CSIR-NEERI team to give this opportunity.

Dr. A. Ramesh Kumar (Project Leader and Senior Scientist, CHWMD) on behalf of CSIR-NEERI has expressed his gratitude to the chief guest and other dignitaries. Dr. L.J. Kanhekar has briefly introduced about the objectives of this training programme which includes- training of trainers (ToTs), pilot testing of these modules to rectify any additions and deletions to be made and Capacity building of trainers and proposed the vote of thanks. **(Exhibit- 2)**.

Exhibit-1: Inaugural Session

Exhibit-2: Group photo of 10th ToT programme

4.0 Training sessions

The total training sessions were 5, each session covered 6-10 parts and each part was conducted for approximately 30-40 minutes and the time was managed depending on a questionary discussion at the end of the session. Every session was conducted as per the timetable of the training programme.

4.1 Training session-1 (Day-1: Monday-18/07/2022)

On the first day (**Exhibit-3**) Dr. L. J. Kanhekar deliberated on the training modules 1 to 4 and their content. He informed that training modules were made available to all the participants in form of module, training booklets, PPT on each module & its content, IEC materials and FAQ's. He deliberated the focus of CSIR-NEERI on successful implementation of pilot testing

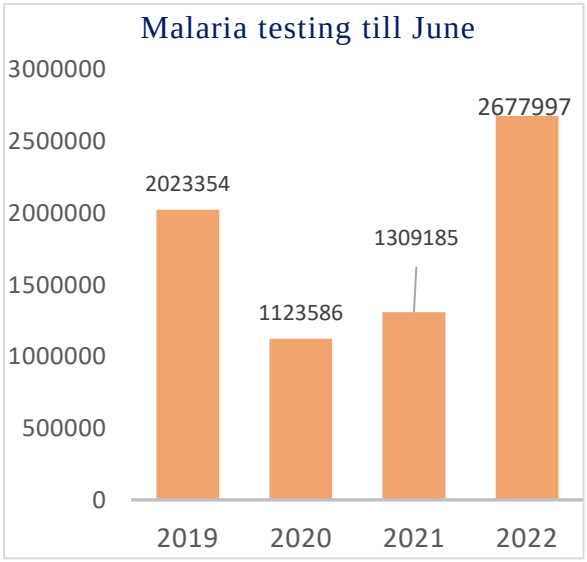
of these training modules (1-4). He suggested to all the participants to provide suggestions/ comments to edit for the perfection of training modules.

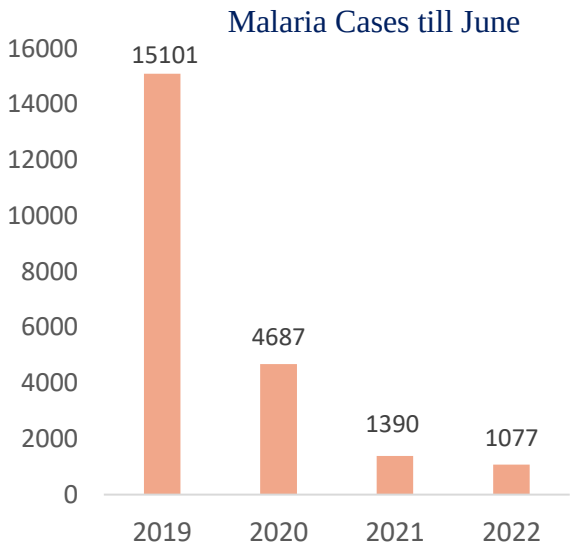
Training Modules 1 to 4

Dr. A. Ramesh Kumar deliberated on DDT and its use in Vector Control and explained Stockholm convention on PoPs, what is DDT; Historical use of DDT; Why DDT needs phase-out; Monitoring study of DDT concentration in Human milk; WHO action plan for the

reduction of dependence on DDT in disease vector control; Overview of Stakeholders; Current scenario of DDT production and use in India, State-wise consumption of DDT (2019-2020); Development and promotion of non-PoPs alternatives to DDT and alternatives to chemical pesticides in vector control programme.

Dr. R. C. Pandey, Addl. Director, & SPO (VBD), U.P. and Dr. Sudesh Kumar, State Entomologists, U.P. made presentation on Entomological and epidemiological situation in Uttar Pradesh. Discussed on U.P. State Targets & Achievements (2018- June 2022); Status of Malaria in U.P. in different years (2010-2021); Vision- Malaria elimination by 2030; VBDs and its Elimination Target in U.P.; Zonal Entomological units in U.P.; Situation of Malaria in U.P.-





Dr. R. S. Sharma deliberated on Malaria, its causative agents (*Plasmodium* Parasite *P. falciparum, P. vivax, P. ovale, P. malariae*) and its transmission with its global burden. Current status according to National Strategic Plan: Malaria elimination mode supported by organisation like NCVBDC, NCDC, NIMR etc., as per National framework for malaria elimination cases has been gradually decreasing from 2006 to 2020 approx. 70% decline. Malaria ecosystem: Malaria system & Malaria sub system (Abiotic factor: Temperature, Humidity & Biotic factors: Parasite & Mosquitoes & their interaction); WHO documentation on Malaria elimination framework for Urban area.

A discussion was made on VBD- Japanese Encephalitis and Chandipura Virus by Dr. P. T. Joshi and he deliberated on causative agents: a virus (Flavivirus) and J.E. vectors in India, key players in JE transmission: Environment, Vector-Agent, Host (amplifying): Pig, Host carrier: birds & human incidentally; Transmission Cycle of J.E. Virus (Natural transmission, horizontal

& vertical transmission); Epidemiology: Epidemic patterns & Endemic patterns; Burden in India (JE endemic states, JE cases & deaths) and global disease burden; Prevention & Control.

Chandipura virus (CHPV) with its prevalence in India and at global level. Chandipura virus belongs to the genus Vesiculovirus placed in the order of Mononegavirales of Rhabdoviridae family. The vector is female sandfly, *Phlebatomus papatasi* and Host: Human, other vertebrates, camel, Goat, arthropods etc. He deliberated on outbreaks of Chandipura virus infection, isolation of CHPV and its transmission.

Dr. L. J. Kanhekar has deliberated on Morphology and Bionomics of Anopheline and Culicine Vector Mosquitoes, mosquito vectors: *Anopheles, and Mansonia* spp.; Classification of mosquitos; Morphological characters of mosquitoes. vectors of malaria: *Anopheles* mosquito (*Anopheles culicifacies, An. stephensi, An. fluviatilis, An. minimus, An. dirus (baimai), An. epiroticus*); Morphological characters, classification (egg, larva, pupa and adult), vector biology (life cycle of vector mosquitoes) and ecology (Distribution, breeding places etc.); Vector of Brugian filariasis - *Mansonia spp.* Mosquito & its external morphology (egg, larva, pupa, adult); Vector biology and Vector ecology.

Dr. Kalpana Baruah, Former Addl. Director (NCVBDC) described vector borne disease: Dengue, Chikungunya & Zika- What is Dengue? It's form, Sign and symptoms; Causative agent: *Flavivirus* (Four strain- DEN-1, DEN-2, DEN-3 & DEN-4); Vector: *Aedes* Mosquitoes (Primary- *aegypti* & Secondary- *albopictus*); Transmission cycle of Dengue: Forest/Enzootic, Rural/Epidemic & Urban/Endemic/Epidemic; *Chikungunya* & its symptoms: fever, chills, headache, nausea, vomiting, severe joint pain, rashes; Causative agent: *Alphavirus*; Vectors: *Aedes* Mosquitoes (*Aegypti, Albopictus*); Transmission cycle of Chikungunya: Sylvatic CHIKV transmission and Urban CHIKV transmission; Burden in India and global burden.

She also commented on Zika, its history: 1st isolated in 1947 from a rhesus monkey in Kampala, Uganda from Aedes Africanus mosquitoes and its sign & symptoms, Causative agent: *Flavivirus*; Vectors: *Aedes* Mosquitoes (*aegypti, albopictus, vitattus, furcifer, africanus* & a*picoargenteus*); Birth complications: Microcephaly, Guillain-Barre syndrome; Incubation and Viremia- incubation period of zika virus 3 to 14 days; Transmission of Zika virus: Vector transmission and Non-vector transmission; Burden in India and global burden of Dengue, Chikungunya and Zika.

Dr. Ramesh Chandra, Former State Entomologists, U.P. explained (Exhibit-3) types of equipments for Larviciding and Adulticiding- Equipment used for Larviciding- a) Knapsack

pump & b) Hand Compression pump; Equipment for Adulticiding- a) Stirrer pump, b) Fogging machine: Cold and Thermal- i) Portable and ii) Vehicle-mounted; c) Atomizer and d) Finit Pump. During this session, he discussed all the equipment parts, its working and application.

Exhibit-3: Photographs of Training session-1

4.2 Training session-2 (Day-2: Tuesday-19/07/2022)

On the second day (**Exhibit-4**), Dr. P T Joshi introduced Crimean Congo Hemorrhagic Fever (CCHF), History of CCHF; Causative agent (*Nairovirus* of the family *Bunyaviridae* and vector-*Hyalomma* ticks), Transmission (Transovarial and Transstadial transmission), Epidemiology and major risks factors; Major outbreaks in India and extensive global geographic distribution; Tick life cycle: Egg→ Larva→ Nymph→Adult; *H. anatolicum*, *H. asiaticum*, *H. dromedarii*, *H. impeltatum*, *H. marginatum*, *H. rufipes* and *H. truncatum*, potential vectors for acquiring, maintenance and transmission of CCHFV- *H. turanicum*; Controlling CCHF in animals & ticks, Insecticide recommended for the control of ticks (Malathion, Dichlorvos, Carbaryl etc.); Reducing the risk of tick to human transmission, animal to human transmission, human to human transmission.

Dr. Ramesh Chandra introduced VBDs- Lymphatic Filariasis its Causative agent (Filarial worm: *Wuchereria bancrofti*, *Brugia malayi*), Micro Filaria periodicity (Nocturnal Periodicity, Diurnal Periodicity), Transmission and life cycle (in human and mosquito body), Vector: *Culex quinquefasciatus, Mansonia annulifera* and *Mn. uniformis*. He also discussed national and global burden of Filariasis, its history in India, salient features of the vector life cycle, elimination of Lymphatic Filariasis, Species of filarial infections prevalent in India, current status of Lymphatic Filariasis in India, Differences between *W. bancrofti* and *B. malayi* species, Filariasis disease manifestation (acute & chronic).

Dr. Himmat Singh, Scientist-D, ICMR-NIMR elaborately explained entomological surveillance of VBDs, entomological parameters and its importance - Methods: detection & monitoring of larval and adult population- Collection of Adult mosquito, Larval collection & Eggs; Methods- Qualitative and Quantitative; Vector Traps for disease surveillance & Surveillance tools; Sampling methods of larval collection- Netting method (surface collection), Dipping method; Siphoning method (Tree hole), well net collection, Larval collection by dropper/ pipettes.

He also gave brief introduction about Entomological parameters and their importance: Adult vector parameter; Entomological Indices: Malaria vector density; Vector incrimination; Mosquito life expectancy (longevity) etc.; Flea: Total flea index, percentage of hosts infested, Burrow index; Larval Survey: Indicator (Density of immatures), larval density, Pupal density; Dengue Larval survey- a) House Index, b) Container Index, c) Breteau Index, d) Pupae Index; Entomological Survey of Lymphatic Filariasis: Ten Man-hour Vector density, infectivity rate, infection rate, mean number of L3/infective mosquito).

Legal associate Ms. Mansi Bachani, Enviro Legal Defence Firm (ELDF) on behalf of Adv. Sanjay Upadhyay explained the Legal perspective to the development of IVPM training materials. She commented on overview of training modules developed by CSIR-NEERI for implementation of IVPM programme, which should conform to the law of the land. The legal chapter on Gap analysis and Action Plan covers the International Laws such as Stockholm Convention on PoPs as well as Insecticides Acts and Rules. National Implementation Plan for assistance and capacity building for the NVBDCP programme; Aspects of specific enviro legal laws that governs various alternatives to DDT- framework for control and prevention of pollution under the Environment Protection Act of 1986; Acts under environmental management methods for vector control management; The Insecticide Act, 1968 for

manufacturers of synthetic chemicals or LLINs, *Bacillus thuringensis* (Bt) and *Bacillus* species, Bio-pesticides and Bio-fertilizers:- registration, grant of licenses, packaging, labelling, transport, disposal, storage and places; Acts for manufacturing units: Environmental clearance, consent to establish and consent to operate; Acts for the use of Larvivores/exotic fishes for vector management; Utilization of synthetic chemicals and organic chemicals for IVM leads to generation of waste which shall be disposed as per the Hazardous Waste and Management Rules of 2016 under the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and for LLINs disposal as per Plastic Waste Management Rule 2016; Use of Neem derived products under Plant Varieties and Farmers Right Act, 2001, the Essential Commodities Act, 1955 (neem as fertilizer), import of neem derived products under the Destructive and Pests Act, 1914; Environmental modification and Environmental manipulation- the Central Water Commission 2018; The Wetlands (Conservation and Management) Rules, 2017 under the E(P) Act 1986 for the conservation and use of wetlands; and Changes to Human habitation and behaviour: The Ministry of Urban Development has issued Model Building Bye-Laws 2016, the Construction and Demolition Waste Management Rules, 2016 and the Solid Waste Management Rules, 2016.

Dr. Kalpana Baruah deliberated on NVBDCP Recommended insecticide for Larval source management and Adult-vector control. NVBDCP recommended insecticide, importance of larval source management, methods of larval source management, Mosquito Larvicidal Oil (MLO), Temephos 50% EC, insect growth regulators (IGR) including pyriproxyfen 0.5% and Diflubenzuron 25% WP. She also deliberated a lecture on adult vector control: adulticides; LLINs; adult vector control (outbreak condition)- indoor space spray, outdoor fogging; preparation and application of ready to use suspension (insecticides).

Dr. N Balakrishnan, Former Jt. Director, NCDC introduced Morphology and bionomics of Ticks and Mites and its classification; capable of transmitting diseases: mainly Crimean-Congo Hemorrhagic Fever (CCHF), Kyasanur Forest disease (KFD); Type of ticks: Soft ticks and Hard ticks and their lifecycle. Population depends on various factors: climate, hosts, predators & competitors; Introduction of Mites and its Classification; External morphology; *Leptotrombidium* (vector of Scrub Typhus), Biology and Ecology of Mites; Collection of soft ticks (direct mechanical methods, vacuum collection & CO_2 traps), hard ticks (passive, systematic & special collection) & mites (Sherman trap) and their Identification.

Dr. Kalpana Baruah deliberated on Vector Control measures/ management by Chemical Method. She commented on Plant products including pyrethrum, neem derived products, synthetic chemicals and its classification (organophosphorus, synthetic pyrethroids and carbamates etc.).

Dr. Gujju Gandhi explained Morphology and Bionomics of Flies and Flea and introduced fleas and its genera and species occur in India; *Xenopsylla spp.* medically important flea (vector of plague and murine typhus); classification and external morphology; Difference between male & female vector and Bionomics of Fleas. He also deliberated on vector of enteric diseases: House Fly (*Musca domestica*), vector of Helminths, faecal bacteria, protozoan & viruses resulting in the spread of enteric diseases; classification of House fly; morphology and its life cycle.

Dr. P. T. Joshi deliberated on Integrated Vector Pest Management: IPM and introduced- IPM (agricultural sectors) & IVM (VBDs control programme)- knowledge about vectors, diseases & disease determinants; Integrated pest control measures: Biological, Cultural, Chemical, Mechanical & Physical Control; IPM implementation consists suppression of harmful organisms, monitoring, adequate decision-making, non-chemical plant protection measures, specific pesticides and evaluation.

Dr. R. S. Sharma deliberated on Alternatives to DDT in Vector Control Management- Conventional Methods & Environmental Management: Introduction to Vector Control tools; Conventional management, Environmental Management, Biological Control, Chemical Control, Genetic Control and Natural Control; Introduction to conventional methods: Cleanliness, Premises inspection, Removal of standing water bodies, Community awareness and sensitization; Introduction to Environmental Management: Components of environmental management (WHO)- Environmental Manipulation, Environmental Modification and Modification or manipulation of human habitation or behaviour.

Dr. N Balkrishnan deliberated on vector borne disease: Plague and its causative agent. Causative agent: *Yersinia pestis*- Gram -ve bacteria); Vectors: *Xenopsylla cheopis*, *X. brasiliensis*; Reservoirs: *Tatera indica*, *Bandicota bengalensis*; Susceptible hosts: *Rattus Rattus, Mus musculus, Bandicota indica;* History; Transmission cycle; its current global status and types of plague (Bubonic plague, Pneumonic plague, Septicemic plague). He also deliberated on current status of plague in India, cases and deaths, plague surveillance network (Rodent, Blood, Organ, Dog sera, Human blood, fleas; surveillance methodology (bacteriology, Serology, molecular & entomological), surveillance-investigation of seas and airports and endemic plague foci in India (1951), treatment, vector control, etc.

Dr. L J Kanhekar deliberated on VBD: Scrub Typhus: Its history; Causative agent: a gram-negative, obligate intracellular bacterium *Orientia*; Vector: Mites genus- *Leptotrombidium diliense*; Sign & symptoms; Diagnosis & treatment: diagnosis bases on bacterial culture, serology, molecular methods-

rapid ICT, ELISA, PCR test; Transmission: Trans-stadial and trans-ovarial transmission; Life cycle of mites: Egg→Larva→Nymph→Adult; Epidemiology & control; prevention & control using topical application of DMP, DEET etc. and burden in India and global.

The training session of day-2 was concluded with a memento presented to the subject experts and other resource persons for their contribution during the training **(Exhibit-5)**

Exhibit-4: Photographs of Training session-2

Exhibit-5: Memento presentation to experts/ resource persons

4.3 Training session-3 (Day-3: Wednesday-20/07/2022)

Dr. N. Balkrishnan deliberated Kyasanur Forest Disease (KFD) its symptoms and clinical features, Host factors, Diagnosis; History; Transmission: trans-stadial mode (nymphal stage ticks), incubation period; Transmission cycle; KFD virus ecology, Vector- ticks *(Haemophysalis spinigera* & *H. turturis*); Natural cycle of KFD: Egg→Larva→Nymph→Adult; Environmental factors increasing risks factor for KFD; Burden in India; Epizootiology of KFD in wild monkeys, amplifying host (*Semnopithecus entellus/ macaca radiata*), reservoirs: cattle, dogs & other domestic animals; Preventive protection measures & Control: Hot spot spray- Malathion powder, use of tick repellent- DMP (dimethyl phthlate) oil, KFD vaccine; recent outbreaks of KFD were discussed (**Exhibit-6**).

On Leishmaniasis (Kala-azar), Morphology and bionomics of Sandflies a lecture had been delivered by Dr. Vijay Kumar (consultant ICMR) and he mentioned: Leishmaniasis (Kala-azar) and its causes: Cutaneous Leishmaniasis, Muccocutaneous Leishmaniasis and Visceral Leishmaniasis & post kala-azar dermal leishmaniasis (PKDL); Causative agent: Protozoa Leishmaniasis (*L. donovani*- in India only, *L. infantum* and *L. chagasi*); Vector: only sand fly vector of kala-azar in India *Phlebotomus argentipes*; Life cycle within human (Amastigote) and Sand fly (Promastigate/ flagellate), Environment factors: altitude, season, rural areas, development projects; Burden in India and global burden. He also deliberated briefly on vector of kala-azar/ Leishmaniasis disease: Causative agent: protozoan parasite; *Phlebotomus argentipes* only known vector of visceral leishmaniasis or kala-azar in India and *Phlebotomus papatasii*- vector of cutaneous leishmaniasis for human; Classification of Sand Fly; External morphology; Vector biology: complete life cycle of sand fly in insectarium; Vector ecology: Distribution, Breeding places, resting habits, feeding habit, biting habit, flight range; Types of parasite development.

On IVPM- Behaviour Change Communication (BCC) Dr. P. T. Joshi deliberated and commented on IEC strategies: between community & Health workers, Social & Community; Objective of BCC; Outcomes of interventions, knowledge & skills, behaviour & activities, Impact- control of vector density & disease; Tools of BCC: Media Information (Radio/ TV Broadcast), Education & Communication, Communication for behavioural impact, and Farmer Field schools; Accredited Social Health Activist (ASHA) trained under National Health Mission (NHM); Multipurpose Health Workers (MPHW)- various kinds of IEC materials like posters, stickers, pamphlets, key materials- prepared to be displayed for BCC & IEC (preferably in local languages).

Dr. Ramesh Chandra deliberated on Monitoring and evaluation of IVPM and discussed Methods, Outcome indicators: Planning and implementation, Organization and management (Within health sector); Behavioural Changing Communication; Entomological surveillance; Insecticide resistance monitoring through susceptibility test, Surveillance of dengue/ malaria vector; Entomological survey of Lymphatic Filariasis Epidemiological surveillance: Incidence, Prevalence; Epidemiological parameters of malaria (API, ABER, A*f*I & SPR) and Epidemiological parameters of Filariasis (Microfilaria rate, Microfilaria density & Filarial endemicity rate).

Dr. Y. P. Ramdev, National Technical Advisor, UNIDO made a discussion on Alternatives to DDT: LLIN, Biolarvicides & Neem derived products, which are evolved through UNIDO for vector control (UNIDO Project) as alternatives to DDT. He introduced UNIDO and its role in this project and the usefulness of neem products.

On Alternatives to DDT: Manufacturing, marketing and distribution- LLIN, Bio-larvicides & Neem derived products for vector control Dr. Rajendra Thapar, Manager, HIL (India) Ltd., gave brief introduction about HIL (India) Ltd. Business segment expansion in various sectors (Public health, agrochemicals, Fertilizers, seed etc.); HIL contribution in DDT phasing out as part of DDT alternative project; Agreement between UNIDO-HIL in 2015 to develop locally appropriate cost-effective and sustainable alternatives to DDT (LLIN, *Bti* based Bio-larvicides & Neem derived products); Present status of HIL in production of DDT alternatives and also LLINs sample was distributed to few trainees.

Dr. R.S. Sharma introduced IVPM: Vector management through Farmer Field School (FFS) approach and background, rational and concept of FFS in IVPM. How to implement FFS in the public health and agricultural community. Farmer Field School (FFS): Evolution of the farmer field school approach, integrated production and management through FFS, vector and VBDs management through FFS, farmers health risks associated with agriculture in India. Role of FFS at the field level for increasing continued monitoring and evaluation to reduce the vector and pest population. Management of mosquito breeding in rice fields through FFS (Sri-Lanka). He also suggested FFS is a very important part of Integrated vector and pest management in the community.

Integrated vector pest management: IVM- Integrated vector control methods and IVM in different situations was introduced by Dr. P.T. Joshi with the basic introduction of VBDs in India, integrated vector and pest management. The main content covered was IVPM basics,

fine key elements of IVM, methods of IVM, vector bionomics of IVM. Integrated vector control methods: environmental management (modification, manipulation and changes to human habitation (or) behaviour, personal protection (protective clothing, repellents, installation of vaporization), larval source management (chemical control- larvicides (dosage & formulation), insect growth regulators, biological control (larvivores fish-Gambusia, Guppy), IRS, LLINs, Spray formulation & dosage for impregnation of bed-nets.

Dr. R. S. Sharma deliberated on Planning & Implementation of IVPM including learning objectives; Introduction to IVPM; Planning & implementation of vector control management (WHO)- Technical steps: 1. Disease situation: a) Epidemiological Assessment- Measures and Estimation of disease occurrence; b) Entomological assessment- Xeno-monitoring or xeno-surveillance; 2. Operational steps: a) Local determinants of disease: i) Parasite, ii) Vector, iii) Human activities & iv) Environment; b) Selection of vector control methods: Environmental, Mechanical, Biological and Chemical to reduce vector population or to reduce human vector contact; Need & resources; He also discussed roles of various sectors in IVM implementation strategy.

Exhibit-6: Lecture/Discussion on Training Session-3

The training session of day-3 was concluded with a memento presented to the subject experts and other resource persons for their contribution during the training **(Exhibit-7)**

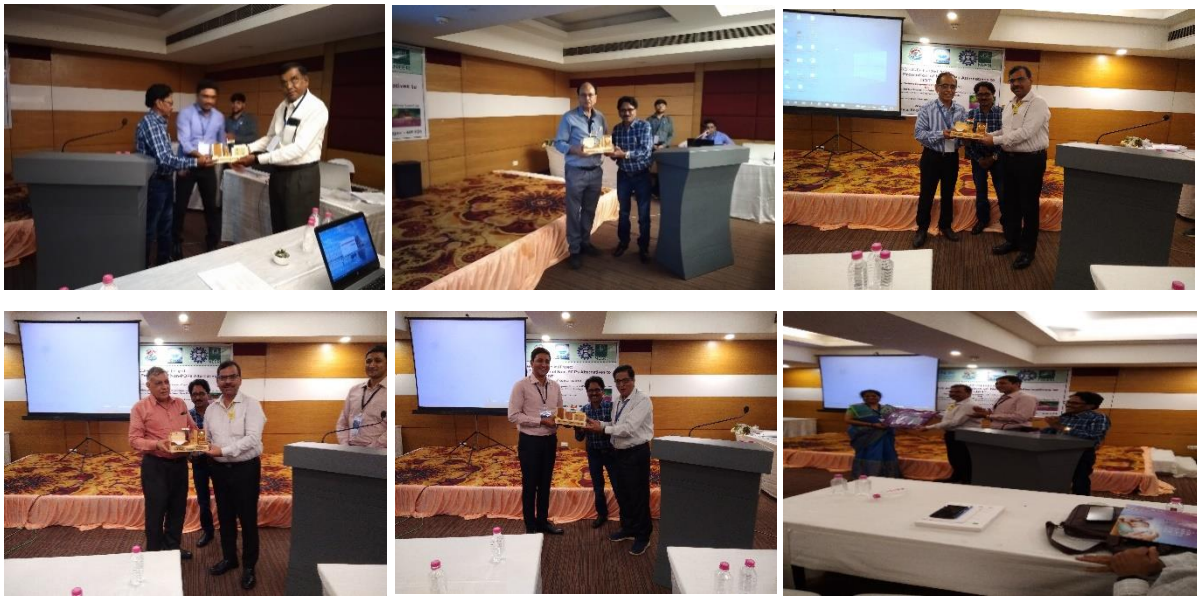


Exhibit-7: Memento presentation to experts/ resource persons

4.4 Training session-4 (Day-4: Thursday-21/07/2022)

Field visit to the locality to explore vector prevalence, demonstration of vector breeding and collection method.

CSIR-NEERI has organised a field visit for all participant trainees from Uttar Pradesh to the locality (Chhathe meel and Kathwara village in Bakshi Ka Talab block of Lucknow district) to explore vector prevalence, demonstration of vector breeding and collection method (**Exhibit-8**). Apart from participant trainees, District Malaria officer team, Biologists, FCO, Entomologists and Subject experts (Dr. R.S. Sharma, Dr. P.T. Joshi and Dr. Ramesh Chandra) were also present. Participant trainees were divided into four teams and asked to perform entomological landscape surveillance (vector biology and vector ecology) such as breeding places/sites, biotic/abiotic factors etc. All teams were equipped with collection tools (Ladle, Enamel bowl, Pipette, Larval vials, larval nets, Aspirators, Torch, paper cups with nets covers, Cotton wool, a pencil, a notebook, a bag to put all material etc.). In addition, Health education awareness program on vector-borne diseases and its vector, preventive measures were given to school children at Poorv Madhyamic Vidyalaya, Chhathe meel, Lucknow.

Exhibit-8: Photographs of Field visit at Chatha meel & Kathwara village, Lucknow

Dr. P. T. Joshi elaborately discussed on Vector control measures/ management: Biological Control and Genetic Control with brief introduction about module-3: Alternatives to DDT in vector control measures/ management: Introduction to Biological control- Different Biological agents used in vector control such as Flatworms, Fungi, Invertebrate Predators, Micro-organism: Bacteria and Larvivorous Fishes (*Gambusia affinis*, guppy *Poecilia reticulata*) etc.; NIMR– suitable fish species used in different mosquito breeding habitats; Desirable attributes of Bio-control agents and Advantages of Biological Control. He also gave a brief Introduction to Genetic Control: Mutagenesis, trans-genesis– gene delivery, Cis-genesis– Gene transfer, Para-transgenesis; Sterile Insect Techniques; Population replacement using *Wolbachia*; Gene Silencing using RNA interference; other genetic approaches: gene drive; Advantages & disadvantages of genetic control **(Exhibit-9)**.

On the Epidemiological surveillance and parameters topic Dr. Ramesh Chandra explained regarding determination of the incidence and prevalence (point and period) of all vector-borne diseases; Epidemiological parameters of Malaria: Annual Parasite Index (API), Annual Blood Examination Rate (ABER), Annual *falcipuram* Incidence (AFI), Slide positivity rate (SPR); Epidemiological parameters of filariasis: Microfilaria rate, Microfilaria density, Filarial endemicity rate.

Field reports had been prepared by all team members with the participant trainees under the guidance of expert faculty and CSIR-NEERI team.


Exhibit-9: Lecture/Discussion on Training Session-4

4.5 Training session-5 (Day-5): Friday- 22/07/2022)

Dr. Sudesh Kumar and all participant trainees have given the *Presentation of the field report*. Dr. Sudesh Kumar presented the field report which includes general topography of the site, biotic (cattle, water hyacinth) and abiotic factor (Temperature, Wind, humidity), Collection of Adult mosquitoes (4 mosquitoes of *Culex quinquefasciatus*), Larval collection (*Culex* spp.), and pupal collection (*Culex* spp.); other breeding sources for mosquito were water containers, plastic bottles etc. He thanked to CSIR-NEERI team to organise such a field visit for trainers to understand the vector prevalence, and demonstrate of vector breeding and collection method. He also suggested that regular field training shall be organised in the state to distinguish different mosquito species. He also discussed the importance of intersectoral coordination: BCC in the VBDs control.

Pilot Testing of IEC materials was carried out by Dr. P T Joshi and Dr. L. J. Kanhekar with a brief introduction about Information, Education & Communication (IEC) materials and their importance for IVPM: IEC campaign/ IEC Operation/ Programme. IEC material should be in a local language/ terminology so that people can understand, cooperate, participate and perform various activities regarding control of vector borne diseases (VBDs). IEC materials provided in the form of posters, pamphlets, stickers etc. are of great importance for the awareness programme. IEC material included following topics: Mosquito life cycle *Aedes*, *Anopheles*, *Culex*; Mosquito transmitted diseases; How to use insecticide treated nets (ITNs); Awareness on insecticide treated nets (ITNs), Malaria (No Mosquitoes- No Malaria); ways to prevent mosquito bite; Diseases caused by mosquito bite; Awareness poster (Let's prevent breeding of mosquitoes and protect public health diseases); Introduction, Vectors and its life cycle, Sign & Symptoms, breeding sites, Transmission, Transmission cycle, and preventative measures of VBDs (Malaria, Chikungunya, Dengue, Filaria, Japanese Encephalitis and Zika); Kyasanur Forest Disease: Introduction, Vectors and its life cycle, Sign & Symptoms, Transmission,

Transmission cycle, and prevention. At the end of this session, Dr. P.T. Joshi asked to participant trainees to provide inputs/ changes to make this IEC material more informative and helps the community to become aware of VBDs programme.

Pilot Testing of FAQs materials/ Glossary of all modules was carried by Dr. P T Joshi and Dr. L J Kanhekar with a brief introduction about FAQs material and glossary on Vector Borne Diseases and asked the participant trainees (DMOs, SPO/entomologists/VBD consultants) from Uttar Pradesh to provide inputs on FAQs material and Glossary of all modules.

Feedback on Modules and training materials from trainees was taken by Dr. L. J. Kanhekar and Dr. Gujju Gandhi to edit Modules and training materials. He gave a brief introduction about all four modules: Vector morphology and Bionomics and all the contents included in the training module. He asked the participants to give their valuable responses and inputs on the training module. Participants have raised queries, suggestions, and also healthy discussion on various topics of modules. Dr. L.J. Kanhekar asked all the participants to provide feedback via e-mail also if any.

Dr. L.J. Kanhekar conducted a valedictory session followed by group photo and certificates distribution (**Exhibit-0**) to all the participant trainees and proposed the vote of thanks to all the participants and experts, thus summing up the training programme. During this session, all the participants were asked to give their opinions on the training programme by filling out the feedback form provided to them.


Exhibit-10: Photograph of valedictory session

5.0 Annexures

5.1 List of organizing members

1. **Dr. A. N. Vaidya,**
   Director, CSIR – National Environmental Engineering Research Institute, Nagpur
   Coordinator, Stockholm Convention Regional Centre.

2. **Dr. M. P. Patil**
   Chief Scientist & HOD, Chemical and Hazardous Waste Management Division,
   CSIR – National Environmental Engineering Research Institute, Nagpur.

3. **Dr. A. Ramesh Kumar**
   Sr. Scientist, (Project Investigator),
   Chemical and Hazardous Waste Management Division,
   CSIR – National Environmental Engineering Research Institute, Nagpur.

4. **Dr. L. J. Kanhekar**
   Project Consultant & Training Coordinator,
   CSIR – National Environmental Engineering Research Institute, Nagpur.

5. **Dr. Gujju Gandhi**
   Research Associate-II,
   CSIR – National Environmental Engineering Research Institute, Nagpur.

6. **Mr. Abhishek Chaudhary**
   Project Associate-I,
   CSIR – National Environmental Engineering Research Institute, Nagpur.

7. **Mr. Ashlesh Katpatal**
   Project Associate-I,
   CSIR – National Environmental Engineering Research Institute.

5.2 List of faculties

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

2. **Dr. Kalpana Baruah**
   Ex- Additional Director, National Centre for Vector Borne Disease Control.

3. **Dr. Y. P. Ramdev**
   National Technical Adviser,
   United Nations Industrial Development Organization.

4. **Dr. N. Balakrishnan**
   Joint Director (Retd), National Centre for Disease Control, Bengaluru.

5. **Dr. Rajendra Thapar**
   Manager, (Public Health & Export), HIL (India) Ltd.

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

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

8. **Dr. Ramesh Chandra**
   Former State Entomologist, Uttar Pradesh.

9. **Dr. P. T. Joshi**
   Former State Entomologist, Gujarat state.

10. **Ms. Manshi Bachani**
    Senior Associate**,** Enviro Legal Defence Firm (ELDF), New Delhi, India.

5.3. List of nominated trainees

S. No	Names	Designation	Location
1	Dr. Awadhesh Kumar yadav	Joint Director Malaria	Add. Director Malaria & VBD Jawahar Bhawan
2	Sri Sudesh Kumar	State Entomologist	Add. Director Malaria & VBD Jawahar Bhawan
3	Sri Vipin Kumar	State Entomologist IDSP	Director communicable disease, Lucknow
4	Dr. Manvendra Tripathi	Zonal entomologist	Add. Director, medical and health Lucknow division.
5	Dr. Ravi Das	Zonal entomologist	Add. Director, medical and health Gorakhpur division.
6	Ms. Meena Rajput	Zonal entomologist	Add. Director, medical and health Agra division.
7	Dr. Keerti Tripathi	Zonal entomologist	Add. Director, medical and health Meerut division.
8	Dr. Alka Chaudhari	Zonal entomologist	Add. Director, medical and health Prayagraj division.
9	Sri D.K. Srivastava	FCO	Ayodhya
10	Mrs. Neelam Dwivedi	FCO	Barabanki
11	Mrs. Deepmala	FCO	Bahraich
12	Mrs. Gayatri Gupta	FCO	Fatehpur
13	Sri Harikesh Lal	Biologist	Azamgarh
14	Sri Hemant Kumar	Biologist	Balia
15	Mrs. Bhavna Verma	Biologist	Banda
16	Dr. Vishal Kumar Soni	Biologist	Deoria
17	Mrs. Kanchan Gupta	Biologist	Gonda
18	Mrs. Apeksha Bhushan	Biologist	Pratapgarh
19	Sri R K Mishra	Biologist	Raebarely
20	Dr. Amit Kumar Singh	Biologist	Varanasi
21	Dr. Priyanka Tripathi	Biologist	Sultanpur
22	Sri K K Gupta	Biologist	Unnao
23	Sri Ashok Kumar Maurya	Biologist	Kheri
24	Sri Ram Shukla	Biologist	Farrukhabad
25	Sri Sharad Pal	VBD Consultant	Moradabad
26	Dr. Shailesh Parihar	Divisional Surveillance Officer	Lucknow
27	Dr. Amrit Sukla	Path NGO	Lucknow

5.4. List of Attended trainees

S. No	Names	Designation	Location
1	Dr. Awadhesh Kumar yadav	Joint Director Malaria	Add. Director Malaria & VBD Jawahar Bhawan
2	Sri Sudesh Kumar	State Entomologist	Add. Director Malaria & VBD Jawahar Bhawan
3	Sri Vipin Kumar	State Entomologist IDSP	Director communicable disease, Lucknow
4	Dr. Manvendra Tripathi	Zonal entomologist	Add. Director, medical and health Lucknow division.
5	Dr. Ravi Das	Zonal entomologist	Add. Director, medical and health Gorakhpur division.
6	Ms. Meena Rajput	Zonal entomologist	Add. Director, medical and health Agra division.
7	Dr. Keerti Tripathi	Zonal entomologist	Add. Director, medical and health Meerut division.
8	Dr. Alka Chaudhari	Zonal entomologist	Add. Director, medical and health Prayagraj division.
9	Sri D.K. Srivastava	FCO	Ayodhya
10	Mrs. Neelam Dwivedi	FCO	Barabanki
11	Mrs. Deepmala	FCO	Bahraich
12	Sri Harikesh Lal	Biologist	Azamgarh
13	Sri Hemant Kumar	Biologist	Balia
14	Mrs. Bhavna Verma	Biologist	Banda
15	Dr. Vishal Kumar Soni	Biologist	Deoria
16	Mrs. Kanchan Gupta	Biologist	Gonda
17	Mrs. Apeksha Bhushan	Biologist	Pratapgarh
18	Sri R K Mishra	Biologist	Raebarely
19	Dr. Amit Kumar Singh	Biologist	Varanasi
20	Dr. Priyanka Tripathi	Biologist	Sultanpur
21	Sri K K Gupta	Biologist	Unnao
22	Sri Ashok Kumar Maurya	Biologist	Kheri
23	Sri Ram Shukla	Biologist	Farrukhabad
24	Sri Sharad Pal	VBD Consultant	Moradabad
25	Dr. Shailesh Parihar	Divisional Surveillance Officer	Lucknow
26	Dr. Amrit Sukla	Path NGO	Lucknow

5.5. Training Schedule

CSIR-National Environmental Engineering Research Institute, Nagpur

(*Project: - Development and promotion of non-POPs alternatives to DDT*)

Training of Trainers (ToT) and pilot testing of modules to promote non-POPs alternatives based on IVPM from 18th July 2022 to 22nd July 2022 to SPO/Entomologists/ FCO/ Biologists and VBD Consultants from Uttar Pradesh

Venue: Hotel Comfort Inn, Gomati Nagar, Lucknow

Training Programme Schedule

Time	Topic	Resource Person
Day 1 (Monday) 18/07/2022		
0915-1000	Registration – Distribution of training materials	
1000-1030	**Inaugural Function** **Welcome Address: Dr. A. Ramesh Kumar**, Sr. Scientist, CSIR-NEERI, Nagpur **Address by: Dr. Atul. N. Vaidya**, Director, CSIR-NEERI, Nagpur **Address by: Dr. M. P. Patil,** Head & Chief Scientist, CHWMD, CSIR-NEERI, Nagpur **Address by: Dr. A. K. Yadav,** Joint Director & SPO (Malaria), DHS, UP **Guest of honour: Dr. R. C. Pandey**, Addl. Director & SPO (VBD), DHS, UP **Inauguration by: Dr. A. K. Singh**, Director, Communicable & VBD, DHS, Lucknow, UP **Vote of Thanks**: **Dr L J Kanhekar**, Project Consultant, CSIR-NEERI, Nagpur	
1030-1045	**High Tea & Group Photo**	
1045-1115	Introduction to Modules 1 to 4	Dr L J Kanhekar
1115-1155	Introduction to DDT and its use in Vector Control ***(Module 1 Chapter 1)***	Dr A Ramesh Kumar, Sr. Scientist & Project Leader
1155-1225	VBD: Entomological and epidemiological situation in Uttar Pradesh	Dr. R. C. Pandey, Addl. Director & SPO / Dr Sudesh Kumar, State Entomologist, UP
1225-1255	Introduction to VBD: Malaria ***(Module 1 Chapter 2 – 2.1)***	Dr R S Sharma, Former Addl. Director, NCVBDC & NCDC
1255-1330	Introduction to VBD: Japanese Encephalitis & Chandipura Virus (To be introduced) ***(Module 1 Chapter 2- 2.3)***	Dr P T Joshi, Former Entomologist, Gujrat State
1330-1430	**LUNCH BREAK**	
1430-1510	Morphology and Bionomics of Anopheline vector mosquitoes ***(Module 2 Chapter 1 to 5)***	Dr L. J. Kanhekar
1510-1540	Equipment for larviciding and adulticiding ***(Module 3 Chapter 8.0)***	Dr Ramesh Chandra, Former State Entomologist, UP
1540-1550	**TEA BREAK**	
1550-1630	Introduction to VBDs: Dengue, Chikungunya and Zika	Dr Kalpana Baruah, Former Addl. Director, NCVBDC

	(Module 1 Chapter 2- 2.4, 2.5 & 2.6)	
1630-1730	Morphology and Bionomics of Culicine vector mosquitoes ***(Module 2 Chapter 1 to 5)***	Dr L. J. Kanhekar
Day 2 (Tuesday) 19/07/2022		
0930-1010	Introduction to Crimean Congo Hemorrhagic Fever ***(Module 1 Chapter 2 - 2.10)***	Dr P T Joshi
1010-1050	Introduction to VBD: Lymphatic Filariasis ***(Module 1 Chapter 2- 2.2)***	Dr Ramesh Chandra
1050-1100	**TEA BREAK**	
1100-1130	Entomological surveillance of VBDs, Entomological parameters and its importance ***(Module 4 Chapter 3.4 – 3.4.1 to 3.4.7)***	Dr Himmat Singh, Scientist -D, ICMR-NIMR
1130-1210	Legal perspectives to the Development of IVPM Training Materials	Adv. Sanjay Upadhyay
1210-1300	NVBDCP Recommended Insecticide: Larval Source Management and ***(Module 3 Chapter 5.0; 7- 7.1 & 7.2)***	Dr Kalpana Baruah
1300-1330	Bionomics of Ticks and mites ***(Mod. 2 Chap. 9- 9.1, 9.2 & 9.3)***	Dr N Balkrishnan, Former Jt Director, NCDC
1330-1430	**LUNCH BREAK**	
1430-1510	Integrated vector control management ***(Module 4 Chapter 1.2 – 1.2.1.6)***	Dr Kalpana Baruah
1510-1555	Morphology and Bionomics of flies & Flea ***(Module 2 Chapter 7 & 8)***	Dr G Gandhi
1555-1605	**TEA BREAK**	
1605-1635	Integrated Vector Pest Management: IPM ***(Module 4 Chapter 1.3 – 1.3.1 to 1.3.4)***	Dr P. T. Joshi
1635-1705	Alternatives to DDT in Vector Control Management – Conventional Methods & Environmental Management ***(Module 3 Chapter 1.0, 2.0, 3.0 – 3.1, 3.2 & 3.3)***	Dr R S Sharma
1705-1735	Introduction to VBD: Plague (***Module 1 Chapter 2 – 2.8)***	Dr N Balkrishnan
1735-1800	Introduction to VBD: Scrub Typhus ***(Module 1 Chapter 2 – 2.9)***	Dr L J Kanhekar
Day 3 (Wednesday) 20/07/2022		
0930-1010	Introduction to Kyasanur Forest Disease ***(Module 1 Chapter 2 – 2.11)***	Dr N Balkrishnan

1010-1100	Introduction to VBD: Leishmaniasis (Kala-azar) and ***(Module 1 Chapter 2 – 2.7)***	Dr Vijay Kumar, Former Scientist, ICMR-RMRIMS
1100-1110	**TEA BREAK**	
1110-1200	Morphology and Bionomics of sandflies (***Module 2 Chap. 6)***	Dr Vijay Kumar
1200-1250	IVPM: Behavior Change Communication ***(Module 4 Chapter 1.0 – 1.4)***	Dr P T Joshi
1250-1330	Monitoring and evaluation of IVPM ***(Module 4 Chapter 3.0 – 3.1 to 3.3)***	Dr Ramesh Chandra
1330-1430	**LUNCH BREAK**	
1430-1500	Alternatives to DDT: LLIN, Biolarvicide & Neem derived products for vector control (UNIDO Project) ***(Module 3 Chapter 9.0)***	Dr Y P Ramdev, National Technical Adviser, UNIDO
1500-1530	Alternatives to DDT: Manufacturing, marketing and distribution – LLIN, Biolarvicide & Neem derived products for vector control	Dr Rajendra Thapar, Manager (Public Health & Exports), HIL (India) Ltd
1530-1540	**TEA BREAK**	
1540-1610	IVPM: Vector management through Farmer Field School approach ***(Module 4 Chapter 1.0 – 1.5)***	Dr R S Sharma
1610-1650	Integrated Vector Pest Management: IVM – Integrated vector control methods and IVM in different situations ***(Module 4 Chapter 1.0 – 1.1 to 1.2)***	Dr P T Joshi
1650-1730	Planning and implementation of IVPM ***(Module 4 Chapter 2.0)***	Dr R S Sharma
Day 4 (Thursday) 21/07/2022		
0800-1330	Field Visit to the locality to explore vector prevalence, demonstration of vector breeding and collection method	Dr L J Kanhekar /Dr R S Sharma/ Dr P T Joshi/ /Dr Ramesh Chandra Dr G Gandhi /Abhishek Chaudhary /Ashlesh Katpatal,
1330-1430	**LUNCH BREAK**	
1430-1520	Vector control measures/ management: Biological Control and Genetic Control ***(Module 3 Chapter 4 and 6; Mod 4 Chap. 1.2 – 1.2.1.7)***	Dr P T Joshi
1520-1530	**TEA BREAK**	
1530-1610	Epidemiological surveillance and parameters ***(Module 4 Chapter 3.5)***	Dr Ramesh Chandra
1610-1730	Preparation of the field report	Dr Ramesh Chandra/ Sudesh Kumar / Dr G. Gandhi /Abhishek Chaudhary /Participant Trainees
Day 5 (Friday) 22/07/2022		

1000-1030	Presentation of the field report	Dr Sudesh Kumar & Participant Trainees
1030-1200	Pilot Testing of IEC materials	Dr R S Sharma/ Dr P T Joshi Dr L J Kanhekar/ Dr G Gandhi/ Abhishek Chaudhary
1200-1210	**TEA BREAK**	
1210-1330	Pilot Testing of FAQs materials / Glossary of all modules	Dr R S Sharma/ Dr L J Kanhekar/ Dr G Gandhi/ Abhishek Chaudhary
1330-1430	**LUNCH BREAK**	
1430-1530	Feedback on Modules and training materials from trainees	Dr L J Kanhekar /Dr G Gandhi /Abhishek Chaudhary /Ashlesh Katpatal
1530-1600	Valedictory session followed by group Photo and certificates distribution	Dr Ramesh Kumar/ Dr L J Kanhekar /

(Dr L J Kanhekar)
Project Consultant & Training Coordinator

Copy to: **1. SPO, Uttar Pradesh**
2. All Participant Trainees