REPORT OF THE MEETING

Advancing Joint Risk Assessment using the One Health Approach in WHO South-East Asia Region

Colombo, Sri Lanka | 25–27 July 2023

Food and Agriculture Organization of the United Nations

World Health Organization
REGIONAL OFFICE FOR South-East Asia

World Organisation for Animal Health
Founded as OIE

Advancing Joint Risk Assessment using the One Health Approach in WHO South-East Asia Region

Report of the meeting
Colombo, Sri Lanka, 25 – 27 July 2023

Advancing Joint Risk Assessment using the One Health Approach in WHO South-East Asia Region. Report of the meeting. Colombo, Sri Lanka, 25 – 27 July 2023

ISBN (WHO): 978-92-9021-150-1

ISBN (FAO): 978-92-5-138849-5

DOI (WOAH): https://doi.org/10.20506/woah.3510

Suggested citation Advancing Joint Risk Assessment using the One Health Approach in WHO South-East Asia Region. Report of the meeting. Colombo, Sri Lanka, 25 – 27 July 2023, World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO) and World Organisation for Animal Health (WOAH), New Delhi, 2024. Licence: CC BY-NC-SA 3.0 IGO.

Cataloguing-in-Publication (CIP) data. CIP data are available at http://apps.who.int/iris.

Contents

Acknowledgements

The regional meeting “Advancing Joint Risk Assessment using the One Health Approach in WHO South-East Asia Region” was organized through collaboration of the Food and Agriculture Organization of the United Nations (FAO) Regional Office for Asia and the Pacific, the World Organization for Animal Health (WOAH) Regional Representation for Asia and the Pacific and the World Health Organization (WHO) Regional Office for South-East Asia, and United Nations Environment Programme (UNEP) Asia and the Pacific Office contributed as an observer (these four organizations work as the quadripartite). The Quadripartite gratefully acknowledge country participants, experts and partners for their active participation and contribution in the meeting. The quadripartite is also grateful to United States Centers for Disease Control and Prevention (CDC) for funding to support the participation of animal health sector participants.

Acronyms and abbreviations

AMR	Antimicrobial resistance
CCHF	Crimean-Congo Hemorrhagic Fever
FAO	Food and Agricultural Organization of the United Nations
HPAI	Highly pathogenic avian influenza
HQ	(WHO) Headquarters
IHR	International Health Regulations
JRA	Joint risk assessment
JRA OT	Joint Risk Assessment Operational Tool
KFD	Kyasanur Forest Disease
M&E OT	Monitoring and Evaluation Operational Tool
MCM OT	Multisectoral Coordination Mechanisms Operational Tool
OH JPA	One Health Joint Plan of Action
PVS	Performance of Veterinary Services
SIS OT	Surveillance and Information Sharing Operational Tool
STAR-IH	Strategic Toolkit for Assessment of Risks on Infectious Hazards
TZG	Tripartite Zoonoses Guide
UN	United Nations
WHO	World Health Organization
WOAH	World Organization for Animal Health

Executive summary

Emerging and endemic zoonotic diseases pose a threat not only to the health of animals and humans but also to the global health security. Since 2017, the collaborative efforts of the "tripartite organizations", namely the Food and Agricultural Organization of United Nations (FAO), World Health Organization (WHO) and World Organisation for Animal Health (WOAH), have led to the development and roll-out of the Joint Risk Assessment (JRA) Operational Tool (OT).

The general objective of the meeting was to strengthen JRA using a "One Health" approach in the WHO South-East Asia Region. The specific objectives of the meeting were to:

1) review good practices, lessons and challenges in conducting JRA using a One Health approach;
2) enhance understanding of Tripartite JRA OT, and other relevant Tripartite/Quadripartite tools, and their applications;
3) identify priority actions to further advance JRA to guide collaborative risk management activities using a One Health approach.

The meeting started with an overview of the health security threats at the human-animal-environment interface in the region, including the regional response. Following the presentations by the Tripartite organizations, countries shared their experiences and lessons in assessing and managing the risks related to: Nipah virus disease in Bangladesh, rabies in Bhutan, Kyasanur Forest Disease in India, dengue in Maldives, avian influenza virus in Nepal, and the possible introduction of rabies in Timor-Leste.

To support the countries in strengthening One Health initiatives, the Tripartite organizations have developed several One Health tools under the Tripartite Zoonoses Guide, including the JRA OT. The JRA OT is a 10-step method for relevant stakeholders to collectively evaluate risks at the human-animal-environmental interface. Sri Lanka shared its experiences and outputs from the recent IHR-PVS National Bridging Workshop, while Indonesia and Thailand shared their experiences and lessons in applying the JRA OT in their respective countries.

Participants were then divided into five groups and these groups participated in a scenario-based discussion to learn and have hands-on practice using the four modules, consisting of 10 steps of the JRA OT. Each module was presented explaining the key considerations and this was then followed by a group exercise. Three groups worked on rabies scenario, and two groups worked on avian influenza scenario. At the end, each of the five groups shared their outputs and the rationale at the plenary.

A panel discussion was held to explore innovation and the way forward in further advancing JRA at the human–animal–environment interface. The panelists shared their work experiences and views, including: use of genomic sequencing to monitor antimicrobial resistance (AMR); use of participatory and wastewater surveillance approaches to detect One Health risks; a review of avian influenza A(H7N9) and SARS-CoV-2 variant incidence to highlight the importance of One Health approaches to genomic surveillance; and environmental drivers for the spill-over events emphasizing the need to expand the scope of JRA from a mere focus on the disease response and control to the overarching environmental drivers of health.

The common priority actions needed to enhance JRA in the Region were discussed, focusing on strengthening coordination among the human, animal and environmental sectors including at the sub-national level, communicating and using the JRA results effectively, using genomics and capitalizing on innovation for JRA, and applying JRA for AMR-related risks.

In the final session, the participating countries shared their ideas on the way forward on how they may apply JRA in the respective countries. Countries expressed their willingness to apply JRA and some requested potential support from the Tripartite organizations.

In conclusion, the country participants, together with Tripartite and other partners, renewed their recognition of the importance of conducting JRA engaging One Health stakeholders to effectively manage health risks at the human–animal–environment interface. The workshop provided the participants with the opportunity to enhance their understanding of the JRA OT. Participants expressed their intention to advance JRA in their countries, using JRA OT as the guide. It was suggested that actual application of JRA in the country may require a "learning by doing" approach and enhanced collaborative efforts to address health risks.

The following **recommendations** were proposed **for the Member States**:

1. Strengthen JRA at the human–animal–environment interface by engaging multisectoral One Health stakeholders in the respective country context.
2. Establish or strengthen country systems for JRA (e.g. steering committee, technical team), and strengthen the trained workforce to conduct JRA, to better inform risk management and risk communication options for ongoing and future health hazards and events.
3. Continue to advance JRA through:
    a. using Tripartite JRA OT as the guiding tool,
    b. engaging the environment sector,
    c. effectively using and sharing various types of information, including genomic sequencing, epidemiological and eco-system data, and
    d. applying JRA OT to other health threats than zoonoses, such as AMR.
4. Consider applying other One Health OTs to enhance preparedness and response to address health threats.

The following **recommendations** were made **for the Regional Tripartite/Quadripartite organizations**:

1. Continue to provide support to countries in the Region to introduce or strengthen systems and in the implementation of JRA at the human–animal–environment interface.
2. Facilitate sharing of lessons learned and best practices between the countries in the Region and with other regions to facilitate adoption of a harmonized approach for assessing risks posed by health threats.
3. Encourage the use of JRA as an effective channel to promote multisectoral planning and coordination in the implementation of the One Health approach in the countries, and
4. Facilitate improvement of One Health OTs and their application, working closely with Member States.

1. Background

Emerging and endemic zoonotic diseases pose a threat not only to the health of animals and humans, but also to global health security. An estimated 60% of known infectious diseases and up to 75% of new or emerging infectious diseases have a zoonotic origin.

Efforts to identify, assess, manage and reduce risks associated with zoonotic diseases benefit from coordination and collaboration between ministries and other agencies within a country that are responsible for various aspects of human health, animal health, food systems, wildlife and the environment. While it is essential for each sector to independently perform assessments to manage risks within their specific contexts, a comprehensive understanding and management of shared risks at the human–animal–environment interface can only be achieved by collectively integrating information and expertise from all relevant sectors.

Countries in the WHO South-East Asia Region have made substantial progress in strengthening multisectoral coordination mechanisms to advance the One Health approach. However, many countries in the Region have expressed a need to adopt a more systematic approach to jointly assess public health risks at the human–animal–environment interface.

Since 2017, the collaborative efforts of the Food and Agricultural Organization of United Nations, World Health Organization and the World Organisation for Animal Health have led to the development and roll-out of the Joint Risk Assessment (JRA) Operational Tool (OT), a practical instrument linked to the Tripartite Zoonoses Guide.

The JRA OT aims to support countries in adopting a consistent and harmonized approach for assessing risks posed by zoonotic disease hazards. The JRA OT now provides decision-makers and technical experts with a comprehensive 10-step process for carrying out joint qualitative risk assessments. In the WHO South-East Asia Region, Indonesia and Thailand applied JRA OT through training and workshops at the national and subnational levels.

Building on these efforts, this meeting aimed to review good practices, lessons and challenges in conducting JRA at the human–animal–environment interface, drawing on experiences of the countries. These included Indonesia and Thailand in the SE Asia Region that have utilized the Tripartite JRA OT, and also other countries that have made strides in assessing the public health risks of zoonoses and other health security threats at the human–animal–environment interface, engaging relevant sectors. The meeting was also aimed at further sensitizing countries on the Tripartite JRA OT, and identifying priority actions to further advance JRA in countries in the Region.

A One Health approach to surveillance and JRA was also highlighted as one of the lessons from the COVID-19 pandemic in the Region, as well as in the WHO's Regional Strategic Roadmap on Health Security and Health System Resilience for Emergencies 2023–2027, adopted at the Seventy-fifth Session of the Regional Committee for South-East Asia in September 2023.

2. Objectives of the meeting

The general objective of the meeting was to strengthen JRA using a One Health approach in the WHO South-East Asia Region.

The specific objectives of the meeting were to:

1) review good practices, lessons and challenges in conducting JRA using a One Health approach;
2) enhance understanding of the Tripartite JRA OT and other relevant Tripartite/Quadripartite tools, and their applications; and
3) identify priority actions to further advance JRA to guide collaborative risk management activities using a One Health approach.

3. Discussions and deliberations

Opening session

The opening remarks were delivered by Mr Vimlendra Sharan, FAO Representative to Sri Lanka; Dr Alaka Singh, WHO Representative for Sri Lanka; and Dr Chadia Wannous, One Health Global Coordinator, WOAH.

Mr Vimlendra Sharan, FAO Representative to Sri Lanka, highlighted FAO's commitment to support Member countries in strengthening the capacity of their animal health systems to reduce the risk and impact of animal health threats, and promote the One Health approach as part of agri-food system transformation to combat health threats, through the Emergency Centre for Transboundary Animal Diseases (ECTAD) in the Regional Office for Asia and the Pacific (RAP). The Quadripartite organizations support countries to ensure a consistent and harmonized approach in addressing disease threats as well as Sri Lanka in implementing the One Health roadmap and strategies collaboratively. He also underlined the importance of JRA for zoonotic diseases and risk management through JRA OT, identifying priority actions for the countries in risk mitigation, and learning from each other through experience sharing and networking, particularly from the countries where JRA OT was adapted to fit the national contexts and used in contingency planning for priority zoonotic diseases.

Dr Alaka Singh, WHO Representative to Sri Lanka, reiterated the persistent threats at human, animal and environment interface - posed by emerging and endemic zoonotic diseases. The context and consequences of these threats are increasingly complex. Countries in the Region have advanced the One Health approach and strengthened multisectoral coordination mechanisms, while the call for a more systematic approach to jointly assess public health risks at the human-animal-environment interface has been pressing. She emphasized that the workshop aimed to strengthen JRA using the One Health approach in the WHO South-East Asia Region. The other objectives were to review and understand good practices and challenges in JRA, and to further advance the collaborative approach to surveillance and risk assessment. She mentioned that owing to the interconnectedness of the world, efforts must transcend geographical, sectoral and disciplinary boundaries, which is critical for a healthier, safer and more resilient world.

Dr Chadia Wannous, One Health Global Coordinator, WOAH, emphasized the importance of collaboration at the human–animal–environment health interface particularly, in view of the recent COVID-19 pandemic and the ongoing burden of neglected zoonotic diseases. She mentioned that the Quadripartite has been an active promoter and implementer of the One Health approach, helping to prevent disease threats and spillover events of zoonotic diseases with pandemic potential. The development of the OH Joint Plan of Action provides a framework for countries to advance and sustainably scale up One Health implementation. Countries in the WHO South-East Asia Region have started to adopt and implement this. Countries are encouraged to share their lessons learned and experiences with other regions and countries. Tools developed by the Tripartite, including the JRA, will help with the implementation of the One Health approach.

Session 1. Managing health security threats at the human–animal–environment interface – situation and response

Chair: Dr Thilanga Ruwanpathirana, Ministry of Health, Sri Lanka

Health security threats at the human–animal–environment interface: global perspectives and response.

Dr Chadia Wannous, One Health Global Coordinator, WOAH HQ, and Dr Lisa Scheuermann, WHO HQ

There is an increasing risk of pandemics, and the Asia-Pacific Region is a hotspot for emerging infectious diseases due to various reasons such as changes in land use and climate, habitat encroachment and deforestation, agricultural expansion and the wildlife trade, poverty, inequality and population growth, and under-investment in a One Health systems. The Quadripartite collaboration on One Health with the support of its advisory group the One Health High-Level Expert Panel (OHHLEP) is addressing these challenges through focusing on strengthen coordination, collaboration, communication and capacity-building. The One Health Joint Plan of Action (OH JPA) was developed by the Quadripartite and launched at the World Health Summit in Berlin in 2022, providing a clear vision, commitment and concrete workplan on One Health.

Following the finalization of the OH JPA, the Quadripartite began the development of an implementation guide, which serves as a complementary document by translating the objectives and high-level activities of the OH JPA into practical guidance that can be adapted to national level contexts to implement One Health.

A large number of animals are susceptible to SARS-CoV-2 and there is ongoing risk of the formation of animal reservoirs of the virus, development of variants of concern and viral evolution in animals. However, resource constraints do not allow us to fully understand and address such risks. A routine observation in North America found 12 different sequences in white-tailed deer due to multiple spillover events from humans to animals. In a separate study in Virginia State in the United States of America, more than 60% of a cohort of 300 animals of 18 species were previously exposed to SARS-CoV-2.

Health security threats at the human–animal–environment interface: regional situation and response.

Dr Masaya Kato, WHO-SEARO, Dr Kinzang Dukpa, WOAH RRAP, and Dr Yin Myo Aye, FAO RAP

Examples of zoonotic threats in humans in the Asia-Pacific Region include highly pathogenic avian influenza (HPAI) with recent cases of infection reported in the People's Republic of China, Cambodia and Viet Nam; Nipah virus with outbreaks reported in India and Bangladesh; rabies and leptospirosis which are both endemic in most countries in the SE Asia Region; anthrax (which has a high case-fatality rate) sporadic outbreaks reported in Southern Asia; antimicrobial resistance (AMR) with high numbers

of fatalities in the region; and the rarer but equally important instance of tick-borne zoonotic diseases such as Kyasanur Forest disease (KFD).

Challenges with zoonotic pathogens in animals include highly pathogenic avian influenza (HPAI) A(H5N1). The A(H5N1) clade 2.3.4.4b has spread globally since October 2020, and infections were reported not only among birds and poultry but also in an increasing number of species of wild, captive and domestic mammals, such as cats, bears, sea mammals, wild boar, minks, and more than 23 species of wild carnivores (such as skunks, raccoons, foxes). Over 70% of countries have reported cases of brucellosis in cattle, sheep, goats and pigs. Surveillance remains insufficient for pathogens including *Mycobacterium tuberculosis* and *Bacillus anthracis*. The high use of antimicrobial agents in animals has been causing widespread AMR.

The Asia-Pacific Regional Quadripartite Coordination Group was established by FAO, the United Nations Environment Programme (UNEP), WHO and WOAH, and aims to address health threats at the human-animal-environment interface including zoonotic influenza, rabies, AMR, food safety, wildlife diseases and transboundary animal disease. The Regional Quadripartite Coordination Group is working to operationalize the OH JPA at country level in the Asia-Pacific Region by supporting high-level policy advocacy and dialogues and OH JPA implementation, and fostering engagement with other stakeholders. At the regional level, the regional Quadripartite will organize policy advocacy and information sharing platforms, harmonize One Health activities, and foster integration and meaningful engagement with the environment sector.

Session 2: Country experiences and lessons in assessing and managing risks at human-animal-environment interface

Chair: Dr Thilanga Ruwanpathirana, Ministry of Health, Sri Lanka

Assessing and managing risks of outbreak of Nipah virus disease
Dr Sohel Rahman, Institute of Epidemiology, Disease Control and Research (IEDCR), Bangladesh

Bangladesh conducted a strategic risk assessment (STAR-IH) workshop in 2021 using the One Health approach and engaging multisectoral stakeholders. STAR-IH helped stakeholders to collectively rank overall risks of different infectious hazards, and Nipah virus (NiV) was assessed as one of the high-risk pathogens. Risk factors for NiV infection were identified through risk assessment, including consumption of raw date palm juice (that is contaminated by bat saliva or urine) and contact with Nipah-infected persons. Key lessons in assessing and managing risks of NiV infection include the following: Obtaining experts' opinions from all relevant sectors is critical; multiple sources of information are needed from human, animal, environment sectors to identify and manage risk; improving credibility, confidence and acceptability of the assessment and mitigation measures are necessary; and pooling of limited resources is important.

Assessing and managing risks of outbreak of rabies
Dr N. Dahal, Department of Livestock/Department of Public Health, Bhutan

Rabies virus is endemic in the southern districts of Bhutan. Bhutan aims to eliminate rabies, as guided by the Strategic Plan for elimination of dog-mediated human rabies in Bhutan by 2030, and National Guideline for Management of Rabies. Key activities include enhancing surveillance and strengthening the response to outbreaks, vaccinating dogs and control of the dog population, enhancing cross-border collaboration and educating the community about the disease. During a recent outbreak of rabies in Sarpang district, the One Health coordination mechanism was activated to investigate and manage the outbreak. Bhutan aims to strengthen the One Health arrangement at all levels of governance for coordination and timely response for rabies and to address endemic, emerging and re-emerging infectious diseases.

Assessing and managing risks of Kyasanur Forest Disease
Dr Thusar Nanasaheb Nale, National Centre for Disease Control (NCDC), India

Outbreaks of Kyasanur Forest Disease (KFD) have been reported in Shivamoga district, Karnataka, India in 2019 and 2022 with cases peaking during the pre-monsoon season from January to March and affecting the most those living near the forests. The key public health interventions for an outbreak response include protection against tick bites and reducing the tick population, vaccination and surveillance of human beings, monkeys and vectors, and the diagnosis and treatment of human cases along with the safe removal of monkey carcasses. The stakeholders involved in the prevention and control of KFD are diverse, and have different responsibilities; however, it is important that the stakeholders work together to assess the risk including at the state, district and village levels. Many lessons have been learned, including: timely and regular data-sharing and resources for the response,

the need for capacity-building and the development of standardized operating procedures, as well as jointly conducting research to better understand the disease.

Assessing and managing risks of dengue
Mr Satheesh Moosa, Maldives Food and Drug Authority, Maldives

In Maldives, outbreaks of dengue are compounded by various factors such as climate change, increased urbanization and overcrowding, increased human movements, and insecticide resistance. The involvement of the community in vector control efforts has been very important. There are ongoing challenges to control dengue in the country, such as the technical capacity of staff, the irregularity of epidemiological and entomological data collection, the absence of insecticide resistance monitoring, the need for multistakeholder collaboration, limited finances allocated for vector control activities and the absence of social science research to guide community engagement and mobilization. To manage the dengue risks, efforts have been made to provide guidance and support, including for vector control (including the use of *Wolbachia*) and entomological support, serological surveillance, clinical management, Monitoring and evaluation, and procurement of essential commodities.

Assessing and managing of avian influenza
Dr Prerana Sedhain Bhattarai, Department of Livestock Services, Nepal

Nepal has experienced approximately 400 outbreaks of HPAI since 2009, which has resulted in the culling of about 2.5 million birds. There are different legal instruments for HPAI control, including standard operating procedures and the One Health Strategy. The Zoonotic Influenza Distribution Assessment and Ranking System (ZIDAR) was carried out to assesses the risk of avian influenza in animals, humans and at the human–animal interface. In 2019, the first human case of HPAI H5N1 in Nepal was jointly assessed by human and animal health officials and representatives from WHO and FAO. Lessons learned include the need for a strong legal basis for the joint assessment (for example, the avian influenza control regulation enables different sectors to work together for HPAI control), although the multisectoral nature of HPAI control sometimes pose challenges in timely data sharing and taking prompt joint actions.

Assessing and managing risk of potential importation of rabies
Ms Josefina Clarinha Joao, National Director for Toxicology and Analysis of water and environment, Timor-Leste

Timor-Leste has been rabies-free, despite the large number of street dogs and dogs illegally imported into the country. Following the recent notification of rabies cases in the province of Nusa Tenggara Timur in Indonesia, which borders Timor-Leste, a joint risk assessment was conducted. The risk to the country of the importation of rabies virus was classified as “high”. Animal vaccination has not been implemented in Timor-Leste, although a vaccine for humans is available, and health facilities are ready to admit cases. As a result of this, a number of activities have been conducted in preparation for the potential importation of the disease, including mass media campaigns, training of community leaders, activation of the rapid response team, training in surveillance and in the clinical management of cases, and vaccine deployment.

Joint FAO/WHO/WOAH Tripartite GLEWS + global disease intelligence and early warning system
Dr Itlala Gizo, Project Officer, World Animal Health Information and Analysis Department, WOAH

GLEWS+ is a global early warning system that formally brings together human and animal public health systems. Diseases are grouped into three categories: 1) those with a high impact on animal and/or human health such as avian influenza; 2) those with a high impact on human health and low impact on animal health such as Middle East Respiratory Syndrome Coronavirus (MERS-CoV); and 3) those with a high impact on public health in an outbreak situation, such as COVID-19 and mpox. Once signals are detected through event-based surveillance, these are shared among FAO, WOAH and WHO via the GLEWS+ platform for verification and additional information, and then disseminated to Member States through early warning mechanisms. Certain criteria will then trigger the need to conduct a tripartite risk assessment.

Session 3: Tripartite Joint Risk Assessment (JRA) Operational Tool (OT) and other One Health Tools – overviews and lessons learned

Chair: Dr Prerana Sedhain Bhattarai, Department of Livestock Services, Ministry of Agriculture and Livestock Development, Nepal

Overview of Tripartite One Health tools including JRA OT
Dr Lisa Scheuermann, WHO HQ, Dr Tikiri Priyantha, WOAH and Ms Tshewang Dorji, WHO-SEARO

The proposed human–animal–environment interface (HAEI) pathway consists of five steps. The steps include:

- First, an assessment of capacities for the International Health Regulations (IHR) (2005) and the Terrestrial and Aquatic Animal Health Codes;
- second, the development of joint roadmaps for improved collaboration;
- third, the implementation of the National Bridging Workshops (NBW) programme;
- fourth, the adoption of principles and best practices, and
- fifth, improved compliance with IHR (2005) and the Terrestrial and Aquatic Animal Health Codes.

The **Tripartite Zoonoses Guide** **(TZG)** was published in March 2019 and is to be used at the country level to address zoonoses and other health threats at the human–animal–environment interface by taking a multisectoral, one health approach. Besides the JRA OT, there are a number of operational tools, which are used to supplement and implement the TZG:

- the **Multisectoral Coordination Mechanisms Operational Tool** **(MCM OT),** which supports national authorities to improve coordination in managing zoonotic diseases by establishing or strengthening a multisectoral, OH coordinating mechanism, and is applicable for all countries and all situations;
- the **Surveillance and Information Sharing Operational Tool** **(SIS OT),** which provides a stepwise methodology to guide the assessment of the national structures or mechanisms for coordinated surveillance already in place and guides the development of a roadmap and a plan to advance the development of the national coordinated surveillance system for zoonotic diseases;
- the **Monitoring and Evaluation Operational Tool (M&E OT),** which guides countries to develop the monitoring and evaluation framework including indicators and data collection templates, which is iterative and flexible to allow the continuous assessment and improvement of activities, update indicators and track progress;
- the **Response Preparedness Programme** **(REPREP),** which aims to strengthen the capacity and preparedness of countries for the response to outbreaks of zoonotic disease, through the development of a joint framework for a coordinated response to zoonotic disease outbreaks; and
- the **IHR – Performance of Veterinary Services National Bridging Workshop** **(NBW),** which supports the development of a joint harmonized and actionable roadmap of corrective measures and strategic investments for 15 technical areas for the prevention, detection and response to address risks at the human–animal–environmental interface.

The **JRA** is proposed with the recognition of the fact that zoonotic diseases require a joint approach to risk assessment among different sectors, as each sector may assess the risks emanating from the same hazard differently. The JRA allows relevant stakeholders to collectively evaluate where and why risk exists through expertise and data gathered from each sector and minimize unintended impacts by understanding and addressing the perspectives and needs from each sector. The JRA OT builds from existing tools and resources available across the Tripartite, and is a 10-step method for assessing risk at the human–animal–environment interface.

It is proposed as the qualitative assessment of a single hazard (e.g. a health event or priority zoonotic disease). It uses existing technical knowledge and available data, and can be iteratively repeated and updated, while it does not replace sector-specific risk assessments. The benefits of the JRA OT include: JRA creates a national structure and approach at the national or subnational level, involves all relevant sectors, allows decision-makers to implement evidence-based approaches for risk management and communication, and fosters regular communication across the sectors.

Country experiences and lessons in conducting a national bridging workshop in Sri Lanka.
Dr Thilanga Ruwanpathirana. Epidemiology Unit, Ministry of Health, Sri Lanka

There are a number of tools to help countries determine their strengths and weaknesses, prioritize actions and understand the pathways for improvement including the Monitoring and Evaluation Framework (MEF), the State Party Self-Evaluation and Annual Reporting (SPAR) the Joint External Evaluation (JEE) under the WHO-IHR, and the Performance of Veterinary Service (PVS) under WOAH. The objectives of the workshop were to: 1) bring together the stakeholders from human and animal health sectors to work on the linkages in the IHR Monitoring and Evaluation Framework (MEF) and PVS; 2) understand the current collaboration gaps, develop a joint roadmap to improve collaboration, and to build capacity, and 3) achieve better prevention, detection and control of zoonotic diseases. Technical areas covered included coordination at the high, local and technical levels, legislation and regulation, finance, communication with the media and stakeholders, surveillance and field investigation, risk assessment, laboratory, response, human resources, emergency funding and education and training. Following the technical session and group work, objectives were prioritized through 283 votes. The prioritized objectives were to: 1) enhance One Health governance at the central and provincial levels; 2) institutionalize and enhance a joint surveillance system for priority zoonotic diseases and food safety; 3) harmonize legislative and administrative procedures to facilitate One Health activities, and 4) strengthen AMR governance and coordination mechanisms.

Country experiences and lessons in applying JRA OT in Indonesia
Dr Syafrison Idris, Animal Disease Surveillance Working Group, Directorate of Animal Health, Directorate General of Livestock and Animal Health Services, Ministry of Agriculture, Indonesia

Indonesia was the first country to pilot the Tripartite JRA OT in April 2018. Following this, a JRA was conducted for rabies in Barat Province, West Nusa Tenggara, in April 2019, to improve preparedness for Lombok Island which was historically rabies-free. Since then, the JRA OT has been adopted into a training programme for the One Health workforce. In Indonesia, Presidential Instruction No. 4 (2019) and the Regulation of the Coordinating Minister for Human Development and Cultural Affairs No. 7 (2022) provides legal foundation for JRA. Following the One Health Zoonotic Disease Prioritization exercise, additional JRAs took place, including leptospirosis in Jawa Tengah Province (2022); bovine

tuberculosis (*Mycobacterium bovis*) in Jawa Tengah Province (2022), human infection of A(H9N2) infection in East Java Province (2022) and human infection of A(H5N1) in Kalimantan Selatan Province (2023). JRA was also applied during the emergency events, including on SARS-CoV-2, Nipah virus, and mpox. The JRAs have enhanced coordination and collaboration, served as a platform for information exchange and provided an evidence-based and systematic approach using multisource data to assess risks. Risk pathways assisted the JRA Technical Team to identify risks at the interface, and informed targeted risk management measures. However, there were challenges of competing priorities and the commitment of stakeholders, the limited awareness of the operationalization of the JRA at the subnational level and the limited follow-up of the recommendations. It was suggested that the Tripartite could update the JRA OT to include reverse zoonoses and supplementing the qualitative risk assessment with quantitative/semi-quantitative methods.

Country experiences and lessons in applying JRA OT in Thailand
Dr Ratanaporn Tangwangvivat, Coordinating Unit for One Health, Department of Disease Control, Ministry of Public Health, Thailand

From 24 to 26 March 2021, the national JRA pilot workshop took place in Thailand on the risk and impact of humans beings infected with avian influenza A(H5N1) from four different groups of the poultry population. Preparatory meetings took place, and policy-makers were interviewed to define the hazard HPAI A(H5N1) and risk assessment framing prior to the workshop. While the likelihood of transmission was considered to be low, once it happens, the impact was assessed as severe, and thus, the overall risk was assessed as high. Lessons were identified following the workshop. While the participants had an increased understanding of JRA and recognize its benefits, it was suggested that JRA should need to take into consideration the evolving situation and seasonality of the disease concerned, that expansion of JRA to the provincial level may require more stakeholders and they need to be engaged at an earlier stage. The JRA could be used to strengthen information sharing across sectors, supporting joint decision-making and fostering collaborative efforts with other One Health initiatives such as the Global Health Security Agenda (GHSA) and the One Health Zoonotic Disease Prioritization. Thailand aimed from training to the actual implementation of JRA, focusing on prioritized zoonotic pathogens. The team will advocate for and support provinces to conduct JRA through the existing provincial multisectoral coordination mechanism (provincial communicable disease committee) with modification of the process to fit in with local needs.

Session 4: Scenario-based discussion: Application of JRA OT Module 1 – Establishing a JRA steering committee and technical team

Chair: Dr Prerana Sedhain Bhattarai, Department of Livestock Services, Ministry of Agriculture and Livestock Development, Nepal

Introduction to the JRA OT module 1 – Establishing a JRA Steering Committee and Technical Team
Dr Tikiri Priyantha, WOAH

Module 1 of the JRA is to set up groups and roles of the JRA. Different groups have different roles and responsibilities: the JRA steering committee establishes and guides the JRA process; the JRA lead leads and manages the JRA processes; and JRA technical team conducts technical assessment. The JRA steering committee is also expected to operationalize the JRA outcomes. Module 1 consists of the following four steps:

Step one involves the setting up of the JRA steering committee that will define the scope and timelines of the JRA process and interpret the results. The steering committee is responsible for the management of JRA and, while they do not engage in technical aspects, they ensure the technical team is not influenced by policy. This step is always recommended but may be skipped in urgent situations.

Step two involves the designation of the JRA lead by the steering committee. The JRA lead is responsible to, and participates in, the steering committee while being in charge of setting up and implementating the JRA process and manages and leads all operational aspects of the JRA process for this specific event or threat.

Step three involves the setting up of the JRA technical team. This is a small group of technical staff, normally comprised of human and animal health and wildlife experts. This group conducts the risk assessment and report back the results to the steering committee.

Step four involves the formation of the JRA stakeholder group that provides a multisectoral, interdisciplinary dimension to the process and may come from sectors such as academia, industry and non-profit organizations. The stakeholder group provides advice to the steering committee but does not have any technical or decision-making functions. It plays a critical role in operationalizing the results of the JRA and promotes advocacy and communication. This step may be skipped in urgent situations.

Guidance for group work

The Secretariat provided the guidance for the group work:

1. Participants would be assigned into one of the five groups with each group including participants from both human and animal sectors.
2. The participants would work in the same group to go over the scenario-based discussion throughout Session 4 to Session 7.
3. Tripartite facilitators would join each group.

4. Each group would be asked to choose one of the two outbreak scenarios for the exercise, either avian influenza or rabies (Annex 1).

Scenario-based discussion by break-out groups

In their assigned groups, the participants discussed the exercise in relation to the JRA module 1 and selected one of scenarios for discussion of the subsequent JRA modules.

Session 5. Scenario-based discussion: Application of JRA OT Module 2 – risk framing

Introduction to the JRT OT module 2
Dr Yin Myo Aye, FAO RAP

Step 5 of the JRA is risk framing, which is performed by the JRA steering committee. The risk framing guides the JRA technical process and the formulation of risk assessment questions. It aims to keep the focus on key concerns and ensure the risk assessment results are practical and useful to support risk management and risk communication. It also improves the mutual understanding of the perspectives of stakeholders. During the risk framing, the specific hazard that has the potential to cause adverse health effects and the scope with the epidemiological boundaries need to be defined. Then, the purpose of the assessment needs to be agreed upon. Generally, the purposes of JRA are to support risk mitigation efforts and the objectives are to provide a basis for management or communication decisions, while these can be adjusted depending on the country situation. Once risk framing is agreed by the steering committee, the information should be conveyed to the JRA technical team.

Scenario-based discussion by break-out groups

Based on the scenario selected by the group, participants discussed this in relation to aspects of the JRA module 2.

Session 6. Scenario-based discussion: Module 3 – Identifying and diagramming the risk pathway

Introduction to the JRT OT module 3
Dr Lisa Scheuermann, WHO HQ

The JRA module 3 deals with the conduct of the assessment, and is divided into three steps for which the technical team is responsible.

Step 6 aims to identify and prepare the diagram for risk pathways. This step relies on two key stages: Identification of all points and processes in the risk pathways from each possible hazard source and elaboration of the final pathway diagram. It is important to consider all potential risk pathways. The diagramming of risk pathways will help identify sources of pathogen and formulate risk questions. It facilitates understanding and communication about risks, and helps identify intervention points for risk management.

Step 7 aims to formulate risk assessment questions, focusing on risk pathways crossing human-animal-environment interface. The risk assessment question should be specific, relevant and time-bound; and clarify with what, when, where and how to guide the risk assessment.

Finally, step 8 should characterize the risk by answering the risk questions. For each risk assessment question, the associated risk pathway should be examined, the likelihood and impact estimated, and the level of confidence assigned. The overall risks should be determined based on the risk matrix and a technical interpretation should be documented for each risk assessment question.

Scenario-based discussion by break-out groups

The participants held discussions to exercise the JRA module 3 in the assigned group, using the scenario selected by the group.

Session 7. Scenario-based discussion: Module 4 – Identifying risk management options and communication messages

Introduction to the JRT OT Module 4
Dr Kinzang Dukpa, WOAH

Module 4 is utilizing the JRA outputs and consists of Steps 9 and 10. During these steps, technical information should be translated into an easily understandable format for policy-makers and stakeholders.

Through the step 9, the JRA team should propose risk management and communications options using the risk assessment results. The evidence base should be explained and rationale for recommendations should be provided. Both short and long-term options may be proposed depending on the feasibility of the implementation. During emergency situations, continuous updates and communications will be required.

The step 10 suggests that assessment results should be documented as the JRA report. The template is provided as the Annex F of the JRA OT. As the recommendations are recorded, the JRA lead and steering committee should communicate with the stakeholder group. This ensures they are informed of risk management options and can be involved in implementation.

Scenario-based discussion by break-out groups

The participants held discussions to exercise the JRA module 4 in the assigned group, using the scenario selected by the group.

Session 8. Scenario-based discussion: Wrap-up

Chair: Dr Narapati Dahal, Ministry of Agriculture and Livestock, Bhutan

Groups one and two presented modules one (establishing a JRA steering committee and technical team) and two (risk framing). Groups three, four and five presented their discussion on the modules three (identifying and diagramming the risk pathway) and four (utilizing the JRA outputs).

Group 1 (Rabies)

Group one selected the rabies scenario. They outlined who should be part of the JRA Steering Committee including the secretary or senior-level officials from the agricultural, environmental, health and finance sectors. They also advised that those from the local government and the national disaster management team in addition to the police should be involved. It was advised that the chief epidemiologist of the health sector or centre for disease control and the chief veterinary epidemiologist should be the JRA leads.

The technical team should comprise clinicians, veterinarians, microbiologists and those from academia, the wildlife and environmental protection agencies, the immunization department and regulatory authorities. Finally, the stakeholder group should include farmers and those involved in animal trading, involved in animal welfare, members of international and national nongovernmental organizations (NGOs), those from academia and private hospitals, forest officers, members of the police and army and those from municipal corporations and the ministry of education.

They defined the hazard as rabies virus, and the scope as the health risks to humans of acquiring rabies from dogs, jackals and any other domestic and wild animals in Chandrapur. The purpose was proposed to estimate the risk and provide mitigation options related to rabies in humans, transmitted from domestic and wild animals.

Group 2 (avian influenza)

Group two selected the avian influenza scenario. With regard to the JRA steering committee they wished to include those from the Ministries of agriculture, livestock, wildlife and the environment, those working in external affairs including border security control; trade, finance and economics, law enforcement and human health. They suggested that the JRA lead should be a senior position in the Ministry of Agriculture who has a strong technical background.

They defined the hazard as a new HPAI with the scope being the “national health risk in Sanghara at the human–animal–environment interface posted by a new HPAI. The purpose of the JRA was to mitigate the further spread of a new HPAI at the human–animal–environment interface with the key objective being to better understand the risk pathways and provide mitigation options including risk communication.

Group 3 (avian influenza)

Group 3 chose the avian influenza scenario. They showed the risk pathways from wild birds to humans via domestic birds and poultry. Their risk assessment question was "what is the likelihood and impact of children becoming infected with a new HPAI from domestic poultry in the affected village in the eastern border of Sanghara within the next three months". They noted gaps in the information including the absence of details on severity and transmissibility of the new HPAI, the epidemiological characteristics of the six children with influenza-like illness (ILI) and deaths of domestic poultry.

The group assessed both the likelihood and impact as moderate with high uncertainty, giving an overall risk in the "'red" category, and suggesting that it is critical to implement mitigation measures. Their short-term management options included conducting active and passive surveillance in affected and border areas, sample collection and testing of cases with ILI and restricting the cross-border movement of poultry. In the long term, they suggested vaccinating domestic poultry, implementing biosecurity measures for domestic poultry and community engagement with the use of village health volunteers. In terms of risk communication, the group advised that this should be focused in the affected and border areas and encouraging farmers to report any sudden deaths of poultry.

Group 4 (rabies)

Group 4 chose the rabies scenario. They showed the risk pathway from stray dogs to humans directly and also via infected livestock, wildlife and pets. Their risk question was "what is the likelihood and impact of one citizen in Chandrapur dying of rabies through the bite of a rabid dog in the next six months?" They reported missing information on the number of deaths from rabies in animals and humans and the density of the stray dog population over time, rabies vaccination coverage among dogs, the incidence of animal bites, the accessibility of post-exposure prophylaxis, staffing and budget for animal birth control programmes, and the likelihood of interactions between jackals, dogs and humans and extent of community awareness about rabies.

The group estimated the likelihood as moderate and impact as minor, both with high uncertainty. They assigned an overall risk as moderate – the "yellow" category – with a need to review and adjust mitigation measures. In terms of short-term management, the group suggested the provision of post-exposure prophylaxis for humans and medical management of those bitten including sufficient availability of anti-serum and vaccination, ring vaccination of dogs in the area surrounding the exposure and vaccination for humans in high-risk groups such as dog handlers, improving surveillance in the animal sector including monitoring of infected livestock, deaths in wildlife and, if possible, testing of suspected/dead animals for rabies virus.

In the long term, surveillance in humans could be improved, for example, considering rabies virus in the differential diagnosis of encephalitis, encouraging the use of personal protective equipment in high-risk groups (such as veterinarians, dog handlers and those working in the slaughterhouse), strengthening the management of waste, conducting the mass vaccination of dogs and improving the integrated management of bites.

Group 5 (rabies)

Group 5 chose the rabies scenario. They highlighted the gaps in information including the incidence of rabies in humans and animals, the vaccination coverage in animals, the density of dogs, community awareness of rabies, the availability of post-exposure prophylaxis and management of bites. They assessed the likelihood of risk as high and the impact as moderate, both with high uncertainty.

This gave high overall risk – the "red" category – and, therefore, suggested that it is critical to implement mitigation measures. They advised that community awareness is needed to ensure those bitten seek care and that there is sufficient surveillance of bites from animals. Additionally, they recommended management of the population and vaccination of dogs and other measures to prevent dog bites.

Session 9. Panel discussion: Innovation and way forward – Advancing JRA at the the human–animal–environment interface

Moderators: Dr Chadia Wannous, One Health Global Coordinator, WOAH; and Dr Masaya Kato, WHO-SEARO

Analysing risks of antimicrobial resistance using whole-genome sequencing
Dr Rungtip Chuanchuen, FAO Reference Centre, Chulalonkong University

The whole-genome sequencing (WGS) for antimicrobial resistance (AMR) is considered important in order to detect AMR in the clinical settings as well as to guide development of novel diagnostic tests and antibiotics. The pathway to WGS starts with the assessment of capacities and ends with the establishment of integrated AMR surveillance including genomic testing. WGS has been used for AMR research in Thailand and its neighboring countries – the examples include determining colistin-resistance and extended-spectrum beta-lactamase (ESBL) production in *Salmonella* and *Escherichia coli* in pigs and pork and evaluating the genomic characteristics of *Salmonella* in pets. A study showed that cooking pork for at least three minutes at 64 °C reduced the annual risk of illness per 100 000 population from *Salmonella,* including ciprofloxacin resistant and ESBL *Salmonella*.

Wastewater surveillance at animal farms
Dr Patipat Susumpao, OpenDream

OpenDream uses digital technology for health surveillance and education. Examples of innovations in disease surveillance include participatory surveillance applications for human health, such as DoctorMe and Sabaidee, which allow members of the community to report symptoms; and an early warning and response application which allows farmers to report events. OpenDream also implements the Participatory One Health Outbreak Prevention System (POOPS) project, which adopts wastewater surveillance. It aims to collect samples from wastewater from animal farms and conduct next-generation sequencing using metagenomics technology. The wastewater surveillance has demonstrated its potential to detect circulating virus much earlier than clinical cases, including in a study in Thailand to detect SARS-CoV-2 variant.

Genomic surveillance at the human-animal-environment interface
Dr Joseph Sriyal Malik Peiris, Chair of Virology, The University of Hong Kong

Avian influenza A(H7N9) virus emerged in 2013 in the eastern provinces of the People's Republic of China, through the genetic reassortment of A(H9N2) and other avian influenza viruses such as A(H7N9) virus in wild birds and H7N3 virus in domestic ducks. This highlights importance of genomic surveillance data from poultry and wild birds. The Tool for Influenza Pandemic Risk Assessment (TIPRA) was developed by WHO and experts, and assesses the risks based on three domains, namely virus properties, host properties, and ecology and epidemiology. TIPRA helps prioritize the development of vaccine seed strains and interventions. In January 2022, there was a case infected with the SARS-CoV-2 Delta variant of concern (VoC) in Hong Kong SAR, China. There had been no local cases of this VoC over the previous three months, and the case had no travel history but was working in a pet shop. Through one health investigation in January 2022, it was found that half of the samples

taken from Syrian hamsters were positive for the variant and it was estimated that the virus had been introduced to hamsters in approximately September 2021 with importation on 7 January to Hong Kong SAR, China. It was thought that multiple reverse zoonotic events had occurred. Dr Peiris emphasized the importance of a One Health involvement in surveillance (including genomic surveillance) at the animal–human interface and in wild animals/birds for early detection of "spillover" events between species.

The Role of the environmental sector in JRA
Ms Marie-Yon Struecker, One Health Consultant, UNEP Regional Office for Asia and the Pacific

The Asia-Pacific Region contains 17 of the 36 global biodiversity hotspots and 7 of the 17 megadiverse countries. It is experiencing a rapid economic growth along with the emergence of several new zoonoses and a threat to all major ecosystems. For the JRA we need to look at the environmental drivers causing disease including the change in land use as a globally significant driver of pandemics. This has caused the emergence of more than 30% of new diseases reported since 1960. The emergence of avian influenza was facilitated by the destruction of habitat and encroachment of humans and livestock into biodiverse habitats, especially the location of poultry operations in wild migratory bird flyways, which provided new pathways for pathogen to spill over. In particular, the maintenance and restoration of wetlands to prevent the spread of zoonotic influenza from domestic flocks to migrating wild birds by minimizing their contact is a priority. Ms Struecker highlighted the importance of shifting from a mere focus on the disease response and control to addressing overarching environmental drivers of health having wider boundaries.

Session 10. Identifying common priority actions to advance JRA in the Region

Discussion through World Café

During the World Café session, the groups of participants rotated through four stations with the aim of identifying common priority actions to advance the JRA in the Region. The priority actions proposed by the participants at each station were summarized as follows:

Station 1: Strengthening coordination, including engagement of environment sectors and subnational levels

- Advocate for and sensitize stakeholders on the One Health approach and JRA OT
- Identify and establish a contact point for JRA from respective One Health sectors
- Organize JRA training for One Health agencies
- Provide technical support to conduct the JRA
- Facilitate resource mobilization, and allocate dedicated funding for JRA
- Develop monitoring and evaluation framework for One Health, including the JRA
- Strengthen communication, coordination and data sharing across One Health stakeholders
- Conduct joint research to better inform JRA

Station 2: Communicating and using the JRA results effectively

- Advocate the JRA results to policy-makers, involving representatives of JRA teams
- Share the JRA results with all three groups: the steering committee, the technical team and the stakeholders
- Communicate JRA results to various types of stakeholders, such as policy and scientific stakeholders
- Engage the health communication bureau, health education group and risk communication specialists to translate the technical information to the public
- Strengthen risk communication and community engagement to translate JRA results into practice
- Conduct knowledge, attitudes and practices (KAP) studies to tailor communication messages
- Create a platform to share the JRA reports across countries
- Conduct an after-action review of the implementation of recommendations of the JRA

Station 3: Use of genomics and capitalizing on innovation for JRA

- Further strengthen the capacities of laboratories to conduct sequencing; set up laboratory networks to share samples
- Use the surveillance and information sharing operational tool (SIS OT) and/or a One Health platform to share genomic sequencing data across human, animal and environment sectors. Move towards real-time data sharing
- Strengthen sampling in wildlife and identify hotspots for sampling, e.g. where there is increased mixing and a risk of spillover
- Create a memorandum of understanding for timely data-sharing across all relevant sectors
- Strengthen monitoring of zoonotic influenza viruses to better inform decisions about vaccines.
- Enhance use of genomic sequence data to monitor antimicrobial resistance
- Integrate epidemiological data in GISAID

- Engage academia to conduct research
- Use artificial intelligence to interpret data
- Advocate for funding and interact with funding agencies to mobilize resources

Station 4: Applying the JRA for AMR-related risks

- Review the existing members/consider new members for the national steering committee, technical team and stakeholders; ensure the stakeholders of AMR is involved
- Identify a JRA lead for potential JRA on AMR
- Ensure there is a national action plan on AMR in most countries, which promotes JRA on AMR
- Strengthen analysis of AMR sequencing data, including bioinformatics
- Enhance and harmonize activities on AMR surveillance, including sample collection, testing and data-sharing among human, animal and environmental sectors
- Create AMR data-sharing platform and disseminate findings and information in the Region
- Hold regular coordination meetings and a regional knowledge-sharing meeting
- Advocate for the awareness of JRA among stakeholders on AMR

Session 11. Planning the next steps to strengthen JRA in countries

Chair: Dr Sudarat Damrongwatanapokin, Department of Disease Control, Ministry of Public Health, Thailand

Each country discussed and shared their next steps following this meeting and possible support needed from the Quadripartite partners to strengthen One Health and to implement the JRA.

Timor-Leste previously had no tool to guide the JRA**.** They proposed the next step to conduct more advanced risk assessment with support from WHO, WOAH and FAO; however, they likely need training or a simulation exercise prior to conduct the JRA.

Thailand wishes to conduct a national JRA for their top five priority zoonotic diseases, including HPAI, coronavirus, Nipah virus, rabies and Ebola virus as well as other health threats. However, they need support to introduce and modify the JRA to the subnational level based on local context, including "training of trainers" sessions. They also suggested creation and provision of short videos and online materials, including good practices related to JRA.

Sri Lanka has a national One Health steering committee and wishes to serve as observers of a national steering committee. Stakeholder mapping will be planned to establish a steering committee for JRA. Sri Lanka requested the Quadripartite organizations to observe the steering committee and guide the JRA process.

Nepal has an existing One Health strategy and plans to convene a meeting of the One Health technical committee to orient participants on the JRA OT and seek agreement to conduct the JRA. They also wished to conduct a "training of the trainers" and the JRA for a selected hazard with the support from the Quadripartite. Following this, they would like to replicate JRA at the subnational level.

Maldives will identify One Health contact points to conduct JRA. Training will be conducted with technical support from the Tripartite partners. They will also promote advocacy on JRA, strengthen collaboration with the environmental and private sectors, initiate capacity for whole genome sequencing and bioinformatics, and establish monitoring and evaluation for One Health. They aim to conduct JRA on AMR based on the national action plan.

Indonesia developed the curriculum on JRA and an online course, with the orientation in 17 provinces. They will strengthen risk communication and develop an action plan to follow-up of the JRA. They will develop a monitoring and evaluation protocol on implementation. They also wish to sensitize teams on the use of the JRA for AMR and consider the use of modelling to better understand the epidemiology of zoonotic influenza and coronavirus.

India will review their existing steering and technical committees such as AMR and avian influenza for possible conduct of the JRA. They will also hold advocacy meetings to sensitize higher authorities about the JRA OT. They aim to conduct sensitization meetings with the Tripartite and Quadripartite organizations to bring people together on a common platform.

Bhutan plans to hold a One Health meeting to advocate for the JRA and prioritize diseases, followed by capacity-building for use of the JRA OT, setting up the steering committee and conducting JRA on prioritized diseases. Following the JRA, they will develop an action plan and implement the risk management activities based on the JRA results.

Bangladesh will advocate for the use the JRA OT and provide sensitization involving the Department of Environment and city corporations. They will conduct stakeholder mapping and JRA with guidance from Quadripartite organizations. They also plan to provide training at the national and subnational levels.

4. Conclusions and recommendations

Conclusions

- Country participants, together with Tripartite and other partners, renewed recognition on the importance of conducting JRA engaging One Health stakeholders to effectively manage health risks at the human–animal–environment interface.
- Participants exchanged their experiences, lessons learned and views in assessing and managing health risks at the human–animal–environment interface and in implementing the tool in two countries in the Region.
- The workshop provided the participants the opportunity to enhance their understanding of the Tripartite JRA OT – including its purpose, scope and methodology.
- Participants expressed their intention to advance JRA in their countries, using the JRA OT as the guide.
- It was suggested that actual application of JRA in the country may require a "learning by doing" approach and enhanced collaborative efforts to address health risks.

Recommendations for Member States

1. Strengthen JRA at the human–animal–environment interface by engaging multisectoral One Health stakeholders in the respective country contexts.
2. Establish or strengthen country systems for JRA (e.g. steering committee, technical team) and strengthen trained workforce to conduct JRA to better inform risk management and risk communication options for ongoing and future health hazards and events.
3. Continue to advance JRA through:
    a. Using Tripartite JRA OT as the guiding tool
    b. Engaging the environment sector
    c. Effectively using and sharing various types of information, including genomic sequencing, epidemiological and eco-system data
    d. Applying JRA OT to emerging health threats, such as AMR.
4. Consider applying other One Health OTs to enhance preparedness and response to address health threats.
5.

Recommendations for regional Quadripartite organizations

1. Continue to provide support to countries in the Region to introduce or strengthen systems and implementation of JRA at the human–animal–environment interface.
2. Facilitate sharing of lessons learned and best practices between countries in the Region and with other regions to facilitate adoption of a harmonized approach for assessing risks posed by health threats.
3. Encourage the use of JRA as an effective channel to promote multisectoral planning and coordination in the implementation of the One Health approach in countries.
4. Facilitate improvement of One Health OTs and their application, working closely with Member States.

Annexes

Annex 1. Scenarios used for scenario-based discussion during the meeting

Avian Influenza

Dr Hamid, an adviser to the Minister of Agriculture in Sanghara, is concerned about an outbreak of avian influenza in domestic chickens in the neighbouring country of Palastrad. This outbreak is located near the eastern borders of Sanghara and has also resulted in several cases of human infections caused by a new highly pathogenic avian influenza virus (HPAI). It is suspected that this virus emerged through reassortment with other co-circulating viruses.

In Sanghara, six children fell ill last week and exhibited flu-like symptoms, although none of them died. The cause of their infections has not been diagnosed yet. A suspected outbreak of HPAI has also occurred in the backyard poultry in one of the villages where these infected children currently reside. Chicken in the area have shown severe lesions and high mortality rates, while ducks and geese, although infected, have exhibited moderate clinical signs.

These villages are located near the eastern border of Sanghara, adjacent to Palastrad, and there is continuous movement of people, vehicles, animals, and animal products across this porous border. Sanghara relies heavily on backyard poultry production, which accounts for 50% of its poultry production. There are few industrial farms in the country, and biosecurity conditions in these farms are often inadequate.

In Sanghara, the veterinary services are part of the Ministry of Agriculture. Dr Hamid advises the ministry to conduct a joint risk assessment to gain a better understanding of and prepare for potential outbreaks among Sanghara residents through contact with domestic or wild birds. He also recommends involving the Ministry of Health due to the zoonotic potential of the virus and the Ministry of Environment, which manages the natural parks where a significant number of wild birds nest. It is important to note that Sanghara has never conducted a sector-wide risk assessment before.

Rabies

Over the past few months, there has been a noticeable increase in the number of reported animal bites, particularly from stray dogs, across several districts in Chandrapur. These incidents have raised concerns among local communities and health authorities.

Dr Rajesh, the Chief Medical Officer of Chandrapur, has been closely monitoring the situation and collaborating with the Veterinary Services. The current scenario is further complicated by the fact that Chandrapur shares its borders with two countries where rabies cases have increased in recent years. In Chandrapur, three individuals, including a child and two adults, were recently bitten by suspected infected dogs in different districts. The child, unfortunately, died from the disease before receiving appropriate medical attention. The two adults are currently undergoing post-exposure prophylaxis (PEP) treatment. These cases have raised concerns about the possible spread of rabies to other parts

of Chandrapur, as the affected districts are major transportation hubs with frequent movement of people and animals.

Additionally, in villages bordering forests, cases of rabies have been reported in jackals. Farmers reported instances of their cattle being bitten by jackals and subsequently, the cattle developed rabies. This raises the possibility of rabies transmission at the village-forest interface, involving humans, domestic animals (dogs, cattle), and wildlife (jackals).

Chandrapur's health-care system is already under significant strain due to limited resources and capacity. There is a need to address the emerging rabies situation promptly and effectively to prevent further human exposures and control the spread of the disease within the animal population.

Dr Rajesh, in consultation with the Ministry of Health and the Ministry of Agriculture, has proposed conducting a joint risk assessment to comprehensively evaluate the situation. The assessment aims to identify the key risk factors associated with the transmission of rabies, such as the density of stray dog populations, vaccination coverage, community awareness and animal control measures.

Given the zoonotic nature of rabies, it is crucial to involve not only the health and agriculture sectors, but also the Ministry of Environment and Forestry, which oversees wildlife conservation and management. Chandrapur is known for its diverse wildlife, including several species of bats, which are potential reservoirs of the rabies virus. Collaborating with experts from the environmental sector will allow for a comprehensive understanding of the potential routes of transmission and formulate appropriate strategies to mitigate the risks.

To address the pressing concerns and potential public panic, the Ministry of Health and relevant stakeholders plan to organize a press conference to disseminate accurate information and address public queries effectively.

Annex 2. Programme of Activities

Day 1 Tuesday, 25 July 2023

Opening session

Opening and welcome remarks
- Mr Vimlendra Sharan, FAO Representative to Sri Lanka
- Dr Alaka Singh, WHO Representative to Sri Lanka
- Dr Chadia Wannous, One Health Global Coordinator, WOAH

Introductions of the participants
Overview of objectives and agenda
Nomination of chairs
Administrative announcements

Session 1

Managing health security threats at human-animal-environment interface – Situation and response

Health security threats at human-animal-environment interface: global perspectives and response
- Dr Chadia Wannous, One Health Global Coordinator, WOAH HQ
- Dr Lisa Scheuermann, WHO HQ

Health security threats at the human–animal–environment interface: regional situation and response
- Dr Masaya Kato, WHO SEARO
- Dr Kinzang Dukpa, WOAH RRAP
- Dr Yin Myo Aye, FAO RAP

Discussion

Session 2

Country experiences and lessons in assessing and managing risks at the human–animal–environment interface

Assessing and managing risks of outbreak of Nipah virus disease
- Representatives of Bangladesh

Assessing and managing risks of outbreak of rabies
- Representatives of Bhutan

Assessing and managing risks of Kyasanur Forest Disease
- Representatives of India

Assessing and managing risks of dengue
- Representatives of Maldives

Assessing and managing risks of avian influenza
- Representatives of Nepal

Assessing and managing risks of potential importation of rabies
- Representatives of Timor-Leste

GLEWS+
- Representatives of WOAH

Facilitated discussion

Session 3
Tripartite Joint Risk Assessment (JRA) Operational Tool (OT) and other One Health Tools - Overviews and lessons learned

Overview of Tripartite One Health tools including JRA OT
- Dr Tikiri Priyantha, WOAH
- Ms Tshewang Dorji, WHO SEARO

Country experiences and lessons in conducting national bridging workshop in Sri Lanka
- Representatives from Sri Lanka

Country experiences and lessons in applying JRA OT in Indonesia
- Representatives of Indonesia

Country experiences and lessons in applying JRA OT in Thailand
- Representatives of Thailand

Facilitated discussion

Session 4

Scenario-based discussion: Application of JRA OT Module 1 -Establishing a JRA Steering Committee and Technical Team

Introduction to the JRT OT module 1 - Establishing a JRA Steering Committee and Technical Team
- Dr Tikiri Priyantha, WOAH

Guidance for group work

Scenario-based discussion by break-out groups

Day 2 Wednesday, 26 July 2023

Session 5
Scenario-based discussion: Application of JRA OT Module 2 - Risk framing
Introduction to the JRT OT module 2 – Risk framing

- Dr Yin Myo Aye, FAO RAP

Scenario-based discussion by break-out groups

Session 6
Scenario-based discussion: Module 3 - Identifying and Diagramming the Risk Pathway
Introduction to the JRT OT module 3

- Dr Lisa Scheuermann, WHO HQ

Scenario-based discussion by break-out groups

Session 7
Scenario-based discussion: Module 4 - Identifying Risk Management Options and Communication Messages
Introduction to the JRT OT Module 4

- Dr Kinzang Dukpa, WOAH

Scenario-based discussion by break-out groups

Session 8
Scenario-based discussion: Wrap-up
Feedback by each group to plenary

- Rapporteur of the six groups

Discussion

Day 3 Thursday, 27 July 2023

Session 9
Panel discussion: Innovation and the way forward – Advancing JRA at human-animal-environment interface

Analyzing risks of antimicrobial resistance using whole-genome sequencing

- Dr Rungtip Chuanchuen, FAO Reference Centre, Chulalonkong University

Wastewater surveillance at animal farms

- Dr Patipat Susumpao, Open Dreams

Genomic surveillance at human-animal-environment interface

- Dr Joseph Sriyal Malik Peiris, Chair of Virology, The University of Hong Kong

Roles of environmental sectors in JRA

- Ms Marie-Yon Struecker, UNEP

Discussion with the panelists

Session 10

Identifying common priority actions to advance JRA in the Region

Discussion through World Café
Feedback to plenary

Session 11

Planning the next steps to strengthen JRA in countries

Break-out discussion by country teams on potential next steps and needs for support from Quadripartite partners
Plenary discussion

Session 12

Closing session

Reflections by participants
Closing remarks

Annex 3. List of Participants

Participants

Bangladesh

1. Dr Sohel Rahman
   Asst. Professor (Epidemiology)
   IEDCR, Mohakhali
   Dhaka
   Email: drsohel33@gmail.com

2. Dr Umme Ruman Siddiqi
   Asst Director
   Directorate General of Health Services (DGHS)
   Mohakhali, Dhaka
   Email: shamme02@gmail.com

3. Dr Puspen Kumer Sikder (Virtual)
   Upazila Livestock Officer, Kotalipara, Gopalganj, Department of Livestock Services
   Email: puspensikder@yahoo.com

4. Dr Md Mazmul Hoque (Virtual)
   Deputy Director, Animal Health,
   Department of Livestock Services
   Email: nhoque37@gmail.com

Bhutan

5. Mr Tshewang Dorji
   Program officer
   Communicable Disease Division
   Dept of Public Health
   Ministry of Health, Bhutan
   Email: tshewangdorji1@health.gov.bt

6. Dr Narapati Dahal
   One Health Focal from Department of Livestock

   Ministry of Agriculture and Livestock
   Bhutan
   Email: ndahal@moal.gov.bt

India

7. Dr Chandrashekhar Shivaji Taklikar
   Professor and Head
   Department of Health Promotion & Education
   MoH India
   Email: shekhartaklikar@gmail.com

8. Dr Tushar Nanasaheb Nale
   Deputy Director
   National Centre for Disease Control (NCDC)
   New Delhi, India
   Email: tushar.nale@nic.in

9. Dr Shubhangi Kulsange
   Deputy Director & OIC
   National Centre for Disease Control (NCDC)
   New Delhi, India
   Email: shubhangi.k@ncdc.gov.in

Indonesia

10. Dr Gunawan Setiaji
    Veterinary Officer
    Zoonoses Group Sub-Coordinator
    Prevention of Disease Transmission
    Directorate of Veterinary Public Health, DGLAHS, Indonesia
    Email: gnwnsetiaji@gmail.com

11. Dr Syafrison Idris
    Senior Veterinary Officer
    Group Coordinator
    Animal Health Surveillance and Laboratory Group
    Directorate of Animal Health, DGLAHS
    Indonesia
    Email: syafrison.idris@yahoo.com

Maldives

12. Mr Satheesh Moosa
    Lead Food Quality Assurance Officer
    Maldives Food and Drug Authority
    Email: satish@health.gov.mv

13. Mr Mohamed Lahfaan Moosa
Assistant Statistical Officer
Animal Health and Veterinary Section
Ministry of Fisheries, Marine Resources and Agriculture

Email: lahfaan.moosa@fishagri.gov.mv

Nepal

14. Dr Prerana Sedhain Bhattarai
Deputy Director General
Department of Livestock Services
Hariharbhawan, Lalitpur
Nepal
Email: prerana.s.bhattarai@gmail.com

15. Dr Sujan Rana
Senior Veterinary Officer
One Health Section,
Department of Livestock Services,
Lalitpur, Nepal
Email: sujanrana@gmail.com

Sri Lanka

16. Dr Samitha Ginige
Chief Epidemiologist
Epidemiology Unit
Ministry of Health
Email: samitha@hotmail.com

17. Dr Thilanga Ruwanpathirana
Consultant Community Physician
Epidemiology Unit
Ministry of Health
Email: thilangar@yahoo.com

18. Dr Sumathy Puvanendiran
Scientist/Virology
Department of Animal Production and Health
Email: sumathypuva@gmail.com

19. Dr Manori Wijemanna
Veterinary Public Health Specialist
Department of Animal Production and Health
Email: lmpwlb@gmail.com

Thailand

20. Dr Sudarat Damrongwatanapokin
Adviser to the Department of Disease Control, Ministry of Public Health
Email: sudarat.d@gmail.com
Also representing SEAOHUN

21. Dr Ratanaporn Tangwangvivat
Veterinarian, Department of Disease Control, Ministry of Public Health
Email: ratanaporn.tw@gmail.com

22. Dr Supalak Prajan
Veterinarian
Wildlife management section,
Serbnakasathern building floor 5,
Department of national park wildlife and plant conservation, 61 Phaholyothin road,
Lardyao, Chatuchak, Bangkok, 10900,
Thailand. Email: yingdnpvet@gmail.com

23. Dr Khemmapat Boonyo
(Veterinarian, Senior Professional level)
Department of Livestock Development
Email: kboonyo.w@gmail.com

Timor-Leste

24. Ms Josefina Clarinha Joao
National Director for Toxicology and Analysis of water and environment/IHR NFP
Email: jclarinhajo@gmail.com

Experts

25. Professor Dr Rungtip Chuanchuen
(Virtual)
Director
FAO Reference Centre
Faculty of Veterinary Science
Chulalongkorn University
Henri-Dunant Road, Pathumwan
Bangkok, Thailand
Email: Rungtip.C@chula.ac.th

26. Professor Dr Joseph Sriyal Malik Peiris
Chair of Virology
School of Public Health
The University of Hong Kong
7 Sassoon Road, Pokfulam
Hong Kong SAR, China
Email: malik@hku.hk

Partners/Observers

27. Dr Sheela Godbole (Virtual)
Director-in Charge,
ICMR- National Institute of Virology,
Pune India
Email: director@nariindia.org

28. Professor Tippawan Liabsuetrakul
(Virtual)
Chief
Epidemiology Unit, Faculty of Medicine
Prince of Songkla University
Thailand
Email: ltippawa@hotmail.com

29. Dr Patipat Susumpao (Virtual)
Managing Director Open Dreams
Thailand
Email: patipat@opendream.co.th

30. Dr A Liyanapathirana
Consultant Community Physician
Epidemiology Unit
Ministry of Health
Sri Lanka
Email: athulalp@yahoo.com

31. Dr TME Dabrera
Consultant Community Physician
Epidemiology Unit
Ministry of Health
Sri Lanka
Email: thusharidabrera@yahoo.com

32. Dr Anushika Wanninayake
Veterinary Research Officer
Department of Animal Production and Health
Sri Lanka
Email: anushika_a@yahoo.com

33. Dr PNC Fernando
Veterinary Investigation
Department of Animal Production and Health
Sri Lanka
Email: vic_anuradhapura@yahoo.com

34. Dr DPH Fernando
Veterinary Investigation
Department of Animal Production and Health
Sri Lanka
Email: vic_kalutara@yahoo.com

35. Dr Samantha Sudharshani Iddamaldeniya
Veterainry Research Officer
Veterinary Research Institute
Sri Lanka
Email: samanthaidd@gmail.com

36. Ms Marie-yon Struecker (Virtual)
One Health Consultant
UNEP Regional Office for Asia and the Pacific
Email: marie-yon.struecker@un.org

37. Dr Karoon Chanachai (Virtual)
USAID Regional Development Mission – Asia
Bangkok, Thailand
Email: kchanachai@usaid.gov

Secretariat

FAO Regional Office for Asia and the Pacific

38. Dr Yin Myo Aye
    Regional One Health Specialist
    Emergency Centre for Transboundary Animal Diseases (ECTAD)
    FAO Regional Office for Asia and the Pacific
    Email: yinmyo.aye@fao.org

FAO Country Offices

39. Dr Ali Arasyi
    Surveillance and Risk Analysis Expert
    ECTAD, FAO Indonesia
    Email: Ali.Arasyi@fao.org

40. Dr Surendra Karki
    National Consultant & Technical Coordinator
    ECTAD, FAO Nepal
    Email: Surendra.Karki@fao.org

41. Dr Zakiul Hasan
    National Technical Advisor - Live Animal Marketing
    ECTAD, FAO Bangladesh
    Email: Zakiul.Hasan@fao.org

42. Ms Isuri Hewage
    Programme Coordinator
    FAO Sri Lanka
    Email: Isuri.ThalpepalaHewage@fao.org

WHO Headquarters

43. Dr Lisa Scheuermann
    Technical Officer, Human-Animal Interfaces
    WHO HQ / WPE
    email: scheuermannl@who.int

WHO Country Offices

44. Dr Anthony Eshofonie
    Team Leader (Health Security and Emergency Response)
    WHO Country Office for Bangladesh
    email: eshofoniea@who.int

45. Mr Kencho Wangdi
    National Professional Officer (Health Emergencies)
    WHO Country Office for Bhutan
    email: wangdik@who.int

46. Ms Anupurba Roy Chowdhury
    Technical Officer (Laboratory Specialist)
    WHO Country Office for DPR Korea
    Email: roya@who.int

47. Dr Tran Minh Nhu Nguyen
    Team Leader
    (Health Security and Emergency Response)
    WHO Country Office for India
    email: tranminhn@who.int

48. Dr Endang Widuri Wulandari
    National Professional Officer
    (Epidemiologist)
    WHO Country Office for Indonesia
    email: wulandarie@who.int

49. Dr Gabriel Eduardo Novelo Sierra
    Team Leader (WHO Health Emergencies)
    WHO Country Office for Myanmar
    Email: novelog@who.int

50. Dr Zar Zar Naing
    National Professional Officer
    WHO Country Office for Myanmar
    Email: znaing@who.int

51. Dr Dipendra Gautam
    NPO (International Health Regulations),
    WHO Country Office for Nepal
    Email: gautamd@who.int

52. Dr Saugat Shrestha
    National Professional Officer
    (Infectious Hazard Management)
    WHO Country Office for Nepal
    Email: shresthasau@who.int

53. Dr Sapumal Dhanapala
    National Professional Officer
    WHO Country Office for Sri Lanka
    Email: dhanapalas@who.int

54. Dr Anajlee De Silva
    National Professional Officer -

Surveillance
WHO Country Office for Sri Lanka
Email: desilvaa@who.int

55. Dr Dushan Sameera Hewage
National Consultant
WHO Country Office for Sri Lanka
Email: hewaged@who.int

WHO SEARO

56. Dr Masaya Kato
Programme Area Manager
WHE/SEARO
email: katom@who.int

57. Ms Tshewang Dorji
Medical Epidemiologist
WHE/SEARO
Email: dorjitsh@who.int

58. Dr Hannah Brindle
Consultant
WHE/SEARO
email: brindleh@who.int

59. Mr Rohit James
Executive Assistant
WHE/SEARO
Email: jamesr@who.int

WOAH Headquarters

60. Dr Chadia Wannous
One Health Senior Specialist and Global Coordinator,
WOAH HQ, Paris, France
Email: c.wannous@woah.org

WOAH Regional Representation for Asia and the Pacific (RRAP) Tokyo

61. Dr Kinzang Dukpa
Regional Project Coordinator,
WOAH RRAP, Tokyo, Japan.
Email: k.dukpa@woah.org

WOAH Sub-Regional Representation for South-East Asia (SRR SEA) Bangkok

62. Dr Tikiri Wijayathilaka
Technical Officer – Antimicrobial Resistance
WOAH SRR SEA Bangkok
Email: t.priyantha@woah.org

ISBN 978-92-5-138849-5

CD1006EN/1/06.24