



One Health Training Manual

(For Elected Representatives, Officials,
Mentors and Volunteers)



Department of Health & Family Welfare
Govt. of Kerala

Kerala.HEALTH

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INTRODUCTION

Kerala had its own unique health culture from a very long time ago. A practice that emphasized cleanliness and used natural materials as medicine. Our balanced life was severely affected by world wars, droughts, food shortages, heavy rains, and floods. Epidemics and deaths were rampant at that time. The first cabinet of Kerala, which came to power in 1957, mainly focused on the fields of health, education, and agriculture. As a result of this, the importance of public health care in Kerala increased. However, rapid population increase, spread, deforestation, and awareness of environmental protection have led us to realize that health security is impossible through human intervention alone. It is clear that all living things and the waste they produce play a major role in the spread of disease in the environment. The spread of covid, bird flu, swine flu, Ebola, nipa, monkey flu and rat flu testify that this situation is not specific only in Kerala but is prevalent all over the world. Dengue fever, malaria, chikungunya, etc. still frighten us. This condition convinces us that man, nature, and other living things are elements within the same circle. The decentralization of power implemented through public planning has provided ample opportunities for local bodies to intervene in the field of One Health. This handbook on One Health has been prepared for the training of people's representatives, coordination committee members, mentors, social welfare workers etc. We hope this will lead to a better One Health approach. We appreciate all the experts who took initiative in preparing the handbook.

Dr Rajan N Khobragade IAS

Additional Chief Secretary

Department of Health and Family Welfare

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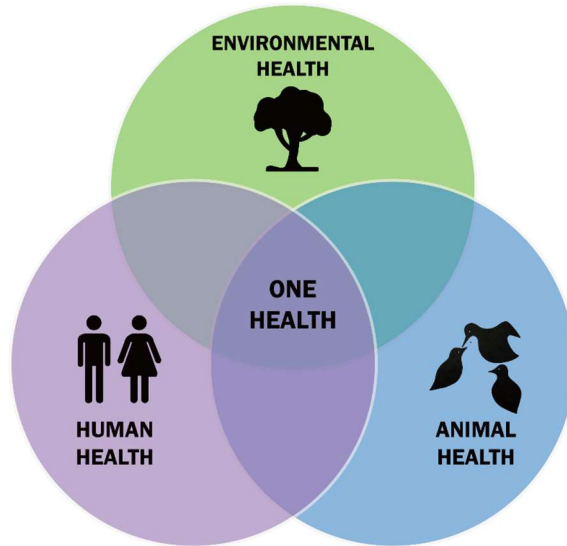
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1. ONE HEALTH – CONCEPT AND HISTORY

One Health is a multi-level collaborative approach between different disciplines working at local, regional, national, and global levels with the goal of achieving better health outcomes through the interrelationships between humans, animals, plants, and the environment they share. The concept of "One Health" is based on the interdependence of human, animal, and environmental health. Although the One Health approach is not a new concept, the discovery that the ongoing interactions between humans, avians, and other fauna influence human health will make the concept even more critical in the coming years. The idea of protecting human health at the expense of other species has no future relevance. Rather, future health actions need to be planned and implemented based on a holistic view of the health of humans, animals, and the environment they share in common.

The impact of the Covid-19 pandemic, which originated in Wuhan, China, has been enormous. The realization that this pandemic is not going to end makes the concept of One Health even more relevant in today's world. Moreover, the concept of One Health is the solution to the growing risks in global health. A new sustainable world can be shaped by ensuring equal importance to humans, animals, and ecological health. As a result of population growth, the distance between human settlements and wildlife habitats has decreased. Due to this, interactions between humans, domesticated animals and wild animals have increased. As a result, diseases began getting transmitted from animals to humans and vice versa. Such diseases are called zoonotic (animal-borne) diseases.

Since prehistoric times, humans have domesticated animals. Different uses of animals were recognized, and human beings started using them for various activities like agriculture, hunting, food, warfare, and crop protection. The ecosystem we live in today is created through a constant give and take between its components. The environment has undergone major changes during this period. Deforestation and unscientific use of agricultural techniques have resulted in significant changes in ecosystems. This increased the possibility of disease transmission from animals to humans. Over the past three decades, the majority of infectious diseases have been human-borne diseases. Due to increased transportation facilities, the above-mentioned diseases have crossed international borders. A global strategy like One Health is needed to deal with such risks posed to humans and animals by zoonotic diseases. This strategy needs to be given more importance in the coming years to address the common health problems of humans, animals, and the environment including plants.



Even though the concept of One Health has been around for a long time, it has not been accepted globally for a long time. Hippocrates, the father of medicine, recorded the relationship and importance of environment and health in his book *On Airs, Waters and Places*. The connection between nature and health is also described in the contributions of the ancient Ayurvedic sage Charaka. Since the 1800s, scientists have begun to recognize similarities between animal and human diseases.

The history of One Health begins with Rudolf Virchow, a prominent pathologist. His study of worms in pigs led him to think about the relationship between humans and veterinary medicine. It was he who started using the name zoonoses for diseases that are transmitted between humans and animals. The slogan 'One World One Health' was first coined at the Global Symposium organized by the Wildlife Conservation Society in 2004. On that day, experts from various fields were brought together and detailed discussions were held on diseases transmitted between humans and animals. Representatives of 111 countries and various international organizations met in New Delhi in 2007 to recommend a One Health approach to pandemic preparedness.

In 1994, 21 horses and two humans were infected with a particular disease at a horse farm in Australia. The disease was caused by hantavirus, which is transmitted from bats to horses. A team of zoologists, veterinarians, microbiologists, and social scientists were tasked with finding the origin of the virus and they succeeded. This opened the world to the possibility of the concept of One Health.

The environment that humans and animals share in common faces many challenges. These challenges affect humans, animals, and the environment alike. Air and water quality issues, pesticides, heavy metals, etc. are changing the environment. Also, deforestation, changes in wildlife habitats, unsustainable land use and climate change are contributing to the emergence and transmission of many zoonotic diseases. The concept of One Health requires coordination between different sectors to succeed.

2.IMPORTANCE OF THE ONE HEALTH APPROACH

The health sector will benefit from multi-sector coordination. Such collective interventions will enable us to tackle the various threats that cause health problems. For example, health problems caused by various diseases, pollution, lack of sanitation, unsustainable food security, natural calamities, changes in atmospheric temperature etc. are different from each other. Therefore, policies formulated in partnership with various sectors will be very helpful. This is where a holistic approach becomes important. If problems in the following areas can be detected and prevented, the path to One Health will be easier.

One health and food security

Millions of people in the world are currently starving. Food security is facing various challenges today. This crisis can only be solved by increasing food production and food grain storage. One Health plays a major role in addressing these challenges. A One Health strategy is needed to promote scientific agricultural practices and ensure collective cooperation in changing existing practices and improving the health and well-being of people, wildlife, and the environment.

One Health and agriculture

Foodborne diseases can be spread through fruits and vegetables. Many plant-based foods and substances that we once thought were safe are now found to be causing foodborne illness. Many of the dangerous microorganisms found in these unsafe foodstuffs are zoonotic. Let's work together to keep these deadly microbes out of the plant system. Many farmers resort to unscientific methods to increase production. These include excessive use of pesticides and fertilizers without proper research. It can cause serious health problems. Practicing farming practices based on the One Health concept will go a long way in preventing such accidents.

Water and sanitation

Millions of children die and suffer serious health problems due to waterborne diseases. The level of water pollution is increasing due to lack of proper drainage systems and lack of sewage disposal facilities. The amount of potable water on earth is very low. These fresh water sources are getting polluted as a result of the reckless behaviour of people. In addition, hazardous chemicals and heavy metals pollute fresh water sources as a result of other human activities. It causes serious health problems in humans, animals, and the environment. Given the growing population, access to clean water will be one of the most important challenges in the coming years.

Bioterrorism and One Health

The intentional spread of pathogenic or deadly microorganisms is called bioterrorism. Such acts of terrorism will destroy a country's economy and create insecurity. The possibility of terrorist attacks against people, animals, and agricultural crops is a serious threat facing all countries. Such terrorism can be defeated by ensuring international cooperation in the field of public health.

Global Trade and One Health

The increased availability of international transport facilities further facilitated cross-border trade and commerce. This had repercussions in the health sector as well. Despite improved treatment and increased availability of drugs, pathogens continue to cross borders through vectors. This helps in the rapid spread of diseases. Cooperation between countries in the areas of trade and international travel security is necessary to solve these problems.

Animal Borne Diseases (Zoonotic Diseases)

Zoonotic diseases are diseases that spread from humans to animals, or from animals to humans. Examples include rabies, bird flu, Kaysanur Forest Disease (monkey fever), hantavirus, and swine flu. We must implement an effective surveillance, coordination, and disease control system to deal with zoonotic diseases. Many insects that we see in our daily life are carriers of pathogens that cause deadly diseases. Animal health experts and human health experts working together with a focus on holistic healthcare can help defeat this scourge.

Antimicrobial Resistance (AMR)

Antimicrobial resistance is one of the major challenges facing the healthcare sector due to unnecessary drug use, inappropriate use of drugs and inadequate disposal methods. It can only be tackled through constant awareness and interventions.

Climate change

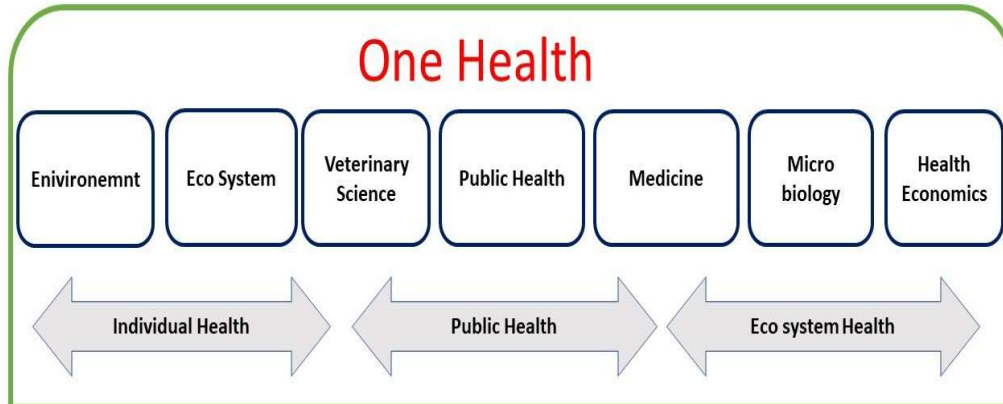
Long-term changes in atmospheric temperature and climate are occurring. If we look at climate change, we can say that the temperature of the atmosphere is rising. This will have a significant impact on Earth in the years to come. This influence will also be evident in the field of medicine. Apart from causing heat waves, floods and diseases affecting humans and animals, it can also pose a challenge to food security.

Biodiversity and One Health

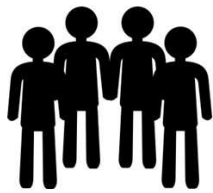
Kerala is rich in diverse species. It is through this biodiversity that our survival is facilitated. Conservation of biodiversity and habitats is essential to escape from this dangerous situation due to the increase in the level of contact between species and humans as well as dangerous changes in the food chain due to the destruction of ecosystems.

Wildlife conservation

A One Health approach is a holistic approach that recognizes and addresses the health of wildlife and the issues they face. Wildlife can provide a healthy life by protecting their natural habitats. Understanding that forests are more than just collections of trees, they also have a significant impact on society.

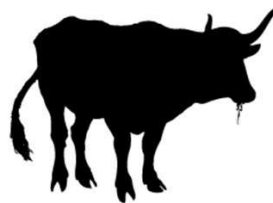


By focusing on One Health, anything related to humans, animals, and the environment they live in can be addressed. Rather than dealing with disasters, attention should be given to measures to avoid disasters.



Human Health Protection

- Vaccination
- Prevention of Infections
- Personal Hygiene
- Health Awareness
- Food Security
- Diagnosis
- Medicine
- Treatment



Animal Health Protection

- Vaccination
- Good Food
- Cleanliness
- Animal Welfare
- Animal Waste Management
- Medicines
- Treatment



Environmental Health Protection

- Prevention of Environmental Pollution
- Proper Waste Management
- Disaster Management
- Prevention of Global Warming

3. ANIMAL BORNE DISEASES

A zoonotic disease or zoonosis is any disease or infection that is transmitted from other vertebrates to humans and vice versa. Frequent contact with birds and animals is the main route of transmission of zoonotic diseases to humans. These diseases can be spread through infected poultry, their surroundings, and slaughterhouses. The main factors contributing to the increase and spread of zoonotic diseases are:

- Deforestation
- Man-made environmental problems
- Population explosion
- Unsanitary conditions
- Change in eating habits
- Increase in animal trade
- Unscientific and inadequate waste disposal
- Increase in the number of stray animals
- Natural disasters
- Global warming
- Climate change
- Migration, etc

Prevalence and impact of zoonotic diseases

Constant contact between humans and animals poses a threat to public health. Zoonotic diseases can be transmitted through direct and indirect contact with animals. Diseases can be transmitted through food, animal waste or secretions. Modes of transmission vary depending on the occupation of individuals, the type of animals they handle, and geographic factors.

Following are some of the ways in which diseases spread.

- By contact
- Through the air
- Through contact with contaminated soil
- Through injuries caused by animal bites and scratches
- Through potentially infectious materials
- Through disease-carrying insects

These zoonotic diseases often have a significant impact on the global economy. It could harm everything from local agricultural markets to international trade agreements. Those engaging in the above activities should take appropriate protective measures for their own safety.

Occupationally Transmitted Zoonotic Diseases

Areas	Affected People	Examples of Diseases
Agriculture	<ul style="list-style-type: none"> • Farmers • Farm Workers • Veterinarians • Family members of all the above 	<ul style="list-style-type: none"> • Leptospirosis • Japanese Encephalitis • Anthrax • Tuberculosis
Animal Products	<ul style="list-style-type: none"> • Butchers • Slaughterhouse Workers • Those who Handle Eggs, Meat, and Dairy Products • Manufacturers of Animal Fur Products • Animal Waste Disposers • Those who Handle Dead Animals 	<ul style="list-style-type: none"> • Brucellosis • Leptospirosis • Plague
Forest Dependent People	<ul style="list-style-type: none"> • Those who Work or Live in the Forests 	<ul style="list-style-type: none"> • Monkey Fever • Nipah Virus
Entertainment	<ul style="list-style-type: none"> • Those who Interact with Domestic Animals Traders • Zoo Employees • Veterinarians 	<ul style="list-style-type: none"> • Rabies • Leptospirosis
Hospitals	<ul style="list-style-type: none"> • Health Workers • Veterinarians • Scientists • Microbiologists / Lab Employees • Public Health Workers 	<ul style="list-style-type: none"> • Tuberculosis • Leptospirosis • Plague

Nipah Virus Infection

Nipah virus was first identified in 1999 following an outbreak among pig farmers in Malaysia. The growth of industrial pig farming has led to significant deforestation in Malaysia. Nipah virus was contracted by pigs eating fruits that were bitten by bats. Nipah virus is a zoonotic virus. The disease can be transmitted from animals to humans or directly between humans. In infected individuals, it causes a range of illnesses, ranging from asymptomatic infections to severe respiratory infections and acute encephalitis. Symptoms such as fever, headache, myalgia (muscle pain), vomiting and sore throat appear initially in infected people. This may be followed by dizziness, drowsiness, intermittent fainting, and neurological symptoms suggestive of acute encephalitis. Some people may experience a specific type of pneumonia and severe respiratory problems. The patient then falls into a coma within 24 to 48 hours. Three cases of Nipah virus have been reported in Kerala so far. Nipah virus infection has been detected in bats from different regions of Kerala. This poses a great threat to the state. There is no vaccine available for this virus.

Avian Influenza (Bird Flu)

Avian influenza is a viral disease that spreads among birds. They usually do not spread to humans; However, the possibility cannot be ruled out. Bird flu is rare in humans compared to other animal-borne diseases. The virus is found in the secretions from the nose, mouth, and eyes of infected birds and in their droppings. Avian influenza viruses are most often transmitted to humans through direct contact with infected poultry during slaughter or feather plucking, or through unprotected contact with surfaces contaminated with avian influenza viruses. However, some infections have been identified that did not involve direct contact with infected birds or their environment.

Let's see how bird flu can be dealt with. Do not allow pet birds to interact with migratory birds or other birds. Do not allow pet birds to interact with wetlands favoured by migratory birds. A clean environment should be maintained for the birds to grow, and the area should be disinfected as directed by the doctor. Those who come into contact with birds should take precautions and wash hands and feet regularly with soap and water. Even though there is no possibility of human transmission, the prevalence of this disease in the duck farming industry in Kerala raises major public health issues.

Monkey Fever (Kysanur Forest Disease - KFD)

Monkey fever was first identified in 1957 in an infected monkey in the Kysanur forest in Karnataka state. It can be transmitted to humans through flea bites or through contact with an infected animal (a sick or recently infected monkey). A vaccine exists for KFD; It is used in endemic areas. The main preventive measures are the use of insect repellents and the wearing of clothing that is resistant to flea bites in areas where fleas are common.

Rabies

According to the World Health Organization, rabies causes 59,000 deaths annually in 150 countries. The fact that 35% of these deaths are in India is a public health concern here. The statistics of the state of Kerala also show that the rabies virus is spreading very dangerously there. 99% of animal-to-human transmission of rabies occurs through dog bites. Rabies is a zoonotic viral disease that affects the central nervous system but is vaccine preventable. Once clinical symptoms are seen, rabies is 100% fatal. Vaccinating dogs, including puppies, is the most cost-effective way to prevent rabies transmission to people. The vaccine prevents the rabies virus from spreading from its source to other places. Vaccines are available after the bite or before exposure to rabies to effectively prevent the disease. Pre-exposure prophylaxis (PEP) is recommended for those in certain high-risk occupations (such as laboratory workers dealing with rabies and rabies-related viruses) and for people in professional or personal activities that come into direct contact with bats or other mammals (animal disease control workers, rangers, etc.). Current statistics indicate that the number of stray dogs in Kerala is increasing at an alarming rate. This is one of the main reasons why rabies can spread to humans. The solution to this problem is not to kill stray dogs, but to apply scientific methods of control.

Leptospirosis (Rat Fever)

Leptospirosis is a disease caused by a type of bacteria from the genus *Leptospira* that affects both humans and animals. Bacteria enter the body through wounds and become infected by stepping in or otherwise coming into contact with contaminated, germ-laden water. The disease can be transmitted through the urine of domestic animals such as dogs and cows, rats, and wild animals. Vaccines are available today.

Anthrax

Anthrax is a zoonotic disease caused by the bacillus bacteria. This bacterium is capable of transforming into spores that can survive in the soil for a long time and can infect animals that inhale or ingest such spores. Infection can be identified by testing blood, other body fluids, nasal or oral secretions, etc. from infected cows or other animals. The disease can be transmitted to humans by handling sick animals. Also, the disease spreads through contact with contaminated water, secretions, etc., or by inhaling spores. Since the bacteria released from the animal's body can remain in the soil for a long time, if an infected animal dies, it should be covered properly, and safety precautions should be strictly followed as per the instructions of the health department.

Tuberculosis

Mycobacterium tuberculosis is the bacteria that usually causes tuberculosis in humans. Animals that become infected through contact with humans cause the disease to spread. This disease can affect elephants and other animals. Mycobacterium bovis bacteria can spread to humans and cause tuberculosis by eating meat from infected cattle or consuming raw milk and dairy products.

Brucellosis

Bacteria are the main cause of brucellosis. Cattle, goats, sheep, pigs, and dogs are the most common hosts of this disease. Infection can be prevented by consuming well-boiled milk and properly cooked meat. Persons in constant contact with animals should wear safety equipment. Infection during or before pregnancy can lead to morbidity and miscarriage.

Toxoplasmosis

It is a zoonotic protozoal disease. The pathogen is a protozoa found mainly in cat feces. Transmission to humans is through food or frequent contact with infected animals. Although these diseases often do not cause serious problems in humans, they can cause serious health problems in people with weakened immune systems. Infection during or before pregnancy can lead to morbidity and miscarriage.

Animal borne worm infections.

The worms or their eggs are spread through animal excreta to humans who follow unsanitary eating habits. Animal-borne worms can be transmitted to humans by eating undercooked vegetables or meat.

Insect borne diseases.

Insect-borne diseases are commonly known as diseases caused to humans by parasites, viruses, and bacteria that are transmitted by vector-borne insects (vectors). Vectors are small organisms that can transmit infectious diseases between humans or from animals to humans. Many of these vectors are blood-sucking insects. Microorganisms get inside them when they drink blood from an infected host (human or animal). Pathogens are then transmitted to new hosts by vectors. Once infected with a vector, the vector continues to transmit the pathogen to new hosts throughout its lifetime. Examples of insect-borne diseases include Zika virus, dengue fever, chikungunya, malaria, and West Nile infection. Mosquitoes are the main vectors of such diseases. Changes in atmospheric temperature caused by global warming have led to the redistribution of many insect-borne diseases. In general, prevention of these diseases is less effective than other zoonotic diseases.

Diseases in Animals that can be Prevented through Vaccination

Disease	Microbe	Disease Carriers
Anthrax	Bacteria	Cattle, Wildlife, Air, Soil
Influenza	Virus	Pigs, Cattle
Bird Flu	Virus	Chicken, Duck, Migratory Birds
Rabies	Virus	Dogs, Cats, Cattle, other Mammals
Brucellosis	Bacteria	Cow, Goat, Sheep, Pigs
Leptospirosis	Bacteria	Rats, Cattle, Dogs
Tuberculosis	Bacteria	Cow, Elephant

Diseases in Human Beings that can be Prevented through Vaccination

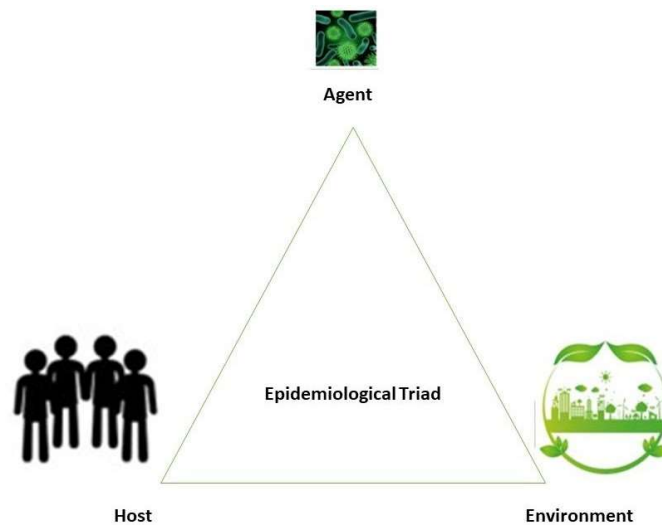
Disease	Microbe	Disease Carriers
Tuberculosis	Bacteria	Humans. Animals
Plague	Bacteria	Rats, Flies
Anthrax	Bacteria	Cattle, Wildlife, Air, Soil
COVID-19	Virus	Humans
Cholera	Bacteria	Contaminated Water
Typhus	Bacteria	Flies, Lice
Japanese Encephalitis	Virus	Mosquitoes
Rabies	Virus	Dogs, Cats, Cattle, other Mammals

4. HEALTH AND ENVIRONMENT

The concept of One Health ensures not only the health of humans and animals, but also the health of the environment in which humans and animals, interact in common. Increasing animal diseases and environmental challenges increase the relevance of the concept of One Health in the new era. Considering the increase in animal diseases and other communicable diseases, it can be seen that human and animal health are given more importance in planning projects or programs at global, national, and regional levels.

The importance of the environment in individual health

In the concept of One Health, the environment is broadly defined to include land, air, water, light, energy, soil, and various interacting flora and fauna, as well as natural and man-made ecosystems. Environment is a factor that directly affects human and animal health. There are three factors that lead to disease transmission in humans and animals. Pathogens, environment, and the infected person (host). Agents or causes are biotic and abiotic factors such as disease-causing organisms and chemicals that cause diseases. The infected person is called the second host. The 'host' element relates to the individual. It includes factors such as physical structure, immune system, and genetic makeup. Climate change, heat, deforestation, soil erosion, air pollution, water pollution, excessive use of chemical fertilizers in agriculture, inadequate food production, poverty, etc. are considered as the third factor as they cause disease in humans and animals globally. The three factors, cause – host – environment, are together called the epidemiological triad.



When we recognize the importance of drinking water sanitation to prevent cholera, environmental sanitation to prevent malaria, and environmental sanitation to prevent rabies caused by stray dogs, the role of the environment in overall health is revealed.

Environmental factors that cause disease

Most of the environmental diseases are prevalent in underdeveloped countries. Factors that cause environmental diseases can be classified as physical, chemical, and biological factors. If we recall the flood situation in Kerala in 2018 and the subsequent administration of doxycycline antibiotics to volunteers to ward off rat fever, and the regular mosquito control measures implemented by the government before every monsoon, it becomes clear that floods, rains, and climate change contribute to the spread of disease. These factors are considered physical factors. Factors such as water, air, soil, and natural energy can adversely affect human and bird health. Humans and other living organisms are constantly exposed to many natural and man-made chemicals. By polluting the land, air, and water sources, humans are creating health problems for themselves. In the case of Kerala, the Endosulfan disaster and the Plachimada drinking water problem are examples of such public health problems. Heavy metals, disinfectants, and chemical pesticides are among the list of environmentally damaging chemicals.

Air pollution

Deterioration in air quality due to the above physical, chemical, and biological factors is called air pollution. When the above factors interact with the environment, air pollution occurs. According to a 2019 World Bank estimate, indoor and outdoor air pollution causes 1.7 million preventable deaths annually. In terms of air quality, India does not fare very well among the countries of the world. There are many answers to the question of how the atmosphere becomes polluted. Any human activity that increases the levels of carbon monoxide, particulate matter, nitrogen dioxide, sulphur dioxide, and ground-level ozone in the atmosphere above normal levels is considered a threat to air quality. Other major sources of air pollution are smoke from industries and vehicles.

Water pollution

Infectious diseases such as cholera, typhoid and amoebic diarrhoea are spread through sewage. Open defecation and dumping of garbage into waterways are major causes of water pollution.

Solid wastes

Solid wastes such as plastics and heavy metals pose a significant threat to public health. Electronic waste that is thrown away pollutes soil and water resources. Trying to burn them causes air pollution. It causes major diseases like cancer. Stagnant water in such wastes leads to an increase in the number of rodents and insects and the spread of many diseases that they carry. Current One Health initiatives focus on human and animal health. Therefore, new legal systems should be developed and implemented for environmental protection considering the importance of One Health.

5. KERALA AND ONE HEALTH

As in many other health initiatives, Kerala is leading the country in implementing the One Health Plan. Kerala is characterized by extensive forest cover and consequently high human-animal contact, high population density, large international travel due to the high expatriate Keralites, relatively high geriatric rates and high prevalence of non-communicable diseases. Hence the comorbidity rate is alarmingly high compared to other Indian states. Frequent and recurrent outbreaks of zoonotic diseases such as Nipah virus, H1N1 and Kayasanur Forest Disease (monkey fever) and insect-borne diseases such as chikungunya and dengue are threats to the health sector. Another major threat is rabies, a disease transmitted by rats and cattle. The current Covid-19 pandemic situation reveals the challenge/crisis that the state may face in dealing with future epidemics. It is in this situation that the Kerala government has started the steps to implement the One Health plan in the state.

As part of Navakeralam Karma Project 2, Kerala's One Health program was inaugurated by the hon. Chief minister on 17 May 2022. In the first phase, the project will be implemented in four Pampa River basin Valley districts namely Pathanamthitta, Alappuzha, Kottayam, and Idukki. The program is being implemented under Rebuild Kerala Initiative (R.K.I.) with funding from International Bank for Reconstruction and Development (IBRD) and Asian Infrastructure and Investment Bank (AIIB).

The World Bank has endorsed a multi-layered resilience program aimed at increasing the effectiveness of in-state resilience against the impacts of climate change and natural disasters including epidemics.

Although the program has mainly focused on the districts of the Pampa River basin, several state-wide innovative projects have been proposed as part of the programme. These include IT-based One Health disease surveillance system at community and district levels, strengthening of public health laboratories at district level and strengthening of data triangulation system of Prevention of Epidemic and Infectious Disease (PEID) cells in all medical colleges. This initiative works on the concept of Program for Results (P for R). Under this concept, funds are disbursed on the basis of achievement of targets or targets set as per Disbursement Link Indicators (D.L.I).

Functions of the State Level One Health Committee

The leadership and supervision of the One Health program in the state will be carried out by the state One Health committee. This committee ensures timely implementation of the One Health Program by issuing necessary government orders and policy directives to ensure effective coordination and cooperation between the respective participating departments. This committee is responsible for ensuring the timely implementation of the program by providing necessary guidelines for the state-level launch of the One Health Program and program planning in the four Pampa River basin districts and overseeing the rollout of the program to the remaining ten districts. The State level

committee is responsible for reviewing the capacity building activities of the schemes covered under the One Health Program and making recommendations for further activities.

Functions of the District Level Committee

The district level committee is responsible for the leadership and supervision of the One Health program activities within the district. The district level committee is responsible for planning and analysing projects, conducting necessary field visits, strengthening, and monitoring the program by forming the district level executive committee. This committee is also responsible for conducting the documentation work by forming the resource group and providing all necessary instructions and assistance to the subordinates. Joint visits of various departments required to oversee the implementation of the program are conducted under the leadership of the district level committee, such as visits to places such as fish and meat markets, where there is a high risk of disease transmission for animal-borne diseases, investigation of disease outbreak conditions, etc.

Activities of Local Government Level Committee

- Lead the implementation of One Health Program at LG level.
- Align LG representatives with the concept of One Health Program.
- Conduct consultations for activities including selection of Nodal Officer (Medical Officer) for implementation of unified health program in the concerned LG and finalize the LG level coordination mechanism.
- Plan and implement programs in collaboration with the LG aimed at building the capacity of the community to enable them to undertake One Health surveillance activities.

Role of Local Governments in the One Health Approach

The activities of Local Government (LG) bodies to achieve the Sustainable Development Goals should be based on the slogan 'Health for all Health in all'. Health-centred development is the way forward. The LG should be willing to proactively identify and proactively address potential problems in the implementation and utilization of health care activities. utilization of health care activities. Also, LG should give due importance to preventive and promotive health care and curative care. Immunization, promotion of health care activities (H. Promotion) and treatment of disease. All these should be the main concerns of the local governments.

LGs should also act as a driving force for developing a healthy culture that empowers the community to become guardians of their own health. By improving the health status of the community, the per capita expenditure on health care can be reduced. The performance of local governments needs to be evaluated based on the health indicators of the respective area.

a) Identify health problems

LGs should develop targets in line with state SDG targets. The LG through its working group should prepare an annual health status report to identify health problems in each region and set targets. The health status report should be prepared based on statistical data collected from various sources. This process can only be effective if the LGs monitor and ensure that the registers are up-to-date, and the data collection system is efficient in providing accurate data. Health status reports should help identify whether service delivery systems in the area are delivering as intended. These problems should be listed in terms of their magnitude and impact on the community and remain unaddressed by the services currently being provided, and there should be mechanisms to consider them on a priority basis. Issues should be discussed with stakeholders on a priority basis to find the most appropriate solutions.

b) Mobilization of resources

The information available in LG may be insufficient to address all identified health problems. LGs should therefore be able to identify sources of factors that are more conducive to problem solving and use them appropriately. Essential information should be gathered from the research conducted by the working groups. Funds from Central Government programs and Block/District Panchayats can also be used for the activities, apart from financial - material - human resource assistance from Corporate Social Responsibility Programmes, N.G.O.s, private institutions, clubs, charitable institutions etc.

c) Health services

A key responsibility of the LG is to ensure adequate resource allocation to various components of health care such as improved disease prevention, health promotion, disease treatment, palliative care, rehabilitation, etc. LGs should ensure infrastructure development and proper maintenance of health facilities to improve healthcare service utilization. LG should ensure adequate availability of drugs, chemicals, and equipment. Wherever additional human resources are required, staff should be provided. Transportation facilities for field, outreach and referral services should be ensured. Clean drinking water should be provided, and cleanliness of the establishment should be ensured. Involvement of LGs is essential to develop sub-centres/population health centers as a nodal point for immunization and health promotion.

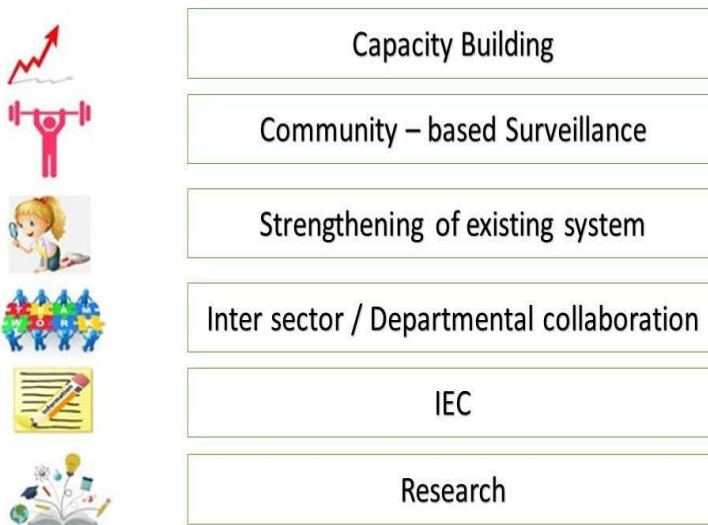
d) Empowerment of individuals through local associations

In order to develop a healthy culture in the society, there is a need to change the attitude towards waste management, food habits, water literacy, environmental protection, and exercise. Local groups such as Ayal Sabha, Ward Sabha, Ayal Koottam, Grama Sabha, Mathrusangamam, PTA, Kudumbashree, Oorukoottam, Ward Level Health and Hygiene Nutrition Committees, Padashekara Development Committees, Community-Political Organisations, Agricultural Organisations, Self Help Groups, Arts and Sports Clubs etc. It is up to the concerned LGs to empower individuals with assistance.

e) Identify social factors influencing health

LGs should work hand in hand with F.H.C.s to address social factors related to health such as poverty, hunger, primary education, gender equality and women empowerment, waste management, clean water and sanitation, clean energy, social justice, and environmental protection through LG projects involving the departments of primary education, water, and local self-government etc. The LG should lead the implementation of various services like opening school playgrounds to the public for sports practice, forming exercise groups, forming organic farming groups, preparing playgrounds for children, and preparing gym facilities for adults. LGs shall also ensure necessary assistance in the implementation of public health laws.

The strategies adopted to implement the one health programme in Kerala



Centre for One Health Kerala (COH-K) is responsible for implementing the One Health Program in Kerala. Under COH-K a State Program Management Unit (SPMU), District Program Support Unit (DPSU),

L.S.G. There are also level One Health committees. COHK SPMU will be established in the Directorate of Health Department to develop and monitor uniform health policies, guidelines, and S.O.P.s (Standard Operating Procedures) including districts.

DPSUs will provide procedural support to district authorities and local governments. Training programs for human resource empowerment, program implementation assistance and capacity building support activities will be planned and implemented in collaboration with various stakeholders of the programme. DPSUs are being established in the four Pampa River basin districts of Pathanamthitta, Kottayam, Alappuzha, and Idukki where the program is currently being implemented. The activities of these units will be coordinated by the District Nodal Officer for One Health, who is also the Nodal Officer for Ardrum.

The DPSUs will function in the District Medical Offices or other convenient places as directed by the District Medical Officer and the DPSUs will be supported by mentors and a partner organization.

Governance of the One Health Programme at the state level

Chairperson	:	Hon'ble Minister of Health, Women and Child Development
Vice Chairperson	:	Principal Secretary, Department of Health and Family Welfare
Convener	:	Director of Health Services

Members:

Additional Secretary
Department of Health and Family Welfare State Mission Director
National Health Mission Project Director
e-Health Managing Director
Kerala Medical Services Corporation Limited Joint Secretary
Department of Health and Family Welfare Director
Panchayat Director
Urban Affairs Director
Animal Husbandry Director
Fisheries Director
Agriculture Principal Chief Conservator of Forests Commissioner
Food Safety Director General
Kerala Institute of Local Administration (KILA)
NKKP State Level Nodal Officer in charge of One Health Scheme
Civil society representative

Organizational structure at district level

- Chairperson** : District Collector
- Members** : District Medical Officer (Health)
Deputy Director Panchayat
District Agricultural Officer
District Animal Husbandry Officer
District Fisheries Officer
District Forest Officer
District Food Safety Officer
District Surveillance Officer
District NKKP P2
Nodal Officer(Convener)
Civil society representative

Organizational structure at local government level

- Chairperson** : Panchayat President/Municipality Chairperson/ Corporation Mayor
- Members** : Panchayat/Municipality/Corporation Secretary
Medical Officer (PHC/FHC/CHC/TH) (Convener)
Chairperson, Standing Committee One Health Officials of
concerned departments of local governments

These committees should review the status of One Health activities at respective levels and plan further steps.

Committee	Periodicity
State Level	Once in three months
District level	Once in three months
Panchayath Level	Once in two months

*A meeting should be held immediately in case of an emergency

Functioning of Local Government Level One Health Committee

Chairperson	:	Local Self-Government Head
Vice-Chairperson	:	Chairperson of Standing Committee one Health
Members	:	All elected representatives of local self-government bodies
Convener	:	Panchayat Secretary
Coordinator	:	Medical Officer
Members	:	Representatives of the following departments Department of Agriculture Department of Animal Welfare Dairy Department Department of Fisheries Department of Food Safety Public Health Inspector/ Officer Community Volunteers (2) and Mentors (2) District Level Mentor Representative CDS Chairperson Kudumbashree ICDS representative

Convergence and review meeting of One Health program should be held once in two months.

Capacity building

Another important component of the program is to strengthen community-based disease surveillance, early detection of problems and necessary interventions for human resource development at various levels. The Kerala Institute of Local Administration (KILA) and the Department of Health and Family Welfare act as the nodal agency to provide support to local governments and volunteers in planning and designing capacity building activities.

Communication Strategies

Communication strategies have been planned to reach out to the people and create a more comprehensive understanding of the importance of the One Health Project and encourage active public participation. It should be planned and implemented by various departments to reach appropriate messages to the people at various levels. In addition to these preparations, community leaders, including elected representatives and program management personnel, will be given clear and appropriate information about the project, the change it will bring to the community, and the opportunity to be an agent of social change.

System strengthening

Empowerment of existing systems to make diagnostic processes for humans and animals more accurate and effective, strengthening the system for resuscitation, setting up health care centers and enhancing the ability to analyse data and respond accurately to enable appropriate decision-making at various levels are some of the key components of the programme. The program is designed as a follow-up system to accurately monitor and analyse the cause of outbreaks and ensure effective follow-up. An integrated IT-based system is also essential for program implementation. Existing mechanisms of local governments have been strengthened to provide adequate support for program implementation at the urban and rural local government levels.

Collaboration between various departments is one of the key elements of primary health care. This type of collaboration is indispensable for disease prevention and control in a complex healthcare system. Encouraging collaboration between various departments concerned for common disease prevention in human-animal-environmental factors is characteristic of the unified approach as a complementary system to primary health care. Similarly, the concept of One Health in its true sense can be implemented only through mutual cooperation between various departments:-

Department of Health and Family Welfare

Department of Local Self-Government (Rural and Urban)

Animal Husbandry

Fisheries

Environmental Climate Change

Food Security Forest Irrigation Agriculture Drug Control PCB

KWA

Dairy Homeopathy Ayurveda

6. COMMUNITY BASED SURVEILLANCE

(COMMUNITY BASED DISEASE SURVEILLANCE AND HOLISTIC HEALTH)

Community-based surveillance is the process by which people themselves systematically detect and report events of public health importance in their communities. The ability of the general public to identify and report health problems can help shape better public health systems. There are mainly two methods in this system.

1. Indicator Based Surveillance or (IBS)

2. Event Based Surveillance or (EBS)

In relation to disease control, disease surveillance is the continuous examination at various levels of infectious diseases and their sudden outbreaks in the community. Effective disease prevention and control depends on surveillance. Collecting, analysing, and interpreting the data required for observation is part of the observation process.



Indicator Based Surveillance (IBS)

Indicators-based public health surveillance is a traditional way of reporting diseases to public health workers. Indicator-based surveillance includes reports of specific diseases from health care providers to public health officials. An example of information obtained through indicator-based surveillance is routine reports in a disease reporting database about the number of influenza cases confirmed in a hospital laboratory.

Event Based Surveillance (EBS)

The event-based public health surveillance method examines reports, stories, rumours, and other information about unusual events that pose a serious risk to public health. Such information can be considered as unstructured information because the information obtained is non-standard or subjective. The goal of EBS is to detect unusual events that may indicate an epidemic. Examples of sources from which EBS can gather

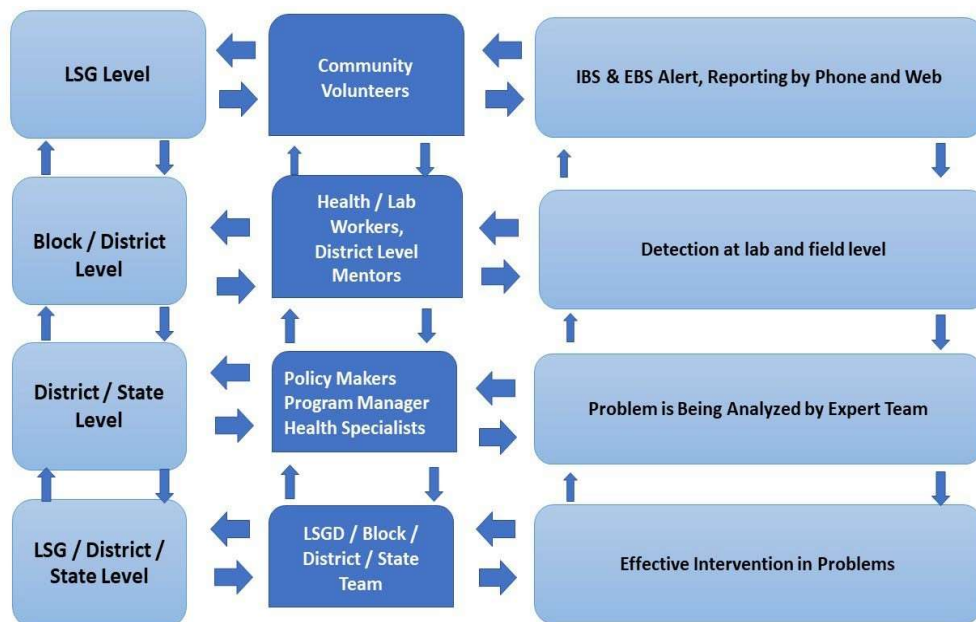
information are media reports and online rumours. The public can report information about an incident of public health importance through a hotline system or other means of communication. In such cases, EBS can be social oriented.

Main objectives of disease surveillance

- Provide information on new and changing trends in community health. E.g., other indicators such as morbidity, mortality, nutritional status, environmental hazards, health practices and other factors that may affect health.
- Provide feedback (feedback) to help modify policy and regulations leading to redefinition of objectives.
- Provide timely warning of public health disasters to facilitate changes in intervention methods as needed.

The role of society is critical in identifying, preventing, and responding to local problems that threaten health, thereby improving the lives of millions of people around the world. One of the main benefits of community-based monitoring is to effectively communicate changes and abnormal events in the health status of the general population of a community to the authorities and essentially act as the voice of the community. Through this method of communication, it is possible to detect the possibility of epidemics in advance and respond appropriately. In this way, infectious diseases can be stopped before they spread.

Reporting & Response – Steps



The WHO Global Technical Meeting held in France in 2018 defined community-based disease surveillance as 'the systematic detection and reporting by members of the community of events of public health relevance that occur within the community'. Similarly, community-based monitoring of One Health program should also be as follows.

1. Be associated with a formal monitoring structure
2. Be proactive and punctual.
3. Be useful to society.
4. Well defined reporting systems.
5. A feedback system and a monitoring and evaluation process.

Considering the concept of a One Health program in Kerala, it is important to develop a system that involves the people along with the existing formal surveillance systems to enable community members to take advantage of the opportunities to monitor their surroundings to detect and respond to potential epidemics or other events of public health relevance in their area.



Implementation of the program in Kerala

In the first phase, the One Health Program will be implemented in the four Pampa Basin districts of Kottayam, Idukki, Pathanamthitta and Alappuzha along with the Rebuild Kerala Initiative. Later it will be extended to the remaining 10 districts. The One Health Program is being implemented in the state utilizing governance and management systems designed for the Navakeralam Karma Program 2.

The One Health Program has adopted the approach of conducting disease monitoring, detection, and interventions at various levels, considering not only human health, but also the health of animals and the environment. All health problems in humans, animals, and the environment they share in common can be identified and addressed through the careful operation of systems designed at multiple levels to identify or detect infectious diseases transmitted from animals and other environmental sources.

Details of local government bodies (urban and rural) implementing the scheme are given below:

District	Panchayath		Block panchayath		Municipal Corporations		Total	
	N	W	N	W	N	W	N	W
Pathanamthitta	53	788	8	106	4	132	65	1042
Alappuzha	72	1169	12	158	6	215	90	1565
Kottayam	71	1140	11	146	6	204	88	1512
Idukki	52	792	8	104	2	69	62	981
Total	248		39		18		305	

N= Number, W=Ward. Source -

<https://dop.LGkerala.gov.in/en/article/158>

One Health Program – District and Local Government Levels

A three-tiered program has been planned for selection, training and activities of community mentors and volunteers in each district

Three tier volunteer programme - Monitored and supported by DPSU.



Mapping of common diseases in the area and their seasonality

Disease mapping is a visual representation of the geographic distribution of a disease within a population. This is one method of determining the source of infectious diseases. Mapping studies based on case counts rather than case rates may lead to erroneous conclusions. For example, large industrial complexes, factories, or apartment buildings where many people work or live may have high numbers of cases. In the absence of other means, information on population density and locations can be obtained from census reports or satellite images. Environmental factors associated with the geography of an area and the hosts of diseases play an important role in disease outbreaks in that area. Examples of environmental factors include the presence of disease vectors, climate, population density, nutrition and dietary patterns, employment and recreational activities, economic development, and events that cause social disruption such as war and natural disasters.

The time when diseases are commonly reported is as important in disease mapping as the region. It provides information on the seasonal changes in diseases according to climatic changes such as rainfall and temperature. Collecting such data makes monitoring and planning preventive interventions more efficient. Therefore, training modules for community volunteers and mentors, who are the backbone of community-based surveillance, should include simple techniques of disease mapping.

Role of laboratories in a One Health programme:

1. Kerala is one of the few states in the country with better laboratory and diagnostic facilities.
2. The role of laboratories is indispensable not only in the confirmation of zoonotic diseases but also in activities including antimicrobial resistance monitoring, antimicrobial residue testing, food safety and environmental safety monitoring.
3. Emerging, new, and recurrent diseases. In the context of environmental disasters, the existing laboratory system of the health department and other related departments needs to be strengthened.
4. Diseases need to be shared as per criteria for early detection.
5. Necessary protocols and IT platforms need to be developed as part of the programme.

7. IDENTIFICATION AND REPORTING OF DISEASES

Surveillance Of Zoonotic Diseases

Symptoms in Humans

Rabies

The first symptoms are flu-like: fever, headache and anxiety, sore throat, and cough. Then comes the neurological period: aggression, epileptic-like symptoms, fear of water, increased salivation, convulsions; paranoia; paralysis; Rapid breathing. The final stage is coma, which leads to death.

Measures to be taken to prevent the disease:

If you come into contact with a suspected rabies-infected pet or stray dog, contact the nearest health care provider immediately.

Reporting: Report sighting of domestic animals or stray animals showing the above symptoms to the One Health Nodal Person of the village immediately.

Anthrax

Cutaneous anthrax:

Bacteria enter the body through a cut or sore on the skin. The body becomes itchy and swollen and then turns into a painless sore with a black centre. Swollen lymph nodes and fever.

Gastrointestinal anthrax:

It is caused by eating uncooked meat from an infected animal. Symptoms include nausea, vomiting, abdominal pain, headache, and loss of appetite. Fever, severe, bloody diarrhoea, and sore throat are other symptoms.

Inhalation (pulmonary) anthrax:

Infection occurs as a result of the patient inhaling anthrax spores. Sore throat, mild fever, fatigue, muscle aches, chest discomfort, Symptoms include shortness of breath, nausea, coughing up blood and pain when swallowing.

Measures to be taken to prevent the disease.

vaccination of livestock, proper disposal of dead animals (deep burial with lime, incineration); Do not open the carcass as exposure to oxygen can help the bacteria form spores. Premises should be quarantined until all susceptible animals have been vaccinated and dead animals have been properly disposed of. Cleaning and disinfecting the premises is just as important as controlling insects and rodents.

Reporting: Report sudden deaths of livestock with the above symptoms to your One Health nodal person.

Bird flu

Symptoms can range from mild to severe. The illness begins with typical flu-like symptoms, including a runny nose and cough. Symptoms include sore throat, high fever (100.4°F or 38°C), headache, muscle pain, red eyes, malaise, diarrhoea, vomiting, and difficulty breathing.

Measures to be taken to prevent the disease.

Avoid contact with infected birds and patients with their secretions. Do not touch dead or suspected infected birds with your hands. Remove dead bird carcasses to a trash can using gloves and plastic carry bags. Avoid travel to areas where bird flu has been reported.

Reporting: Educate poultry farmers in your village. If you notice any of the above symptoms, please inform the Nodal Officer of One Health

Monkey fever

Some patients recover without major complications after 1-2 weeks of symptoms. Initial symptoms such as severe muscle pain with vomiting, gastrointestinal problems and bleeding may occur 3-4 days after infection. A proportion of patients may recover without significant complications within a week or two, but 10 to 20 percent of patients will enter the next phase with complicated symptoms by the third week. These symptoms include fever and severe headache, mental disturbances, tremors, and signs of neurological problems such as vision loss.

Measures to be taken to prevent the disease.

Prevent insect bites by wearing clothing that covers your arms and legs and using appropriate insect repellent. Insecticides are effective in reducing flea and other insect populations. Those who interact with rural environments and other open settings for recreation or as part of their occupation (e.g., hunters, herders, forestry workers, farmers) are at increased risk.

Reporting: Exercise extreme caution in areas where monkeys are encountered and inform health personnel regularly.

Nipah

Symptoms of Nipah virus start to appear within five to fourteen days after entering the body. Initial symptoms include fever, headache, and drowsiness. Then there may be mental confusion and body disorientation. Respiratory problems can also occur in the early stages. Coma symptoms appear within 24 to 48 hours. Nipah patients who have difficulty breathing and are over 45 years of age are more likely to spread the virus.

Measures to be taken to prevent the disease.

Avoid contact with bats and sick pigs during outbreaks. Avoid eating fruits bitten by bats.

Reporting: Contact the One Health nodal person in your area immediately if you notice any symptomatic person during an outbreak of Nipah.

Leptospirosis (Rat fever)

It is an occupational hazard that occurs to many people who work in open areas or with animals, such as farmers, miners, waste disposal workers, slaughterhouse workers, veterinarians, animal welfare workers, dairy farmers, bonded labourers, etc. The disease has also been linked to swimming, kayaking, and rafting in polluted lakes and rivers. Also, incidences of leptospirosis infection have been reported in urban sanitation children. A person becomes infected between 2 days and 4 weeks after contact with a contaminated source. The disease usually starts suddenly with fever and other symptoms. Measles can occur in two stages: After the first stage, which includes fever, chills, headache, muscle aches, vomiting, diarrhoea, jaundice, and redness of the eyes, the patient may recover for a while but may relapse. In some patients, kidney and heart damage can lead to death.

Measures to be taken to prevent the disease.

Avoid wading or swimming in water that may be contaminated with animal urine. Avoid contact with infected animals. Persons who come into contact with sewage or soil as part of their work or for recreational purposes must wear appropriate protective clothing or footwear, especially during the rainy season.

Reporting: The disease spreads during the rainy season. Immediately inform the One Health Nodal Officer if you see any person with the above symptoms.

Disease surveillance in animals

Disease surveillance in animals

Rabies

Aggressiveness, restlessness, licking the bite, excessive salivation, paralysis. Symptoms may not appear immediately; Symptoms may appear within 10 days or later.

Remember, bats can also cause rabies.

Measures to be taken to prevent the disease.

Vaccinate your pets and prevent contact with unfamiliar animals and wild animals. Report correctly.

Reporting: If you see a pet showing the above symptoms, or a stray animal, report it to the responsible health worker

Anthrax

Among cattle and sheep, a sudden febrile and agitated state followed by depression, lethargy, respiratory distress, or cardiac arrest followed by death occurs. Cattle infected with this disease usually die very quickly. Blood may be found in the nose, mouth, and anus of animals that have died from the disease.

Measures to be taken to prevent the disease.

Vaccination of livestock. Proper disposal of dead animals (deep burial with lime/ incineration). The carcass should not be opened as exposure to oxygen can help the bacteria to sporulate. Premises must be quarantined until all infected animals have been vaccinated and all carcasses removed.

Reporting: Report any sudden deaths of cattle with the above number of lakhs to your One Health Nodal Officer

Avian Influenza (Bird flu)

Symptoms of bird flu include fluid, body discoloration, diarrhoea, discharge from the nose, abnormally shaped eggs, and low egg production.

Measures to be taken to prevent the disease.

Avoid contact with infected birds and patients with their secretions. Do not touch dead or suspected infected birds with your hands. Remove dead bird carcasses to a trash can using gloves and plastic carry bags. Avoid travel to areas where bird flu has been reported.

Reporting: Educate poultry farmers in your village. If you notice any of the above symptoms, please inform the Nodal Officer of One Health

Brucellosis

It is a zoonotic disease caused by bacteria. It is transmitted from animals to humans. There is no effective way to detect infected animals by their appearance or symptoms. The most obvious signs are abortion or the birth of weak calves. Abortion and late pregnancy may cause a decrease in milk production due to a difference in the normal lactation period. Not all the infected cows abort their pregnancy. Abortions usually occur between the fifth and seventh months of pregnancy.

Measures to be taken to prevent the disease.

Vaccines are available for this disease in animals. Remove sick animals as soon as possible. Take effective identification measures in areas where the disease is likely to be more prevalent. Use milk and milk products safely.

Reporting: If reproductive problems occur in cattle observed the above symptoms; and inform the concerned health workers immediately

Ringworm infection

Puppies and kittens often have round or irregularly shaped patches of hair loss and itchy red patches and bumps on various parts of the body. The infected area may not be completely hairless, instead the hair may be broken or weak.

Measures to be taken to prevent the disease.

Infected animals should be quarantined, and their housing disinfected to control the disease. People who have been in contact with an infected animal should be closely monitored and treated immediately.

Reporting: Report anything unusual in animals immediately

Toxoplasmosis

Symptoms include fever, diarrhoea, shortness of breath, jaundice, and muscle weakness. This disease causes serious problems during pregnancy. It is a disease that spreads from animals to humans.

Measures to be taken to prevent the disease.

Keep animal feeding bowls clean. Disinfect the animal's cage and surroundings at regular intervals.

Reporting: Report anything unusual in animals immediately

Agriculture and One Health

Agriculture is the act of growing plants, fungi, and other organisms for food, fibre, biofuel, medicine, and other products to sustain and improve human life. Modern agriculture, plant breeding methods, use of agrochemicals such as pesticides and fertilizers, and improved techniques have led to a sharp increase in yields. At the same time, excessive and unscientific use of these elements has led to widespread environmental damage and adverse effects on human health. A major problem faced by farmers in Kerala is the attack of various pests and diseases on all agricultural crops. The impact of pest and disease attacks varies depending on climate, soil, and other environmental factors. We know that a clear understanding of such variability is essential to developing better agricultural practices. Increase in pests and diseases is one of the major causes of reduced crop productivity. A pest can be defined as any organism that causes significant damage to man and his property in such a way as to disrupt the economy.

Different kinds of pests

Pests - beetles, cockroaches, flies

Non-insect pests - mice, snails, birds

Diseases - viral, bacterial, fungal

Parasites of flowering - Striga Weeds – Monocots and Dicots

Deforestation, destruction of natural enemies, excessive use of unscientific farming methods, use of new crops and emergence of new pests are the main reasons for the increase in pests.

Reporting: Strengthen monitoring and immediately report any unusual activity to higher levels.

Fisheries sector and One Health

Fisheries are a rapidly growing sector to meet the growing global demand for food containing meat (protein). As well as being a relatively inexpensive enterprise, fish is considered a safe food source, and the muscles of healthy fish are largely sterile. Many hazards (biological, chemical, and environmental) lurk throughout the production supply chain of aquatic resources. Furthermore, these hazards may also occur due to inappropriate farming practices, environmental pollution and socio-cultural practices prevailing in different regions. Therefore, the need for proper assessment of food security issues and appropriate legislation is evident given the increasing global population and demands for water resources products.

Problems in the production sector - chemicals, plastics, heavy metals, antibiotics etc.

Problems in the distribution sector – marketing of aged fish, preservation using chemicals etc.

Many people today keep different species of fish in aquariums and tanks for curiosity and entertainment. Fish, like all other animals, can carry pathogens that can make humans sick. These germs can also contaminate the water in which fish live. Although fish and aquarium water can spread pathogens to humans, illness from fish farming is rare. By taking regular care of your fish and their aquarium and applying a few simple tips, you can reduce the risk of getting sick from touching, feeding, or owning aquarium fish. *Aeromonas* is a type of bacteria commonly found in freshwater lakes and aquariums. These bacteria can cause disease in fish and amphibians. *Aeromonas* can discolour the limbs of amphibians and the fins of fish. It can also cause internal bleeding in aquatic animals. The pathogen reaches humans through open wounds or drinking contaminated water. Infection usually occurs in young children and immunocompromised adults. This can cause diarrhoea or blood infection. Ensuring the quality of water in aquariums, removing dead fish promptly, and practicing healthy habits including hand washing can reduce the risk of *Aeromonas* infection.

Antimicrobial resistance

Antimicrobials—including antibiotics, antivirals, antifungals, and antiparasitic—are drugs used to prevent and treat infections in humans, animals, and plants. Antimicrobial resistance (AMR) is a condition in which the internal structure of bacteria, viruses, fungi, and parasites changes over time and becomes unresponsive to drugs.

This makes the infection difficult to treat and increases the risk of disease spread, serious illness and death. An example of this is bacteria becoming resistant to antibiotics. Antibiotics were a revolutionary invention in modern medicine. This invention led to a great leap forward in the field of health, saving billions of lives. Antibiotics played no small role in the large increase in average life expectancy, which was 46 years at the beginning of the 20th century. Some microbes have developed resistance to drugs that used to be effective against them. Resistance can occur naturally in bacteria through genetic mutation or by acquiring resistance from one species to another. Resistance can be achieved naturally due to random biotransformation. It also occurs through the spread of resistance genes through genetic transfer. Indiscriminate use of antibiotics causes mutations (biotransformation) to occur that can render antibiotics ineffective. By 2050, the number of deaths due to antimicrobial resistance will increase significantly. This is more than any other disease or accidental death. World Antimicrobial Awareness Week (WAAW) is an annual global campaign to improve awareness and understanding of AMR and promote better immunization practices among the public, healthcare professionals, and health policymakers.

Kerala Antimicrobial Resistance Strategic Action Plan (KARSAP)

KARSAP has been developed covering multiple sectors. It addresses several actions needed to effectively address the problems caused by AMR. Integration of KARSAP and One Health activities is an important part of activities as part of RDRAM-RKI.

8. SELECTION AND CAPACITY BUILDING OF COMMUNITY MENTORS AND VOLUNTEERS

Voluntary activity is formed in areas where valued people live and interact. Kerala is a state with a great history of progressing and achieving great goals through the combination of talent and determination.

Library movement, literacy movement, public planning, natural calamity relief activities, covid prevention initiatives etc. are all examples of Kerala model of volunteerism.

Characteristics of volunteers

- ✓ Social responsibility
- ✓ Self-motivation
- ✓ Empathy and compassion
- ✓ Patience and service readiness
- ✓ Persistent engagement
- ✓ Ability to work as part of a team.
- ✓ Organizational excellence

Election of workers

- ✓ Knowledge of local governments
- ✓ Willingness to cooperate with elected representatives, officials etc.
- ✓ Active participation in flood/covid activities
- ✓ Familiarity with smart phone
- ✓ Willingness to participate in trainings.

Social responsibility

Society is a network of different types of relationships. Social responsibility is a sense of duty formed in individuals who believe that each person has a role to play in the society. Dedicated individuals will use their skills, knowledge and time for the maintenance, development, and sustainability of society.

Self-motivation

The best examples of self-motivation are those who constantly work to improve their skills such as communication, leadership skills, organizational skills, problem solving skills, etc. and use the skills thus acquired for their own betterment as well as the betterment of society. Their ability to face adverse situations with equanimity is their specialty.

Empathy and compassion

Only those individuals who can recognize and empathize with other people's emotions can provide emotional support to them. The presence of loving and understanding people is very important for one to be happy in personal life. Only those who have a great sense of empathy can love and understand others in this way. Compassion is the ability to shine the light of goodness on the sad and downtrodden. Volunteers must be compassionate and empathetic.

Patience and service

Patience is an essential quality for volunteers. All volunteers must understand that they will often encounter inappropriate behaviour.

Persistent engagement

The concept of dedication is developed by those who believe that serving others is their duty as a citizen rather than a means of earning a reward. Volunteers find excitement and satisfaction in volunteering.

Ability to work as part of a team.

Various types of organizations are formed in the service delivery sector. Many associations of people's representatives, experts, officials, volunteers etc. are working successfully in Kerala. Volunteers should be willing and able to work cooperatively with others as part of such organizations.

Organizational excellence

Volunteering requires the ability to plan and execute programs in an organized and timely manner.

Who can be Community Mentors?

Presently engaged in health and social welfare activities and having previous experience in such fields (e.g.: -Retired health workers/other employees, job seekers after training in health work, senior citizens with capacity and interest, representatives of social voluntary organizations, representatives of residence associations, women council/Matsya Sabha members / youth representatives, representatives of marginalized communities). e.g.:

- A. Anganwadi workers, palliative volunteers, etc. who work directly with the people in the field of health and social welfare. C. / Es. T. Promoters etc
- B. Seven community mentors are deployed in each ward division.

Duties of Community Mentors

- Attend a one-day training program organized for Community Mentors and understand the responsibilities
- Train community volunteers and provide ongoing support for activities
- Effectively implement the One Health Program by working in coordination with the District Mentor in charge of the local government and the local government
- Disease monitoring (IBS and EBS)
- Report diseases and abnormal events according to the instructions of the state

Community volunteers or social volunteers

Each community mentor will identify 7 community volunteers each according to the specified criteria and provide them with necessary training and link them to community-based disease surveillance systems as part of the One Health Project. Half a day is usually the duration of the training program. These community volunteers will be added to the ward-level list, regularly contacted, and given necessary follow-up training. They will also be linked to an IT-based reporting system set up for community-based disease surveillance and other holistic health activities.

The role of community volunteers in community-based monitoring

- Effectively implement the One Health Program by working collaboratively with the local government and community.
- Understand the duties involved in the half-day training program organized for community volunteers.
- Disease surveillance - Indicator Based Surveillance (IBS) and Event Based Surveillance (EBS)
- To report diseases and abnormal events and organize awareness programs as per the instructions of the State.

District Level One Health Mentors

Experts with experience in dealing with social health issues or working in coordination with LGs will be appointed as district level One Health mentors. 12 such mentors will be selected and deployed under each District Program Support Unit (DPSU) for implementation of the One Health Program focusing on Community Surveillance. There will be a total of 48 district level mentors across the four Pampa Basin districts. They will provide support to their subordinate LGs, Community Mentors and Community Volunteers as required.

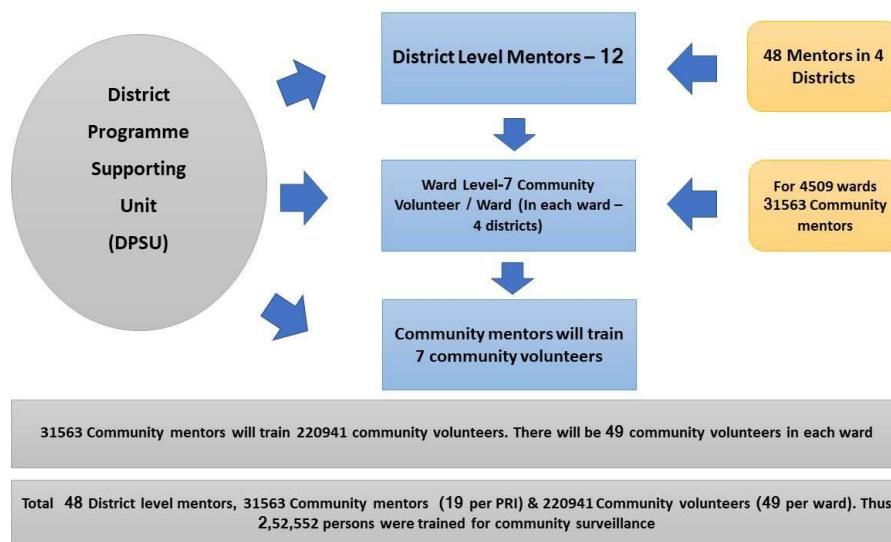
Enrolment, training, and engagement of community mentors

Community mentors are key links in the community-based disease surveillance system outlined in the One Health programme. They are part-time volunteers. 7 community mentors from a ward/division should be selected according to the criteria explained earlier. The responsibility of finding and enrolling community mentors is vested in the respective local governments. Ward members/division councillors with the help of officials from the health department and other departments related to One Health should find those who can be considered as community mentors and prepare a list and submit it to the local government One Health committee. Community Mentors will be selected by the One Health Committee after checking the said list and 7 names per ward/division. The list of such selected candidates should be approved by LG Secretary and published. One day training for the selected community mentors will be conducted at the respective LG. The trainers will be a team (team of 2) consisting of District Mentor assigned to LG and trained personnel from Health Department. The training will be organized in batches of 50 people.

Enrolment, training, and engagement of community volunteers

One of the main responsibilities of the Community Mentors is to identify and train 7 community volunteers as per the prescribed criteria and link them to community surveillance systems as part of the One Health Programme. A shortened version of the training module (half-day program) for community mentors will be used to train community volunteers. These community volunteers will be included in the ward-wise LG list and will be contacted regularly and given necessary guidance. They will also be linked to IT-based surveillance systems developed and equipped for community-based disease surveillance. Community volunteer systems are under the control of each local government; They will also have technical support from DPSU and District Health Authorities.

Composition of Community Mentors and Community Volunteers – District, LG, and Ward Levels



Implementation Steps – Key processes to be followed.

Action plan for training community mentors at gram panchayat / municipality level is prepared by nodal officers in consultation with LGD Joint Director and DMO in each district. After finalizing the implementation plan, the state team is officially informed about the same. Specific guidelines for selection, enrolment and related activities of district level advisors, PRI level community mentors and ward level community volunteers need to be developed before implementation of the programme.

Two comprehensive training modules (one for district level advisors and one for mentors and volunteers) should be developed and fine-tuned before conducting training programs for each group.

The involvement of various departments including LGD at district level and LG level should be ensured while planning and implementing the system of Community Volunteers.

Ensure and promote LG ownership of the project by involving LGs in the planning and implementation of the Community Volunteer Programme. The list of participants should be prepared in advance in consultation with the concerned LG and notifications/communications about the training should be sent in advance. Proper follow-up of the same should be done by LG/DPSU.

The three key features of a One Health program are as follows:

- Continuous community surveillance of unusual events that may cause zoonotic diseases.
- Early detection of factors that may cause zoonotic diseases.
- Sustained participatory interventions at necessary stages

District Level One Health Mentors

District level mentors are responsible for providing training to local governments, providing support to panchayat-level community mentors, aiding in developing a group of community volunteers, assisting local governments in planning, and implementing a One Health program, providing other support and assistance as required, and providing necessary reports to the concerned officials and DPSU.

Methods of communication

Volunteers, counsellors, public servants, officials, etc., should maintain a formal politeness in language when communicating with each other. Do not scold or reprimand anyone. Attend the meetings and carry a simple written review report. While sending WhatsApp messages, be careful not to include information that may cause social discomfort. Do not send trolls or forward messages in such WhatsApp groups. The administrator should take care to keep the group active and delete unnecessary and meaningless messages. Any suspicious health problems noticed in a ward / division should be reported to the ward member / division counsellor. Individuals are identified in WhatsApp communications using local government sanctioned codes instead of their names. It is up to local governments to issue a code number such as Community Volunteer 1 (CM1) and Community Mender (CM1) including the ward number and record the full details of the person with that number.

9. WHAT CAN BE DONE AT THE LOCAL LEVEL?

Health is not just the well-being of an individual, but the general well-being of society. Epidemics like Covid-19 are sending a message that health threats must be tackled through the harmonious interaction of humans, flora and fauna and the environment they belong to. Human health care is linked to the ecosystem and its other links. Almost all infectious diseases started in animals and spread to humans. This situation may become more serious in the future. Human, animal, and environmental health can be maximized by bringing together and bringing together people, groups, and communities who can protect and care for human, animal, and environmental health, and related factors. One World is an outline of global health systems that emphasize the principle of One Health.

The Manhattan Principles. Let's see what the highlights are.

- Recognize that human health is inextricably linked to the health of animals and the environment. Decisions that humans make individually or collectively can have a positive impact on this relationship.
- Include a wildlife component in all globally organized initiatives related to disease risk assessment, surveillance, and control.
- Replace the traditional, human-centric approach used to monitor and control emerging and re-emerging infectious diseases with an all-species approach.
- Reduce and control illegal wildlife poaching both domestically and internationally
- Dispel the misconception that animal-borne diseases can be controlled by killing wildlife and domestic animals and avoid such trends.
- Working hand in hand with government agencies, private organizations, and the public to create a unified health vision.
- Ensure adequate facilities for global wildlife health monitoring systems
- Create awareness of the importance of the One Health Vision globally
- Consider issues such as biodiversity and disease risk in development related projects.

What can we do?

- Raise as much awareness as possible in the community about how to communicate according to the Manhattan Principles, both as an individual and as a representative of government, non-governmental organizations, or private institutions.

- Raise awareness of the potential environmental impact and epidemic potential of any modern development program.
- Use only scientific methods to prevent, control and treat health problems.
- Use pesticides, herbicides and fungicides only as needed.
- Ensure that wild animals are not traded or exploited.
- Educate people to avoid destroying ecosystems by killing wildlife to eradicate endemic diseases.
- Ensure a One Health approach in local interventions and projects.
- Gain knowledge about infectious disease possibilities, sources, and interventions.
- Implement a common disease surveillance system locally by integrating primary health centers, veterinary hospitals, animal shelters and other allied departments.
- Reorganize the existing systems of health department according to
- One Health approach

How to plan early intervention for epidemic control?

Infectious diseases need to be identified at an early stage. This helps in reducing the number of cases and thereby reducing the direct and indirect costs. The general method for confirming an epidemic outbreak is to examine available disease surveillance data (if the condition is a reportable disease). One of the main uses of surveillance data is the detection of epidemic outbreaks.

In cases of large-scale under-reporting of cases such as salmonellosis, shigellosis, or pertussis, comparative studies with the average number of cases reported during a similar period in the past can be helpful in identifying the truth.

In some cases, the disease cannot be identified, but an outbreak is recognized when a sudden increase in symptoms such as vomiting, or diarrhoea is noticed. A number of people who attended an event where food was available may be reported sick. Until it is confirmed that multiple people have the same illness and have consumed the same food, declaring a foodborne illness outbreak may not be the correct course of action.

Arrangement of available systems at various levels to control infectious diseases.

Surveillance Systems: The state has a strong surveillance system including a network of hospitals and laboratories to regularly report infectious diseases to the health department. The Department of Health also has an electronic reporting system that allows real-time recording of disease outbreaks.

Rapid Response Teams: The State has a Rapid Response Team (Rapid Response Team) responsible for investigating and responding to outbreaks of infectious diseases. A team of public health experts is responsible for visiting locations and collecting samples and implementing control measures in coordination with local health authorities.

Quarantine and Isolation Facilities: Quarantine/Isolation Centers have been established in the state for the handling and relocation of persons exposed to or infected with an infectious disease. **Testing and Diagnostic Facilities:** The State has a network of testing and diagnostic facilities including government/private laboratories to identify communicable diseases and conduct necessary tests.

Vaccination Centres: Vaccination centers have been set up in the state to administer vaccinations to susceptible individuals.

Community Health Centers (CHCs): CHC is part of primary health care. Almost every block in the state has one CHC and CHCs are responsible for providing maternal and child health services and non-communicable disease control services.

Primary Health Centers (PHC): PHCs are responsible for providing primary health services including maternal and child health and infectious disease control services.

Mobile Medical Units (MMUs): MMUs are equipped with medical staff, equipment, and medicines. MMUs are deployed to provide medical assistance to remote and interior areas.

Coordination with other organizations: The state health department works in coordination with organizations like the Indian Council of Medical Research (ICMR) and the World Health Organization (WHO) to ensure that the state meets national and international standards in dealing with outbreaks of communicable diseases.

Panchayat Raj Institutions (PRI): Panchayat Raj institutions play a vital role in early detection and reporting of disease outbreaks, awareness raising about such diseases, contact tracing, distribution of personal protective equipment (PPE) and control of disease outbreaks.

Sustainable Development Goals (SDG)



The Sustainable Development Goals or SDGs are 17 goals set by the United Nations to achieve a sustainable and better future. Understanding how people, animals, and the environment are interconnected and being able to manage the associated difficulties is essential to combating epidemics. This kind of comprehensive approach requires thorough coordination of various departments. If this coordination is fully achieved, the well-being of humans, the animals they associate with, and the environment they inhabit can be ensured and the Sustainable Development Goals can be easily achieved.

How to be a good facilitator when training community volunteers.

- During the self-introduction session, facilitators should introduce themselves and give a brief description of themselves. This will help the participants of the training program to get interested in the program.
- Introduce each session with the title of the topic and its rationale. Also mention the learning objective if necessary.
- Facilitator must read and understand all training modules and reference materials prior to training.
- Must be familiar with each of the various aspects of the concept of the subject of training in the concept, planning and coordination of a One Health program.
- Participants should be given due respect and their queries should be
- answered with due importance.
- Facilitators should follow adult learning methods rather than student learning methods.
- Facilitators should use the local language for all communications and interactions in the program.

- Encourage discussion among trainees and respond very sensitively and constructively.
- Conduct exercises only module wise and focus on the problems they are going to deal with.
- Simple language should be used during the sessions and the queries of the trainees should be answered accurately and, in a manner, acceptable to them.
- Always be prepared to answer questions from training participants. Do not mislead or provide false information. If you don't know about a particular piece of information, say "don't know" and tell them where they can get the information. Or you can find the correct information and tell it at the next opportunity.
- Facilitator should always try to maintain a continuity between sessions while conducting module wise training. It is also a good idea to give a short explanation at the beginning of the session about the session and how it relates to the previous one and the next one.
- Listen attentively to the trainees as they answer questions during the training session Your body language should convey to the participants that you are listening carefully and giving them due importance and recognition.
- Do not encourage situations in which event participants judge each other about their comments or answers. Rather, encourage mutual assistance and improve participation by supplementing comments.

Don'ts for Facilitators

- Do not increase the speed of your communication. Always speak slowly. Present the given information systematically in points.
- Try to stick to the schedule. Don't let the discussions go on for too long. If the matter is to be handled carefully, some time may be allotted at the end of the session for such discussions.
- Do not provide false or uncertain information to participants.
- Do not generalize based on personal information or isolated cases. Generalizations should be based on study results or empirical evidence.
- Do not ask participants questions that may challenge/question their capacity, ethics, knowledge level, skill level etc.
- Do not use mobile phones during training. If necessary, use the mobile phone only before or after the session.
- Do not act in an unfriendly manner, be careless or unresponsive to responses.
- Do not be aggressive in communication or body language.
- Don't be blunt when pointing out people's mistakes. In such cases respond only in soft language so as not to undermine their confidence.

- Do not provide confusing or off-topic information and instructions.
- Don't discuss things that are inappropriate for the situation or hurt people
- Do not give examples in a way that makes participants feel that they are talking about themselves. Non-recognizable names should be used in examples.
- Do not deny participants the opportunity to share their knowledge and experience – encourage them to do so when necessary or possible.
- Avoid expressions that are difficult to understand or out of context

International days related to One Health

March 21	-	World Forest Day
March 22	-	World Water Day
April 7	-	World Health Day
April 22	-	World Earth Day
June 5	-	World Environment Day
July 6	-	World Animal Disease Day
July 11	-	World Population Day
November 3	-	One Health Day
November 18-24	-	World Antimicrobial Awareness Week

Abbreviations

IBRD	International Bank for Reconstruction and Development
AIIB	Asian Infrastructure and Investment Bank
NGO	Non-Governmental Organisation
SPMU	State Program Management Unit
DPSU	District Program Support Unit
SOP	Standard Operating Procedure
NKKP	Navakeralam Karma Project
CBS	Community Based Surveillance
COH-K	Centre for One Health Kerala
PRI	Panchayath Raj Institution
PHC	Primary Health Centre
CHC	Community Health Centre
AMR	Antimicrobial Resistance
KARSAP	Kerala Antimicrobial Resistance Strategic Action



**Center For One Health Kerala(COHK)
Thycaud Thiruvananthapuram**