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ONE HEALTH INTERFACE MEET (KERALA) Report and Recommendations



DEVELOPMENT OF ONE HEALTH GOVERNANCE IN KERALA

Organized by
COHEART, KVASU with support from FAO of United Nations, New Delhi

In collaboration with
Directorate of Health Services and
State Institute of Animal Disease (Animal husbandry Department)

26–27 September 2018
Kerala – INDIA

Disclaimer

This report is prepared by Centre for One Health, Education, Advocacy, Research and Training (COHEART) following the interface meet on “Envisioning the institutionalization of One Health for combating emerging public health threats in Kerala” that was held from 26-27 September 2018 at Cochin. This meeting was organized by COHEART, KVASU, with support from FAO of United Nations (India) and partnering with the Directorate of Health Services and State Institute of Animal Diseases, AHD. Neither COHEART, nor any person/ organization associated with it, makes any expressed or implied representation or warranty with respect to the sufficiency, accuracy, completeness or reasonableness of information set forth in this report, nor do they owe any duty of care to any recipient of this publication. COHEART is not liable for any loss or damage howsoever caused by relying on information provided in this document. This report has been prepared without prejudice. All the images are used only for representational purpose and copyrights rests with the respective owners.

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Acronyms and abbreviations

AHD	Animal husbandry Department
AI	Avian influenza
AMR	Antimicrobial resistance
CCHF	Crimean Congo Haemorrhagic Fever
COHEART	Centre for One Health Education, Advocacy, Research and Training
DADF	Department of Animal husbandry, Dairying and Fisheries
DHS	Directorate of health Service
EID	Emerging infectious diseases
FAO	Food and Agriculture Organization
ICAR	Indian Council for Agricultural Research
ICMR	Indian Council of Medical Research
IHR	International Health Regulation
IVA	Indian Veterinary Association
KFD	Kyasannur Forest Disease
KUHS	Kerala University of Health Sciences
KVASU	Kerala Veterinary and Animal Sciences University
MoA	Ministry of Agriculture
MoHFW	Ministry of Health and Family Welfare
NGO	Non-governmental organization
OH	One Health
OHS	One Health Secretariat
OIE	Office International des Epizooties
SAARC	South Asian Association for Regional Cooperation
SDMA	State Disaster management Authority
SIAD	State Institute of Animal Diseases, Palode
SOPs	Standard Operating Procedures
WHO	World Health Organization

Executive Summary

The consultation meeting on “**Development of One Health Governance in Kerala for the control of Public Health Threats**” was held from 26-27th September 2018 in Kerala, India. The meet was organized by COHEART, KVASU with support from FAO of United Nations, New Delhi. The State Institute of Animal Disease (Animal husbandry Department) and Directorate of health Services partnered the consultation meet. The participants of the meet included government officials, academia, research scholars, NGOs and experts from human health, environment and animal health sectors of Kerala and India. A total of 60 invited delegates and facilitators participated in the meet. The meeting was organized to bring together stakeholders from human health, animal health, agriculture, environment and research institutes, to discuss the importance of a ‘One Health’ approach in containing emerging public health threats and developing recommendation for the state to establish a One Health governance and to agree on a potential secretariat of the network.

Kerala state, situated at the South Western corner of India, is unique in many ways. With its high literacy rate, high sex ratio, comparatively low birth and death rates, Infant Mortality Rate and Maternal Mortality rates, the state is at par with the most advanced countries of the world. However, the state is currently facing many health threats some of which includes the occurrence and spread of infectious diseases that emerge (or re-emerge) at the animals (wildlife, domestic), humans and the ecosystems interfaces. This situation is a result of several factors, including the exponential growth in human and livestock populations, rapid urbanization, rapidly changing farming systems, closer interaction between livestock and wildlife, forest encroachment, changes in ecosystems and globalization of trade of animal and animal products. The health and sustainability consequences of such changes are economically, socially, medically, and environmentally costly, and as such, their control can be considered a global public good. The complexities and breadth of such threats demand interdisciplinary solutions that address the connections between human and animal health, as well as the underlying environmental drivers that impact health. The recent success stories involved in combating the HPAI, KFD, Lyme disease and Nipah outbreak proved the effectiveness of one health approach. Subsequently, the state government is eyeing towards ‘One Health’ (OH) approach that aims at bringing together the experts in human health, animal health (including wildlife), environment and allied sectors to control health events at human-animal-environmental interfaces. A One Health approach can improve cross-sectoral understanding of the problems confronting animal disease control authorities and enables a more holistic approach to involve regional communities in control programs. A useful strategy is to leverage existing programs to institutionalize the One Health approach; wherein, the existing preparedness systems could effectively formulate the structured models for disease programs under the One Health approach.

To overcome this challenge, the Department of Health, the Department of Animal husbandry, Veterinary and Health University of Kerala and other partners have to work closely together to develop the Kerala One Health strategic plan. Successful implementation of the strategy will contribute to the realization of the interface meet by improving public health, food safety and security, and hence significantly improve the socioeconomic status of the people of Kerala.

The interface meet involves Interactive group work activities to draft recommendations under five major Themes, (1) Development of OH governance structure in Kerala, (2) and (3) Suggest models for Kerala Model One Health disease surveillance network and emergency response, respectively (4) e-networking of laboratories working on One Health areas and collaborative research (5) Identify One Health Capacity building measures and the key domains for One Health Action. The group work session was conducted in a modified ‘World Café style’ with plenary sessions and group discussions.

Following were the key outcomes of the interface meet:

- A structure for establishing a functional Kerala One Health governance model including purpose of the secretariat, surveillance structure and next steps were documented (See section 6.3)
- FAO shall provide technical support for its initial establishment of One health platform in Kerala
- Animal Husbandry Department, Directorate of Health Service and Kerala Veterinary and Animal Science University shall co-ordinate in the development of governance structure in Kerala and has decided to form One Health Steering Committee
- One Health Steering Committee will include members from Animal Health, Human Health and Environmental health. The members from Animal Health component shall include professionals each from Animal Husbandry Department and Kerala Veterinary and Animal Science University. The members from Human Health component shall include professionals from Directorate of Health Service and Kerala University of Health Science. The members from Environmental Health and allied components shall include professionals from State and ICAR Institutes. Each department should identify key personals and organize a take off meeting
- This recommendation drafted in the interface meet (See section 6.3) will be circulated among all the One Health Steering Committee member and they shall work on it and submit to the government and arrange meeting periodically to review the progress.
- The identified Key domains for One health Kerala was broadly categorized as (A) One Health Core areas and (B) One Health Allied areas. Core One Health areas included Antimicrobial resistance, Zoonotic diseases, Emerging Infectious Disease, Food Borne Infections and Allied One Health areas included Environmental hazards, Wild life conservation and disease management, Food Safety, pollution and waste management and disaster management. Under each core group, it was recommended to develop Kerala state action plans.
- **Key domains of action** for One Health Steering Committee (OHSC) were defined. This were classified under two domains
 - **One Health Core:** Antimicrobial Resistance, Zoonotic/ Emerging Infectious diseases, Food Safety & Hazards
 - **One Health Allied:** Environmental hazards, Wild life disease management, Pollution and waste management and Disaster/ crisis management
- Under each domain, OHSC will develop **Kerala state One Health action plans** with technical advice from FAO-WHO-OIE
- **Communication flow** between sectors during incidence of disease was documented
- **Developed tentative plan for coordinated surveillance** for addressing public health threats using One Health integrated approach
- Developed **tentative** plan to integrate human health and veterinary sectors for catering **public health emergency and outbreak preparedness and response**
- Developed procedures for **laboratory e-networking** and detecting public health threats at the state level and emphasized need for collaborative research across sector
- Identified **institutional resources** and **capacity building areas** to empower professionals on One Health approach

1. Background

Kerala state has felt the essence of One Health approach during the incidence Highly Pathogenic Avian Influenza H5N1, KFD, Nipah etc. With the high human activity at environment, human and animal (wildlife, domestic) interface, Kerala is prone for the occurrence and spread of emerging and re-emerging infectious diseases which can impact on the socio-economic growth. The main lesson learnt from the management of emerging and re-emerging infectious diseases is the need to adopt a multi-sectoral, multi-discipline, integrative approach to prevent and control diseases in order to attain optimal health for people, animals and the environment.

A major existing challenge in effective implementation of One Health approach in the state is weak linkage and compartmentalization among different departments and agencies responsible for human and animal health and the environment. An inter-ministerial and multi-agency approach to policy making, surveillance, outbreak response, prevention and control could define steps towards institutionalizing an effective One Health collaboration within the Government of Kerala.

In the recent years, Highly Pathogenic Avian Influenza, Lyme disease, Nipah viral encephalitis and leptospirosis associated with the flood were brought to limelight. It could also be possible that due to the high human and animal population densities and the frequent interactions between animals and humans, would result in the emergence of novel, potentially pandemic diseases in the near future. The aim of the One Health approach is to diminish the threat of emerging infectious diseases, ensure food safety and minimize the impact of endemic zoonoses. There are many success stories of One Health approach for control of emerging zoonoses in Kerala. All this was possible by the dedication, passion and the commitment shown by the Health (and allied health) care department, veterinary professionals and the government administration, working as cohesive team and pro-actively addressing the threats and thereby demonstrating the efficacy of a people-centric healthcare model that the rest of India can follow.

KFD Control in Kerala

- **Case Scenario:** On January 6th 2015, the Kyasanur Forest Disease (KFD) had spread to Kerala and a forest guard from Sulthan Bathery, Wayanad who had disposed the monkey carcass was succumbed to the disease. The disease was confirmed from Manipal institute of virology. Spot surveillance of the area by Health department revealed more fever cases among women working as fire line workers. A total of five panchayats have been affected in the district. On 10th February, 2015, a resident of Madappali tribal colonies died due to this disease. This is the first case of death due to Monkey fever in Kerala. Thereafter, a drastic increase in cases have occurred with a total of 102 confirmed cases and 11 deaths reported.
- **One Health approach:**
- **Human Health Sector:** Prompt action for management of disease in Humans by fever surveillance, vaccination and developing treatment guidelines. The risk group for vaccination was identified as frontline staff of the Health Department, Asha workers, tribal promoters, those residing in forest hamlets, veterinarians, and tribal people who depend on the forest throughout the year for their livelihood. Tertiary hospitals provided inpatient care and expert treatments
- **Animal Health Sector:** Veterinary Sector developed conceptual framework on disease control and distributed public awareness leaflets on tick control, demonstrated educational videos about the disease in all affected areas and also conducted awareness camps in adjoining district. They were also involved in epidemiological

surveillance, occupational hazards identification and environmental monitoring. They also organized vector control activities in domestic animals.

Environment and other allied Sectors: Forest Department attended cases of monkey deaths. Entomologist and parasitologists identified tick during surveillance at forest areas. The tribal development office distributed compensation for the bereaved families. Media was responsible for spreading awareness message and reporting current status

- **Outcome:** Of the 102 confirmed cases, mortality was reported from 11 cases. Over a period of three months, a drastic decline in fever incidences and KFD cases were observed in all the five affected panchayats due to the collaborative multiple disciplinary One Health approach.

Avian Influenza and its Control in Kerala

- **Case Scenario:** Avian Influenza outbreak was confirmed in Kerala state on 23/11/2014 and mortality of nearly 17,000 ducks were reported in the Central Kerala. Bhopal-based National Institute of High Security Animal Diseases has confirmed H5N1. The H5N1 strain of virus is pandemic and contagious to human beings. It was not just the duck farmers, but also the ancillary industry which was hit due to this outbreak. The outbreak also had its impact in the broiler sector and its consumption has drastically reduced in Kerala

- **One Health approach:**

Animal Health Sector: The veterinarians played major role in adopting preventive operations; this included securing and culling affected birds, 24-hour control rooms at various areas, distributing protective clothing to public in the affected areas, providing prompt treatment to disease suspected birds in other adjoining districts, conducting awareness camps etc. The veterinarians developed and released awareness video in social media to reduce the panic among public. A three tier awareness programme was implemented for local body representatives, farmers and public. The veterinarians team frequently visited the affected areas to take necessary measures to contain the spread of the disease. The teams monitored the dead birds in water bodies and dead birds lying unnoticed in the fields. Surveillance had been stepped up around 10 km of the areas from where the mass death of ducks had been reported. Also surveillance was carried out in all other districts of Kerala with special importance to places where migratory birds are present.

Human Health Sector: Physicians played an important role in treatment and prophylaxis of affected or prone individuals. The flu drug was promptly dispensed to individuals for prophylaxis. Physicians also conducted regular checkup of the duck farmers and their families and also the neighbourhoods, including the rescue teams. Public health personnel's ensured biosecurity measures and Personal protective equipments

Environment and other allied Sectors: Wild life and forest department played a crucial role to report any unusual deaths among wild birds and to conduct the post mortem examination of wild birds if any found dead. Laboratory workers had role in diagnosing disease condition in all the avian species. Government played the role to offer compensation to farmers for culling their birds. A central government team also visited the sites to probe the death of hundreds of birds in that area. Tourism department was on alert and helped in reducing panic among local as well as foreign tourists present at the area at the time of outbreak. Media had an important role to play in updating the status of bird flu and spreading awareness and alert to inform about risks & prevention measures. Food Safety officers provided information on how to properly cook poultry products so as to make it disease free and does not pose a food safety risk for consumers.

- **Outcome:** During mid of December 2014, Kerala government lifted all restrictions imposed on the movement of poultry following the successful containment of H5N1 virus in the affected areas

Nipah Control in Kerala

- **Case Scenario:** Nipah virus (NiV) infection is a newly emerging zoonosis that causes severe disease in both animals and humans. The natural host of the virus are fruit bats of the Pteropodidae Family, Pteropus genus. A 26-year-old young male gets admitted and treated with symptoms of acute encephalitis on 5/5/18 at a government tertiary facility (Primary case). He died on the same day. The next casualty was the death of his younger brother aged 23 (Index case) which was confirmed by the health authority to be Nipah during May 19. The symptoms were fever and cold, encephalitis and myocarditis
- **One Health approach:**
- **Human Sector:** From the index case report, Health ministry and health service department (including tertiary hospitals) pioneered the efforts in disease control measures. The physicians played significant role in diagnosis, treatment and prophylaxis of affected or prone individuals. The antiviral drug and monoclonal antibodies was made available for prophylaxis. Physicians also conducted regular check-up of the people suspected and their families and also the neighbourhoods, including the rescue teams. Personal protective equipment's was made readily available. Public health personnel's looked into the biosecurity measures. An advisory (Nipah cell) was formed under direction of Directorate of Health Services and was managed by District Administrator
- **Animal Sector:** The veterinarians adopted preventive operations; mainly addressing farm biosecurity measures and keeping vigilant on health of domestic animals in and around the infected premises. The veterinarians were directly or indirectly involved in collection of samples from bats and transporting those to the National Institute of High Security Animal Diseases Laboratory (NIHSAD) located at Bhopal, which holds the OIE referral lab for exotic viruses especially, HPAI in India. Other activities included, Nipah awareness classes, advisory services, awareness video/radio talks in local language.
- **Environment and other Sectors:** To trace the source of infection Fruit bats of *Pteropus* sp. act were sampled by the forest department. The laboratory services were provided at Manipal Institute of Virology and other referral laboratories of national repute (NIV, Pune, NIHSAD, Bhopal). They had played a crucial role in diagnosing the disease. A central government team and an expert team also visited the affected region to study the epidemiology of infection and provide advisories to the administration bodies. Tourism department was put on alert.
- **Outcome:** During mid of July 2018, Kerala government lifted all restrictions imposed on the movement following the successful containment of Nipah virus in the affected areas

Rabies Control in Kerala

- Rabies - one of the oldest recognized and most popular zoonotic diseases that has historically garnered significant awareness. While until 1998, catch-and-kill was the method adopted for over 100 years to control populations of stray dogs, the Blue Cross of India studied the situation and intervened in 1964, proposing a more humane, sustainable and sensible alternative program of catch-and-neuter plus rabies vaccination, thus giving birth to the ABC-AR (Animal Birth Control- Anti-Rabies) program.
- **One Health approach:**
- **Animal Sector:** Veterinarians were involved in education and outreach on dog bite prevention, ABC-ARV with local organisations and government, Law enforcement against dog killing, waste management etc.
- **Human Sector:** Physicians service to vaccinate & treat victims, health education
- **Environment and other Sectors:** Wildlife experts to advise on Rabies from wild, ecologists to tell responsible authorities why sterilization is better than culling, Sanitarians to eliminate garbage that feeds strays, Educators to teach people to vaccinate their pets, Media to inform about risks& prevention

Antimicrobial Resistance Control in Kerala

- Antibiotics remain the cornerstone of treating infectious diseases and yet today it is increasingly proving to be a bane than the boon that it was. With abusive use of antibiotics at multiple levels of the food chain, today AMR is looming as one of the cross-cutting challenges across the human and animal health continuum. Data from ICMR suggests that more than 70% Enterobacteriaceae—including *Salmonella*, *E. coli*, *Yersinia pestis*, *Klebsiella*, and *Shigella*—are resistant to third-generation cephalosporins. The Kerala State Action Plan against AMR marks a significant step in terms of government communication on the topic of AMR using a convergent efforts from all relevant ministries and departments to take a One Health Approach to handle the problem. In response to WHO's Global AMR Action Plan, the Indian Government has put forward the National Action Plan on Antimicrobial Resistance (NAP-AMR) in April 2017, which prioritizes six areas for strategic implementation namely, Awareness through communication, Education & Training, Strengthening surveillance, Promote investments in AMR initiatives, strengthening India's leadership on AMR and Reducing the incidence of infection through effective infection prevention and control

Lymes Disease Control in Kerala

- **Case Scenario:** A 50-year old woman died at a private hospital, and the health authorities were not able to ascertain the cause of death. The disease had also affected four others in that locality. The woman who succumbed to the disease had flu- like symptoms including fever, skin lesion, meningitis, fatigue and rashes on the body. Further enquiry with family member revealed that the deceased had complaint about tick bite and scratch wound during coffee seed plucking adjoining forest areas, which reported to have lot many deer population
- **One Health approach:**
 - Animal Sector:** From the history, the veterinarians understood the link of ticks- deer proximity- plantation workers and hence suspected the cause to be deer tick. The victim of the case must be bitten by infected deer ticks from the plantations. They took sample of ticks for identification
 - Human Sector:** Observed the case study, taken into record the varied symptoms and clinical history and tentatively diagnosed the source to be from ticks from coffee plantation P health education. Advised the plantation workers to take personal protective measures while venturing into forest areas to avoid deer tick bites
 - Environment and other Sectors:** Entomologist (Parasitologist) Identified the tick, **experts from diagnostic laboratory** collected blood sample and investigated and ruled out various diseases and diagnosed to be Lyme disease caused by *Borrelia burgdorferi*

To conclude,

The major lesson learned by the above approaches is the importance of efficient surveillance, effective intersectoral collaboration, a well-designed communication strategy and sustained will to health for all. Where any of these elements has been absent or insufficient, we have been less able to detect and control the spread of infection. This approach can be further boosted by the developing One Health governance system in Kerala.

2. Need for One Health strategic framework

This OH strategic framework draft is based upon recognition of the intimate linkages among the human, animal and ecosystem health domains. It proposes an interdisciplinary, cross-sectoral approach to manage health threats through surveillance, monitoring, prevention, control and mitigation. While health threats to man and animal cannot be completely avoided, the vulnerability to various hazards can be sustainably and substantially reduced by planned prevention, mitigation and preparedness measures. Therefore, the current perceptions of public health threat management that considers emergency response services from respective department require a paradigm shift. The new approach emanates from the conviction that public health threats mitigation and preparedness should be built into the development process and it should be multidisciplinary spanning across all sectors of development. The need is to have a state specific policy that articulates its vision and strategy for health threats in the state which are more cost effective than expenditure by working as silos by different department. The urgency of the strategic framework is also driven inter alia by the unique features of the State currently facing like the incidence of Nipah virus, KFD, Avian influenza, pesticide threats, potential impact of climate change and other exotic infectious diseases.

Pooling resources will lead to economies of scale and enable common problems across systems to be addressed in a targeted manner without duplication. Successful implementation of the strategic plan will contribute significantly to the overall goal of improving public health, food safety and security, and the livelihoods of our people. This strategic plan also aims to create and maintain active collaboration between the sectors for the prevention and control of zoonotic diseases to ensure that there is timely preparedness, and a consistent and coordinated response in the event of an occurrence of a zoonotic event. It is in this regard that FAO-COHEART call upon other government departments, development partners, institutions of higher learning, civil society, private sector and the Kerala community to join us in this noble One Health initiative. This strategic plan should be considered a “living document” and is open for feedback, additions and revisions based on changing needs.

3. Objective of the interface meet

- To envision the development of a model for One Health governance in Kerala for sustainable health for people, animals and their environment
- To clarify the purpose of the One Health governance to various stakeholders
- To Identify high profile experts from Kerala for the development and implementation of governance model and surveillance network
- To suggest the process for operationalizing Kerala Model One Health disease surveillance network and emergency response
- To explore laboratory e-networking and conducting collaborative research
- To Identify One Health Capacity building for key stakeholders and setting key domains for One Health Action

4. Meeting Agenda

- **Session 1: Opening ceremony**
- **Session 2: Experts talk to sensitize about One health (citing examples of AMR and Nipah)**
- **Session 3: Development of One Health governance system in Kerala under 5 themes.**
 - **Theme 1: One Health Governance-** To develop governance structure in Kerala
 - **Theme 2: One Health Surveillance Network-** To suggest the process for operationalizing Kerala Model One Health disease surveillance network
 - **Theme 3: One Health Emergency/outbreak response-** To suggest the process for operationalizing Kerala Model One Health Emergency/outbreak response

- **Theme 4: One Health Research and laboratory networking-** laboratory e-networking and collaborative research
- **Theme 5: One Health Capacity building-** To Identify key domains for One Health Action
- **Session 4: Expert talk on Status of One Health in India**
- **Session 5: Way-forward and meeting conclusion**

5. Participants

The participants of the meet included government officials, academia, research, NGOs and experts from human health and animal health sectors of Kerala and India, technical experts from FAO and other international delegates. A total of 60 delegates participated in the meet, which included one international expert from Eco Health alliance, one national expert from Department of Animal Husbandry Dairying and Fisheries and two FAO officers who provided technical support for the workshop.

6. Interface proceedings

6.1 Session I: Opening ceremony

Dr Prejit, Officer-In-Charge, COHEART, KVASU delivered the opening remarks. He welcomed all the participants and briefed about the need for establishing and charting out the governance structure and roadmap for One Health governance in Kerala. While many networks were created in other regions of the world, there is no such governance model in India and in the light of Nipah infection and flood scenario, it is ideal that Kerala can initiate the formation of One Health Secretariat, which could include government agencies, academia and experts, private sectors and NGOs, and international organizations as stakeholders.



Dr. Sadanandan P.K, Additional Director of Animal Husbandry Department inaugurated the program and enlightened the benefit for implementing One Health governance in the state. He briefed that the challenges of EIDs and AMR require a One Health approach that supports a holistic, multisectoral, coordinated and collaborative network and ensured the support of Animal husbandry department in implementing One Health in Kerala



Key note was delivered by Dr. Jonathan Epstein, the Vice President for Science and Regional Consultant, Outreach at EcoHealth Alliance. He spoke on how functional One Health platform help to strengthen co-ordination, collaboration, networking, joint surveillance, preparedness and response to counteract health hazards and thereby enabling the policymakers, professionals and other stakeholders in contributing towards the control of emerging zoonoses and in long run help to achieve Sustainable Millennium Development Goals.

“This interface meet is the stepping stone for implementing One Health governance in Kerala” said Dr. Kuttappan N.K., District Medical Officer (Ernakulam). He urged everyone to work together and to develop a framework to move forward this initiative of establishment of One Health Governance in Kerala. The region is considered one of the ‘Global Hotspots’ for emerging and re-emerging diseases, including facing serious AMR challenges. He congratulated Centre for One Health Education, Advocacy, Research and Training for initiating the spark of hope to from One Health governance for global scientific fraternity



FAO representatives, Dr. Rajesh Dubey and Dr. Rajesh Bhatia spoke on the occasion. Dr. Dubey released the One Health Governance framework position paper for Kerala. Dr. Bhatia briefed that the international organizations such as WHO, FAO, OIE (under Tripartite agreement) have been supporting One Health approach and establishment of regional networks for early detection and sharing of information, and responding to outbreaks in a coordinated and collective manner. He further briefed that the establishment of this One Health type of governance will bring significant improvement in capacity for

disease prevention, disease surveillance, rapid response, disease emergency preparedness planning and response, and containment of AMR both at the state and country level

Dr. Joseph Mathew, Registrar of KVASU detailed that the world is experiencing increasing events of emerging and re-emerging infectious diseases, most of which originate in animals and Kerala has already experienced the success of One Health approach by containing emerging zoonoses like Nipah by multisectoral coordination and collaborative approaches.

Dr. H.R. Khanna, Assistant Commissioner, Department of animal husbandry dairying and fisheries, Dr. M. K. Prasad, Chief Disease Investigation Officer, Dr. E. K. Easwaran, Chief Forest veterinary officer, Dr. Mohandas A. C, District Animal Husbandry Officer, Calicut and Dr. Sukumaran, State epidemiologist of Directorate of Health Service spoke on this occasion.



6.2 Session II: Experts talk to sensitize about One health using examples

6.2.1 Overview of Nipah Virus

The session was handled by Dr. Jonathan Epstein who is Vice President for Science and Regional Consultant, Outreach at EcoHealth Alliance. He highlighted how One Health was key for the success of controlling Nipah virus due to its implementation at federal level. He elaborated how nipah is causing pandemics worldwide and explained the ecological drivers of emerging viral disease how the interactions between bats and humans, would result in its emergence. Every outbreak starts with a spillover. Based on outbreak study in Bangladesh, the knowledge gaps identified are in areas of virus genotype and virus dynamics. Nipah virus surveillance and control measures include, integration of human and animal surveillance, active hospital surveillance, integrated outbreak response, anthropological study and simple intervention.



6.2.2 Status of Anti-Microbial Resistance (AMR) in India and One Health approach

In this presentation, Dr. Rajesh Bhatia elaborated on Status of Anti-Microbial Resistance (AMR) in India and the need to contain AMR in coming years by One Health approach. Dr. Bhatia briefed about the Indian scenario of AMR and its impact. The magnitude of AMR is measured by 700,000 Annual deaths, 10 million Projected deaths and 3.5% Reduction in global GDP in 2050. He further emphasized that a Policy shift is required to de-sectoralize human, animal, plant and ecosystem health.

6.2.3 Need to develop One Health governance in Kerala

In this presentation, Dr. Sukumaran stressed on the need for Kerala to adopt and implement a One Health approach as threats like Nipah infection can be effectively controlled. One Health approach in Kerala will strengthen integration and inter-sectoral cooperation to prevent, detect and respond to threats of emerging infectious diseases, especially zoonotic diseases and resistance to antimicrobial agents.



6.3 Session III: Recommendations for Development of One Health governance system in Kerala

A group discussion was chaired by Prof. (Dr.) C. Latha (representing Animal health), Prof. (Dr.) G. Madhu (representing Environmental health) and Dr. Ravi Prasad Varma (representing Human health). These discussions were the main focus of the interface meet. The participants, facilitators and rapporteurs worked together in a world café style on five major themes. The groups were assigned task to forward important recommendations based on the themes allotted.



- **Theme 1: One Health Governance-** To develop governance structure in Kerala
- **Theme 2: One Health Surveillance Network-** To suggest the process for operationalizing Kerala Model One Health disease surveillance network
- **Theme 3: One Health Emergency/outbreak response-** To suggest the process for operationalizing Kerala Model One Health Emergency/outbreak response
- **Theme 4: One Health Research and laboratory networking-** e-laboratory networking and collaborative research
- **Theme 5: One Health Capacity building-** To Identify key domains for One Health Action

The outputs of this group activity are summarized below

6.3.1 Develop governance structure in Kerala

TASK: The groups were assigned the task to outline the Institutional arrangements, policy frameworks and management mechanisms in place to facilitate a One Health Approach to prevent public health threats at the animal, human and eco-system interface and ensure food safety and security.

OBJECTIVE:

- To advocate policies to advance the One Health approach in Kerala and mobilize resources and experts
- To coordinate multi-sectoral preparedness and response plans for controlling health threats at Man, Animal and Environment Interface
- To foster the exchange of selected data, information, experience and expertise across sectors



RECOMMENDATIONS

- **Establish State One Health Authority-** This will be the apex body called as One Health Secretariat (OHS) and may be chaired by the Chief minister. The OHS shall function as the top decision-making body and facilitate, coordinate, review or monitor all One Health related activities in the state. The members shall comprise of the Ministers of Health, Animal Husbandry, Environment Forest & Wildlife, Agriculture, Fisheries, Local Self Governments along with their respective Secretaries, food safety commissioners and District Administrators. A nodal officer from each of these departments would also be included in the OHS. The OHS shall lay down the State One Health policy and guidelines to be followed by the government departments and approve the One Health Plan of different department. The OHS may seek the advice from the experts from International (FAO, WHO, OIE), National or regional bodies.
- **Establish a District One Health Authority (DOHA):** The State Government should establish and constituted District One Health Authorities in all fourteen districts. The District Authority shall act as the district planning, coordinating and implementing body for health threats and take all measures for the purposes of its management in the district in accordance with the guidelines laid down by the State One Health policy. The District Administrator shall act as the Chairman of DOHA. The District Authority shall have members from various departments such as, Health, Animal Husbandry, Forest, Agriculture, Fisheries, Local Self Governments, State drug controller, Food safety Officers and organize meetings as and when required.
- **One Health Steering Committee:** During the initial phase of establishment, a One Health Steering committee can be formed who will be coordinating. The Steering Committee shall comprise of members from Animal Husbandry Department, Directorate of Health Service, Kerala University of Health Science and Kerala Veterinary and Animal Science University and co-opted members from other institutes who will work together.

6.3.2 One Health Surveillance Network

TASK: The groups were assigned the task to identify strategy for co-ordinated surveillance for public health threats using One Health integrated approach.

OBJECTIVE:

- To set up a platform for reporting active surveillance of disease both in man and animals in a Coordinated approach for the early warning, prevention and control of emerging, re-emerging and high impact public health threats.
- To make policy for sharing data collected among organizations in real time and coordination of field activities.



RECOMMENDATIONS:

- Coordinated surveillance mechanism between sectors by sharing data collected among departments in real time based on clear understanding of how the information is to be used and by whom. The existing mechanism could be modified by providing thrust to the data sharing/reporting mechanism.
- The priority threats for coordinated surveillance identified were Anthrax, Avian Influenza, Brucellosis, Hydatid disease, scrub typhus, JE, KFD, Lyme disease, Leptospirosis, Leishmaniasis, Nipah, food-borne infections (Salmonellosis), Tuberculosis, Chemicals, Pesticides and food toxins.
- Strengthen cross-border sharing of information on zoonotic diseases by periodical review meeting
- The network should facilitate sharing and harmonization of guidelines and SOPs on disease surveillance, and outbreak prevention and management
- To co-ordinate at Directorate of Health services/ Animal Husbandry by organizing quarterly meetings for sharing information on surveillance activities in human, livestock, wildlife and environment interface
- Support development of reliable and effective disease surveillance systems including cross-sectoral integrated surveillance system for zoonoses

6.3.3 One Health Emergency/outbreak response

TASK: The participants were assigned the task to identify ways to integrate human health and veterinary sectors for public health emergency/ outbreak preparedness, prevention and response in Kerala.

OBJECTIVE:

- To coordinate outbreak preparedness and response, involving human health and animal health sectors and conducting joint investigations



RECOMMENDATIONS:

- Identifying various departments for Multi-disciplinary approach in disease diagnosis and risk communication
- Sharing the information about untoward incidence among various related sectors through electronic media and organize meetings
- Develop integrated guidelines and contingency plans for coordinated emergency preparedness and response of zoonotic diseases
- Develop coordinated standard operating procedures for emergency preparedness and response.
- Conducting joint investigation during emergencies
- Creating mass public health awareness.
- Introduce technologies including computers, mobile phone data collection applications, and tele-conferencing to improve detection, monitoring and intervention for controlling the threats

6.3.4 One Health laboratory networking and collaborative research

TASK: The participants were assigned the task to explore how to foster laboratory networking and collaboration in detecting public health threats at the state level and how to propose collaborative research in pertinent domain.

OBJECTIVE

- Identify One Health priority areas and e-connect all the testing laboratories of Kerala
- To develop collaborative project to address public health threats at man-animal and environment interfaces

RECOMMENDATIONS:

- The thrust research priorities identified were AMR surveillance, surveillance for emerging & re-emerging zoonotic diseases, pesticide and antibiotic residues in food and environment
- Networking of the laboratories can be done by e-connecting the existing labs in Kerala by identifying their scope of testing parameters by calling expression of interest. This then needs to be classified at district level, state level and national level
- Map out laboratory capacities and resources in each sector
- A separate website may be constructed for the purpose which should include the list of labs, their testing parameters, SOPs as per standards in vogue, the test procedures (including costs) etc.
- Promote inter-sectoral research by establishing competitive network collaborative projects. In the light of Nipah infection., a proposal on a larger multi-year study of spillover of bat-borne viruses in Kerala was discussed under the leadership of Dr. Jon Epstein, the Vice President for Science and Outreach, Eco Health Alliance. Various departments and laboratories will work on this proposal. This is with regard to the recent Nipah viral outbreak in Kerala.
- The laboratories will be e-reporting the results
- Establish state level One Health research policy



6.3.5 One Health Capacity building and key domains for One Health Action

Task: The participants were given the task to identify institutional resources that can train for One Health, identify stakeholders and key domains or core areas where One health can be approached

Objective:

- For effective utilization of expertise and resources available in the state that can address One Health challenge
- To identify stakeholders who can act as expert or who can participate
- To identify key domains or core areas where One health can be approached

Recommendations:

- The following departments/ institutions are identified to be ideal in conducting various capacity building activities of One Health in the state level. This includes, Departments of Community Medicine of KUHS, Departments of Veterinary Public Health of KVASU and COHEART, Department of Animal Husbandry, Department of Health Services, ICAR Institutions- CIFT, CMFRI, ICAR-IVRI, Kerala State Drugs Control Department, Department of Food Safety- FSSAI, State Disaster Management Authority, The Marine Products Export Development Authority of India etc.
- Following are the stakeholders who needs to be trained on One Health. This includes, relevant Ministerial staffs responsible for human health; livestock; food safety; wildlife; and environment, academic and research institutions, Allied ministries: Ministries responsible for Emergency/Disaster Management, Finance, Foreign Affairs, Trade and Industry, Homeland/Interior/Planning and Development, Parliamentarians, Media partners, Social scientists, Civil societies (e.g. Human and Animal Rights Groups, NGOs, etc) and Private sectors and corporate companies
- Sensitization on One Health through different media and other forum
- Increase awareness of the OH concept in high secondary schools
- Develop training programmes for existing professionals to promote the sharing of knowledge, skills and resources to address current and future One Health needs
- Communicating One Health concepts to policy and decision makers
- To extend KVASU's PG courses on One Health to all the participating departments



- Key domains or core areas agreed upon by the group where One health can be approached includes Antimicrobial resistance, Zoonotic diseases, Environmental hazards and climate change, Wild life conservation and disease management, Food Safety, pollution and waste management and disaster management.
 - **Antimicrobial resistance**- Antimicrobial resistance is a global problem of complex epidemiology and Kerala is not an exception. Impact of Antimicrobial Resistance is overwhelming having implications on overall health as well as on economy, politics and developmental practices, thus affecting the livestock production, human health and a decline in global exports. Antibiotic resistance is a direct consequence of the selection pressure from antibiotic use in humans, animals and the environment where they live in. Since antibiotics are used for humans and animals and they find their ways into waters, only a One Health approach will identify solutions.
 - **Zoonotic diseases**- Evidence based research has demonstrated that over 60% of human pathogens are of zoonotic origin, whereas 75% of diseases considered to be emerging or re-emerging are also zoonotic. Over the last 3 decades, new infectious agents and diseases affecting humans have emerged in Kerala at a rate of more than one per year, sometimes resulting in high morbidity and mortality in humans and animals, calling for an urgent One health action
 - **Environment hazards and Climate change**- Effects of climate change on human health can be expected to be mediated through complex interactions of physical, ecological, and social factors. Collaboration between veterinary, medical, environment specialists, anthropologists and public health professionals to understand the ecological interactions and reactions to flux in a system can facilitate clearer understanding of climate change impacts on environmental, animal, and human health. The global environment is rapidly changing, and animals and human beings are exposed to shared environmental health risks.
 - **Food Safety** -We face a global situation where an estimated 925 million people go hungry. Adoption of an integrated approach to food safety throughout the food chain “from farm to fork” is critical for preventing food borne diseases and other food safety hazards. Food borne illness and food safety issues constitutes an unmanageable enigma especially in developing and underdeveloped countries which are generally lack in better surveillance, modern traceability and diagnostic methods to locate and reports such outbreaks.
 - **Disaster Management**- Disaster management plans are multi-layered and are aimed to address such issues as floods, hurricanes, fires, bombings and even mass failures of utilities or the rapid spread of disease. Kerala received heavy monsoon rainfall, which was about 256% more than the usual rain fall in Kerala, on the mid-evening of August 8, resulting in dams filling to capacity. Over 483 people died, 14 are missing and at least a million people were evacuated. Also more than 10,000 livestock were lost. An integrated approach was defined by the State Disaster management Authority under the provision laid down by Disaster management policy 2005 where all the involved state department should execute their own department management plans and should be connected to the district disaster management authority via the district administrator.
 - **Pollution and wastes**- Waste contaminating water supplies can cause disease outbreaks and can contribute to disease manifesting themselves on different time scales. Initiatives to manage solid and liquid wastes do not only support public health, but often promote socioeconomic development and well-being as well. Millions of people are exposed to dangerous levels of biological contaminants and chemical pollutants in their drinking-water due to inadequate management of urban, industrial or agricultural wastewater. Therefore, the environment-human-animal interface should be considered together when thinking of avoiding catastrophes.
 - **Wild life Conservation and Diseases**-The extinction of endangered animal species is one of the major challenges faced today, for which approaches like One Health is needed. Habitat destruction and man-made changes in the landscape together with the introduction of alien species are significant environmental variables that affect the ecology of infectious diseases in wild. Wild animals often share exposure risks from noninfectious disease threats, such as air and water quality problems, pesticides, lead, and carbon monoxide.

6.4 Session IV: Expert talk on Status of One Health in India

Dr. H.R. Khanna, Assistant Commissioner, Department of Animal Husbandry Dairying and fisheries elaborated the status of one health in India. He emphasized that the lesson learnt from the last two decades regarding the emerging and re-emerging infectious diseases has spotlighted the need to adopt a multi-sectoral, multi-discipline, integrative approach at local, national and global level to prevent and control emerging and re-emerging infectious diseases in order to attain optimal health for people, animals and the environment. He further mentioned that the most frequently cited examples for One Health approach in India was Avian Influenza and AMR. First outbreak of Avian Influenza was reported in 2006 in Maharashtra and Gujarat Confirmation of testing at NIV, Pune. Following this there was Joint declaration, Joint press notes (Human- Animal sectors), media briefing Joint control and containment operations, Joint trainings of RRTs by Health and Vets (conducted by NCDC), Joint awareness programmes on TV, Radio, Newspapers, Joint trainings of vets and wildlife officials on control and containment of Avian influenza (by DADF)



7. Feed back

All the participants expressed their satisfaction with the outcomes of the consultation meet, and extended their appreciation and thanks to FAO and COHEART for taking this important initiative of establishing the One Health System thinking in Kerala. The participants responded that the workshop has achieved all the set objectives very well (55.56 %) to well (44.44 %). The majority of the participants (61.11–83.33 %) also responded that the usefulness and relevancy of Themes covered in the group work session were 'Extremely useful/relevant'. The participants felt that the workshop duration was sufficient (88.89%), neither too short nor long. The majority of them also felt the logistic arrangement were handled very well to exceptionally well (61.11%). All the details of the evaluation are in Annexure 4.

8. Concluding Remarks

Dr Prejit emphasized that the success of the consultation meet is achieved if each individual participant provides full commitment and take ownership and leadership towards establishing a fully functional One Health Secretariat in Kerala. Kerala model One Health response goes beyond the traditional approach of sector wise disease surveillance, outbreak investigations and response to a collaborative approach. It also includes new competencies around leadership/governance and efficiencies in resource utilisation. In the past, the Department of Health Service, the Animal husbandry department, other government organisations, academic institutions and NGOs had separate roles with little overlap. Despite limited resources, Kerala One Health approach is intended to develop collaborative leaders committed to improving health equity and social justice by addressing health disparities that impact on efficiency by promoting shared resources and collaboration among those working at the animal (wildlife, livestock and companion animals), ecosystem and human health interface.

Dr Rajesh Bhatia emphasized 6 C's for One Health which included **C**onsensus among stakeholders, **C**ollaboration among professionals, **C**ooperation among interdisciplinary groups, **C**oordination among partner agencies, **C**ommitment (Political and financial) by donors, partners, regional organizations and national governments and **C**hief minister's involvement. All participants were thanked for actively participating in the workshop and for showing their great interest and commitments. The Key elements in framework for OH implementation include political commitment, policy formulation, programme development, sustained farming, knowledge sharing, collaboration, capacity enhancement and civic authority's involvement. Dr. Bhatia informed that OH is a validated, holistic, simple and powerful approach, warranting multi-sectoral and multidisciplinary approach. India's National Action Plan for AMR is an example of OH approach

Moving forward, Kerala government should embrace the concept of 'oneness' to develop common policies, approaches and evaluations that can feed into action plans and improved health infrastructure such as providing better equipped laboratories and data tracking. It is now well known that No single individual, discipline, sector or Ministry can pre-empt and solve complex HEALTH problems. Hence, International Organization (FAO, OIE, WHO) have endorsed One Health concept. Currently, SAARC Countries are drafting framework to establish South Asia One Health Disease Surveillance Network. Although India has initiated One Health action strategies for control of emerging diseases like Avian Influenza, nothing much has progressed. Hence, Kerala with a robust health system can only initiate One Health Governance and act as role model for the country.

9. Acknowledgements

COHEART, KVASU would like to gratefully acknowledge the strong technical and financial support extended by FAO of United Nations (India). The centre would also like to extend sincere appreciation and thanks to the partners of the interface meet, Directorate of Health Services and Animal Husbandry Department (SIAD, Palode). COHEART would also like to thank all participants, facilitators, media personnel's and hotel staffs for making the interface meet a very interactive, productive and successful one!

10. Pre workshop meeting on project formulation

A pre workshop meeting was held on 25/09/2019 at the workshop venue. The meeting was held to discuss on formulation of a One Health project which can address the recent Nipah incidence in Kerala. The discussion was attended by Dr. Jon Epstein, Vice President, Eco Health Alliance, Dr. Rajesh Bhatia, FAO, Dr. Rajesh Dubey, FAO, Dr. Arun Zacharia from Forest Department, Kerala and Dr. Prejit and Dr. Jess Vergis from COHEART. The discussion was held to develop a project on One Health Surveillance for Spillover of Zoonotic Viruses in Rural Communities of Kerala. The project shall be proposed with the objective to address henipa and filovirus spill over from wildlife-livestock-humans. Dr. Jon Epstein will prepare the draft proposal and will circulate among the other members.

Annexure 1a. Workshop agenda

Day 1: Wednesday, 26 September 2018

Session 1. Opening Session		
08.30 – 09.00	Registration	
09.00 – 09.10	WELCOME REMARKS	Dr. Prejit , Officer-in-Charge, COHEART
09.10 – 09.20	PRESIDENTIAL ADDRESS	Dr. Joseph Mathew , Registrar, KVASU
09.20 – 09.30	INAUGURATION	Dr Sadanand , Additional director, AHD
09.30 – 09.45	KEY NOTE ADDRESS	Dr. Jonathan Epstein , Vice President for Science and regional Consultant, Outreach at EcoHealth Alliance
09.45- 10.15	FELICITATIONS	Dr. Kuttappan N.K. , District Medical Officer (Ernakulam) Dr. M. K. Prasad , Chief Disease Investigation Officer Dr. Mohandas A. District Animal Husbandry Officer, Calicut Dr. E. K. Easwaran , Chief Forest veterinary officer Dr. H.R. Khanna , Assistant Commissioner, Department of animal husbandry dairying and fisheries Dr. Sukumaran A , State epidemiologist of Directorate of Health Service spoke on this occasion.
10.15– 10.30	INTRODUCTION OF THE PARTICIPANTS	Participants and facilitator
10.30–11.00	Photo session followed by Tea/Coffee	
Session 2. Experts talk to sensitize about One health using examples		
10.30 – 11.30	Overview of Nipah Virus	Dr. Jonathan Epstein , Vice President for Science and regional Consultant, Outreach at EcoHealth Alliance
11.30 – 12.00	Q & A and Discussion	
13.00 – 14.00	Status of Anti-Microbial Resistance (AMR) in India and One Health approach	Dr. Rajesh Bhatia , FAO Consultant
14.00 – 14.30	Q & A and Discussion	
12.00 – 13.00	Lunch break	
Session 3. Development of One Health governance system in Kerala		
	Need for One Health Governance in Kerala	Dr. Sukumaran A , State Epidemiologist, Directorate of Health Service
14.00 – 14.30	Q&A and Discussion	
15.30 – 16.00	Tea/Coffee break	
14.30 – 15.30	Group Exercise and Discussion <ul style="list-style-type: none"> ▪ Theme 1: One Health Governance- To develop governance structure in Kerala ▪ Theme 2: One Health Surveillance Network- To suggest the process for operationalizing Kerala Model One Health disease surveillance network ▪ Theme 3: One Health Emergency/outbreak response- To suggest the process for operationalizing Kerala Model One Health Emergency/outbreak response ▪ Theme 4: One Health Research and laboratory networking- e-laboratory networking and collaborative research ▪ Theme 5: One Health Capacity building- To Identify key domains for One Health Action 	
18.30 onwards	Reception dinner	

Day 2: Thursday , 27 September 2018

Time	Activity	Facilitator
09.30 – 09.45	Recap of Day 1	Dr. Prejit Officer-in-Charge, COHEART
Session 5: Status of One Health in india		
09.45- 10.30	One health updates in India	Dr. H.R. Khanna, Assistant Commissioner, DADF, Gol
10.30– 11.00	<i>Tea/Coffee break</i>	
Session 5: Development of One Health governance system in Kerala (Contd)		
11.00 – 13.00	Presentation of interface meet outcomes <ul style="list-style-type: none"> ▪ Theme 1: One Health Governance ▪ Theme 2: One Health Surveillance Network ▪ Theme 3: One Health Emergency response ▪ Theme 4: One Health Research & lab networking ▪ Theme 5: One Health Capacity building 	
13.00 – 14.00	Lunch break	
14.00 – 15.00	<ul style="list-style-type: none"> ▪ Discussion on way-forward 	
15.00 – 15.30	<i>Tea/Coffee break</i>	

Annexure 1b. ORGANIZING COMMITTEE

Sl. No	Committee	Members	
1.	Patron	<ul style="list-style-type: none"> ○ Shri. Anil X, IAS, Vice Chancellor, Kerala Veterinary and Animal Sciences University 	
2.	Co Patrons	<ul style="list-style-type: none"> ○ Dr. Joseph Mathew, Registrar and Director of Entrepreneurship, Kerala Veterinary and Animal Sciences University ○ Dr. N. Ashok, Director of Academics and Research, Kerala Veterinary and Animal Sciences University ○ Dr. K. M. Syam Mohan, Finance officer, Kerala Veterinary and Animal Sciences University 	
3.	Chairperson	<ul style="list-style-type: none"> ○ Dr. C. Latha, Dean, College of Veterinary & Animal Sciences, Mannuthy 	
4.	Co-Chairperson	<ul style="list-style-type: none"> ○ Dr. Koshy John, Dean, College of Veterinary and Animal Science, Pookode 	
5.	General Convenor	<ul style="list-style-type: none"> ○ Dr. Sunil B, Professor, Dept of Veterinary Public Health 	
6.	Organizing Secretary	<ul style="list-style-type: none"> ○ Dr. Prejit, Officer-In-Charge, COHEART 	
7.	Co-Organizing Secretaries	<ul style="list-style-type: none"> ○ Dr. Jess Vergis, Co-ordinator, COHEART ○ Dr. Asha K, Asst. Prof, Dept. of VPH, CVAS, Pookod 	
8.	Committee Conveners and members	Convener	Members
	Invitation	<ul style="list-style-type: none"> ○ Dr. Shibu K Jacob, Asst. Prof, CLPR 	<ul style="list-style-type: none"> ○ Dr. Anu George, Asst. Prof, CLPR
	Registration and Inaugural Session	<ul style="list-style-type: none"> ○ Dr. Bincy Mathew, Asst. Prof, VPH 	<ul style="list-style-type: none"> ○ Dr. Hamna Hakim ○ Dr. Manjushree T. R
	Stage and Technical Session	<ul style="list-style-type: none"> ○ Dr. Vrinda Menon, Asst. Prof, VPH 	<ul style="list-style-type: none"> ○ Dr. Annie Navomi Philip ○ Dr. B. Chaitanya Kumar
	Publicity and Photography	<ul style="list-style-type: none"> ○ Dr. Deepa Jolly, Asst. Prof, VPH 	<ul style="list-style-type: none"> ○ Dr. Solomon Rajkumar ○ Dr. Suma N
	Hospitality	<ul style="list-style-type: none"> ○ Dr. Deepthi Vijay, Asst. Prof, VPH 	<ul style="list-style-type: none"> ○ Dr. Anisha K. N ○ Dr. Sreekutty SS
	Food, Accommodation and Transportation	<ul style="list-style-type: none"> ○ Dr. Jess Vergis , Asst. Prof, VPH 	<ul style="list-style-type: none"> ○ Dr. Pratheesh P. T ○ Dr. Asif M. Hebbal

Annexure 2: Implementation strategy of One Health

The large and ever-increasing number of national, regional, and international meetings being organized under the One Health umbrella serves as testament to the importance and growing acceptance of this approach when addressing issues at the human–animal– ecosystem interface. To make the One Health a reality, there should be frequent meetings and interactions between human, animal and environment health experts at different levels and discuss the topics of common Public Health interest and exchange the information. Veterinary Colleges / Institutions and Medical Colleges/ Hospitals should work out for a common research projects, provide clinical materials and clinical history for research and investigations/ Postgraduate research work



One Health Team- Who all can play lead roles

Team Member	Examples of skills or roles that they play in a One Health team
Veterinarian	For animal health and food safety issues, epidemiology of animal diseases
Physician	For human health issues, epidemiology of human diseases
Nurse	For human/community health issues
Public Health Worker	For community health issues, disease prevention strategies, epidemiology, communicable disease knowledge
Epidemiologist	Epidemiology, disease control, surveillance, questionnaire design
Wildlife Scientist	Wildlife ecology, zoology
Local Leader/ Politician	Important for support and any action in the local community
Environmental Health Worker	Assess environmental contamination, source of disease, alteration of environmental factors
Ecologist	Connection between organisms and the relevant components of the environment
Economist	Assessing financial impact of the disease and the cost of the recommendations for control or eradication
Communications Specialist	Risk communication, interaction with media, engaging with communities
Emergency Responder	For acute outbreaks or disasters
Laboratory Technician	For confirmation of organism causing the disease
Pharmacist	For treatment of disease
Logistician	Outbreak response logistics
Public Affairs/Marketing	For interactions with the media and the public
Information Technology Specialist	For information technology, data analysis, data storage and data sharing
Social Scientist	For culture and group dynamics affecting risk, transmission or prevention

Points to consider for Operationalizing One Health approach *(Taken from High-Level Technical Meeting to Address Health Risks at the Human-Animal-Ecosystems Interfaces)*

Political will and high-level commitment-The existence of sufficient political will is a basic ingredient for successful cross-sectoral collaboration. The will to engage in cross sectoral approaches must be present from management at every administrative level, from the highest levels of government, including the ministries responsible for human and animal health, to the technical units. Such high-level commitment is also required to encourage the cultural and behavioural changes that might be necessary within institutions. For this individuals must be convinced that cross sectoral approaches work better than conventional vertical approaches. A clear demonstration that cross-sectoral collaboration for addressing health risks at the human–animal–ecosystem interface is more efficacious and/or cost-effective, i.e. a ‘proof of concept,’ is required.

Trust-Trust among partners and among institutions is an essential ingredient for effective cross-sectoral collaboration. None of the other cross-sectoral elements is possible or sustainable unless individuals in the different sectors trust each other. Transparency and communication are essential components of trust. Trust is difficult to establish and easy to destroy. Once destroyed, negative feedback loops are initiated that make trust even harder to re-establish. Partners and institutions must also have technical confidence in each other’s capabilities, and be seen as taking responsibility for their actions. Therefore, all players must prioritize being accountable and credible, as well as trustworthy.

Common objectives and priorities-Collaborations are more likely to be successful and sustainable when common objectives are identified. To ensure adequate engagement of all partners, shared ground must be actively sought early in the planning of activities.

Shared benefits-In order for partners to engage in an activity, they must be convinced that they would benefit, directly or indirectly. The benefits of cross-sectoral collaborative activities are not always obvious for each sector, especially during the relationship-building and planning phases; there may be extra work necessary to engage partners, and the outcomes may seem to benefit some partners more than others.

Strong governance structures and aligned legal frameworks-The different sectors responsible for human, animal, or ecosystem health generally have different mandates and often function under different sets of international standards and legal frameworks, at international and national level. Effective cross-sectoral collaboration is supported by good governance within sectors and an understanding of the potential constraints, overlaps, and/or gaps in the mandates and legal frameworks across the sectors. Activities at the national level, including enacting legislation to facilitate crosssectoral collaboration, should be based on the governance and standards issued from the international organizations (e.g. WHO International Health Regulations (IHR) and OIE and Codex international standards); this effort would be best supported by further harmonization of these international standards.

Adequate and equitably distributed resources-The finite nature of resources requires both a careful evaluation of the existing resources and identification of options for prioritization and allocation of these resources. In some countries a political decision is required on the allocation of budgets linked to health priorities. For cross-sectoral projects, the distribution of resources may be harder to justify and implement than for allocation within a sector and require more complex decisions coordinated among agencies, necessitating sufficient political will and an understanding of the shared benefits. Finance options for countries in need must be developed in consideration of national priorities, and solutions found to provide funding to countries to both strengthen sectoral systems and facilitate implementation of cross-sectoral approaches

Identification and involvement of all relevant partners-Taking into account the varied aspects of a given health issue at the human–animal–ecosystem interface, the development of a common vision and plan is the crux of One Health and the rationale for implementing cross-sectoral approaches. Identification of all relevant partners at all relevant administrative levels, and their inclusion from planning through implementation, can increase efficiency and sustainability. Partners may more willingly engage and maintain their involvement when they are recognized and

included as a partner early in the process. Inclusiveness also requires looking outside the sectors to include non-governmental partners, communities, and the public, who might be called upon to contribute information or resources.

Coordinated planning of activities-Efficiency and sustainability need to be addressed early in the planning of all collaborative activities, from time-limited projects to permanent national cross-sectoral programmes and systems. Coordinated planning ensures that many of these key supporting elements can be simultaneously addressed, i.e. objectives, benefits, and resource allocation can be clearly identified for all relevant partners, as described above. Planning should start with the identification of relevant partners by the lead institution and continue with all contributing their part in developing objectives and activities to address the problem, defining tasks to be accomplished, identifying the partner(s) most appropriate (based on expertise or infrastructure) to address each task, defining clear roles and responsibilities, timelines, and milestones, and allocating funds based on each designated role

Guidance on implementation of cross-sectoral collaborations-One constraint to the broad, consistent implementation of effective cross-sectoral approaches is a lack of guidance and tools for development and implementation. Guidance on best practices for both policy and technical aspects of cross-sectoral collaboration would provide standard, agreed elements for discussion, alignment, prioritization, and implementation by national ministries and other entities considering taking cross-sectoral approaches.

Capacity development-Capacity development to improve the implementation of cross-sectoral collaboration is necessary, including training that promotes the benefits of working together cross sectorally, combined with providing tools to allow joint work. Training and other capacity development should be conducted in a cross-sectoral manner, including jointly identifying and solving problems, to allow understanding of each other's perspectives and to demonstrate immediately the benefits of working cross-sectorally.

Strong and effective health systems within the individual sectors-Notwithstanding the importance of establishing and ensuring collaborative aspects of national health systems, the strength and quality of the individual sector national health systems is recognized as crucial to being able to contribute to cross-sectoral approaches. Without the capacity to prevent, detect, identify, and respond effectively to threats within each individual sector, national systems will not have the capacity to address health threats at the animal-human-ecosystem interface.

Annexure 3: Evaluation and feed back



Food and Agriculture Organization
of the United Nations



TWO DAYS INTERFACE MEET
Envisioning the institutionalization of One Health for combating emerging public health threats in Kerala

(TOWARDS DEVELOPMENT OF ONE HEALTH GOVERNANCE IN KERALA)

26-27 September 2018

Organized by COHEART, KVASU

In Association with

Directorate of Health Services, Trivandrum

State Institute of Animal Diseases, AHD, Trivandrum

Sponsored by FAO of United Nations

A. Presentation feedback. Focus on One Health through understanding of Nipah and AMR and need for One Health governance				
	Not well at all (%)	Reasonably well (%)	Very well (%)	Exceptionally well (%)
1. How well did the presentations capture information on Nipah, AMR and One Health governance in Kerala?	0	0	38.89	61.11
2. Were the presentations clear and relevant?	0	0	22.22	77.78

B. Purpose of the One Health Governance in Kerala				
	Not well at all	Reasonably well	Very well	Exceptionally well
3. How well has the overall purpose of a proposed One Health Governance in Kerala been described?	0	16.67	44.44	38.89
4. How well have we described some of the deliverables such as what One health Secretariat could achieve?	0	16.67	61.11	22.22

5. How well have we described who could be the key stakeholders in the One Health Governance?	0	5.56	61.11	33.33
C. Develop a robust structure for One Health Disease Surveillance				
6. How well have we described how this network could be established and governed?	0	11.11	61.11	27.78
7. How well have we described a possible secretariat model for the network?	0	.56	55.56	44.44
8. How well have we identified roles and expectations of the network and its members?	0	11.11	61.11	22.22
D. Develop a road map/next steps for a One Health Governance in Kerala				
9. How well have we identified priority actions to collectively address priority disease surveillance and information sharing?	0	5.56	44.44	50
10. How well have we identified actions/next steps to improve or strengthen disease outbreak preparedness, investigation, and response?	0	11.11	50	38.89
E. How useful and relevant were the themes covered in the group work?				
	Not useful/relevant at all	Moderately useful/relevant	Extremely useful/relevant	

11. One Health Governance	0	16.67	83.33
12. One Health Surveillance Network	0	38.89	61.11
13. One Health emergency/outbreak response	0	27.78	72.22
14. One Health research, networking and partnerships	0	16.67	83.33
15. One Health capacity building	0	27.78	72.22
F. Achievements of meeting objectives and its duration			
16. How well were the objectives of the workshop achieved?	Not at all	Achieved well	Achieved very well
	0	44.44	55.56
17. What is your opinion about the length of the meeting?	Too short	Sufficient	Too long
	0	88.89	11.11
G. Logistics arrangement			
18. How well was your food, accommodation and other logistics handled?	Not well at all	Reasonably well	Very well
	0	0	38.89
19. How could this interface meet be improved?			
20. Any other comments or suggestions?			

Annexure 4: One Health in Media

KERALA

Framework for One Health programme



SPECIAL CORRESPONDENT

KOCHI, SEPTEMBER 27, 2018 00:00 IST
UPDATED: SEPTEMBER 27, 2018 03:53 IST

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A draft framework for the implementation of One Health, a programme for food safety and control of zoonoses (diseases that spread from animals to humans) and combating antibiotic resistance is being prepared for the State. It came up for discussion at the two-day interface meet that began at Kochi on Wednesday.

P.K. Sadanandan, Additional Director, Animal Husbandry Department, inaugurated the programme.

The programme was organised by the Centre for One Health of Kerala Veterinary University in association with the Directorate of Health Services.



Kozhikode: Learning a lesson from its fight against the Nipah virus, the state government has decided to set up a One Health Surveillance Group for

[public health and disease surveillance](#)

in the state. The surveillance will be carried out with 'one health' perspective, recognizing the interdependencies of human, animal and environmental health.

The initiative would bring together experts in human health, wildlife and animal health, environment and allied sectors for inter-disciplinary and systematic collection and analysis of data to detect health events, including infectious diseases, at human-animal-environmental interfaces.

It assumes significance as 75% of the emerging infectious diseases are zoonotic (diseases spread between animals and people).

Additional chief secretary (health and family welfare) Rajeev Sadanandan said that countries like Bangladesh have put in place such surveillance mechanisms following Nipah outbreaks.

"The state currently has a One Health working group on anti-microbial resistance (AMR), involving doctors and representatives from veterinary, fisheries, poultry and other sectors. In the back drop of Nipah and other zoonotic diseases like Leptospirosis in it imperative to have a One Health concept for surveillance as well," Sadanandan added. The concept recognizes that the health of people is connected to the health of animals and the environment.

Meanwhile, experts have called for policy changes to implement the One Health approach to counter the threats from zoonotic diseases. "We plan to submit a report to the state government and the Kerala state planning board, highlighting the need to set up a One Health secretariat. Even though our health service system is very robust, there is need for a more formal inter-sectoral and multi-disciplinary mechanism," said Dr Prejit, officer in charge of the Centre for One Health Education, Advocacy, Research and Training (Coheart) at the Kerala Veterinary and Animal Sciences University, Wayanad.

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Call for One Health approach to prevent infectious diseases - The Hindu

THE HINDU

KERALA

Call for One Health approach to prevent infectious diseases

Mini MuringatheriThirissur

MINI MURINGATHERI, MAY 22, 2018 23:16 IST
UPDATED: MAY 22, 2018 23:16 IST

The initiative promotes collaboration among fields to identify root of diseases

As infectious diseases keep the State Health Department on its toes, experts call for policy changes to implement the inter-disciplinary One Health approach to control them.

"The current outbreak of Nipah viral infection and the outbreak of Avian influenza during 2015-16 clearly indicate that new zoonotic threats are emerging in the State. More emphasis should be given on an inter-disciplinary approach to surveillance and control of diseases," says T.P. Sethumadhavan, former Director of Entrepreneurship, Kerala Veterinary and Animal Sciences University (KVASU).

"The State urgently requires state-of-the-art viral disease diagnostic centres, including high security virology lab," he points out.

Of the total viral diseases, 75 per cent are zoonotic in nature.

The Nipah infection is a sporadic incidence. Chances for further spread of the infection is comparatively low taking into account the epidemiological analysis of the disease during the past two decades. But sufficient biosecurity and disease control measures were the need of the hour, he adds.

"Across the world, the concept of One Health for human beings, animals, and nature is emerging. This concept will address all the health-care issues on a sustainable basis. Kerala Veterinary and Animal Sciences University had launched a One Health centre, COHEART (Centre for One Healthy Advocacy Research and Training), to popularise this concept," says B. Sunil, Professor, Department of public health, KVSU, Mannuthy.

The One Health initiative promotes collaboration between the fields of medicine, veterinary medicine, and environmental sciences to improve the interconnected health of people, animals, and ecosystems.

"Only by studying the human-animal-environmental interface will we be able to get to the root of the outbreak. Human and animal health benefits a lot by this approach. It results in great economic benefits as diseases are tackled and prevented at source," said Dr. Sunil.



ENVISIONING ONE HEALTH GOVERNANCE IN KERALA FOR THE CONTROL OF EMERGING PUBLIC HEALTH THREATS



One Health Governance in Kerala

With the recent emergence of Avian Flu, Kyasannur Forest Disease and Nipah virus in Kerala, the state government is aiming to prioritize 'One Health' (OH) approach that brings together the experts from human health, animal health (including wildlife), environment and allied sectors to detect and control health events at human-animal-environmental interfaces. This sustainable and multi-sectoral collaboration mechanism will detect, respond and prevent any public health threats that Kerala may face in future. Although there are many success stories of One Health approach in Kerala, there still do not exist any formal mechanism of communication between health and veterinary sectors. As a pioneer One Health Centre in Kerala, the Centre for One Health Education, Advocacy, Research and Training (COHEART) with support from **FAO of United States** organized an expert consultative meeting on "Development of One Health Governance in Kerala for the control of emerging Public Health Threats" during September 2018. The **Animal Husbandry Department** and **Directorate of Health Services** were the collaborating partners. The objective was to develop a model for One Health Governance in Kerala for sustainable health of people, animals and their environment. The event brought together different stakeholders from human health, animal health, wild life, agriculture, environment, drug authorities and research institutes to discuss the importance of One Health approach in controlling emerging public health threats and to recommend the establishment of One Health governance and a potential OH secretariat for its function.

One Health Approaches in Kerala



Avian Flu outbreak (South Kerala, 2014)

- **Veterinary Sector:** Securing & culling affected birds, 24 hour control rooms, Prompt prophylaxis, Awareness camps, Dead bird Surveillance, Biosecurity, Action plan
- **Health Sector:** Prophylaxis (flu drug), Health checkup, Biosecurity, Provision of PPE's, Health Advisory Services
- **Environment and forest:** Reporting unusual deaths of wild birds, Post mortem of wild birds, Bird Sampling
- **Laboratories:** Pathogen detection
- **District Administration:** Co-ordinating control measures, Farmers compensation for culling their birds
- **Media:** Communicating Disease Status in consultation with Govt. Dept's
- **Food Safety Dept:** Meat Advisory
- **Police Dept:** Law and order
- **Others:** WHO-OIE-FAO-National Inst.

LYMES DISEASE 2013- Led to One Health Initiative in Kerala



The Human Health Sector identified acute febrile illness with rash and myalgia and derived at the diagnosis after its detection at laboratory (MCVR). Communicated to Animal Health Sector

The Animal Health Sector after receiving communication Evaluated the link of ticks and deer. Observed high deer population in the disease reported area. They took sample of ticks & identified.

Both human & Animal health sectors re-visited the affected areas, organized meeting & follow up actions by inviting allied departments. Sensitized **District Administrator**. Regular review meeting.

Key outcomes of the interface meet

- A structure for a **functional Kerala model One Health governance** including purpose of the secretariat, surveillance structure and next steps were documented
- It was proposed to form a **One Health Steering Committee (OHSC)** with members from Animal Husbandry Department, Directorate of Health Service, Academicians from University, premier institutes and from Environment related sectors. OHSC shall plan and co-ordinate future activities in the development of governance
- **Key domains of action** for One Health Steering Committee (OHSC) were defined. This were classified under two domains
 - **One Health Core:** Antimicrobial Resistance, Zoonotic/ Emerging Infectious diseases, Food Safety & Hazards
 - **One Health Allied :** Environmental hazards, Wild life disease management, Pollution and waste management and Disaster/ crisis management
- Under each domain, OHSC will develop **Kerala state One Health action plans** with technical advice from FAO-WHO-OIE
- **Communication flow** between sectors during incidence of disease was documented
- **Developed plan for coordinated surveillance** for addressing public health threats using One Health integrated approach
- Developed plan to integrate human health and veterinary sectors for catering **public health emergency and outbreak preparedness and response**
- Developed procedures for **laboratory e-networking** and detecting public health threats at the state level and emphasized need for collaborative research across sectors
- Identified **institutional resources** and **capacity building areas** to empower professionals on One Health approach



KFD outbreak (North Kerala, 2015)

- **Veterinary Sector:** Tick control in animals, Education & awareness class, Epidemiological surveillance, workshops/ review meetings, Vector control
- **Health Sector:** Disease diagnosis, Disease Management in Man, Door to door Fever surveillance, Vaccination, Treatment guidelines, Epidemiology
- **Environment and forest:** Monkey deaths- Control Burning @ hotspot
- **Laboratories:** Pathogen detection (Labs- MCVR, NIV)
- **District Administration:** Co-ordinate KFD control activities, Review meeting
- **Media:** Communicating Disease Status in consultation with Govt. Dept's
- **Entomologist:** Tick identification in forest areas
- **Tribal development Dept:** Compensation for bereaved families

Expert from DHS and DADF Dr. Sukumaran A and Dr. Khanna



Expert from FAO: Dr Rajesh Bhatia



Release of Position paper



Participants



Group Discussion



Eco Health - Dr. Jon Epstein



Nipah outbreak (North Kerala, 2018)

- **Veterinary Sector:** Farm biosecurity, vigilant animal care, Fruit bats sampling, Nipah awareness classes, Advisory services for farmers
- **Health Sector:** Diagnosis, treatment and prophylaxis of patients, Awareness and Advisory Services, Personal protective wares, Biosecurity measures, Nipah guidelines
- **Environment and forest:** Trace the source of infection Fruit bats
- **Laboratories:** MCVR- Manipal, NIV- Pune, NIHSAD-Bhopal
- **District Administration:** Co-ordinating Nipah Cell, Review meetings
- **Media:** Updation of Disease Status in consultation with Health/ Vety. Dept's
- **Central team, Research Centre, Universities, NGO's:** Health & Safety Advisory, Situation monitoring, Research, outbreak tracking
- **OIE-FAO-WHO:** Providing top level leadership on Global Health matters
- **Central and State Ministries:** Over all management of the outbreak scenario

Conclusion

One Health type of collaborative Governance and formal approach will soon be operationalized in Kerala which will pave way for different sectors to respond to public health threats under one common umbrella. COHEART, KVASU would like to acknowledge the technical and financial support extended by FAO of United Nations (India) for organizing the interface meet. Special appreciation and thanks to Directorate of Health Services & Animal Husbandry Department of Kerala for endorsing One Health approach.



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