



Post-2020 Avian Influenza Control Framework in ASEAN

**Adopted at the 45th Meeting of the AMAF
on 4 October 2023**

The development of this framework was made possible through the assistance of the Department of Foreign Affairs and Trade, Australia; the Food and Agriculture Organization of the United Nations and the ASEAN Secretariat.

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Abbreviations

ACCAHZ	ASEAN Coordinating Centre for Animal Health and Zoonoses
ACGL	ASEAN Communication Group for Livestock
ALDF	ASEAN Laboratory Directors Forum
AVEG	ASEAN Veterinary Epidemiology Group
AMAF	ASEAN Ministers on Agriculture and Forestry
AMS	ASEAN Member States
ASEAN	Association of Southeast Asian Nations
ASF	African Swine Fever
FAO	Food and Agriculture Organization of the United Nations
FETV	Field Epidemiology Training for Veterinarians
FMD	Foot and Mouth Disease
GF-TADs	Global Framework for the progressive control of Transboundary Animal Diseases
GAHP	Good Animal Husbandry Practices
HPAI	Highly Pathogenic Avian Influenza
HPED	Highly Pathogenic Emerging Diseases
H5N1	Avian Influenza A subtype (H5 haemagglutinin; N1 neuraminidase)
LBM	Live bird market
PVS	Performance of Veterinary Services
RSU	Regional Support Unit
WHO	World Health Organization
WOAH	World Organisation for Animal Health (formerly OIE)

Executive Summary

The adoption of the Roadmap for an HPAI-Free ASEAN Community by 2020 has served as a long-term strategic framework towards the prevention, control and eradication of HPAI and other HPEDs in the region by providing directional and action-oriented strategies and a broad vision that integrates lessons learned and key elements with previous regional frameworks and ongoing regional initiatives such as the Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) and the One Health approach.

During the workshop to develop the ASEAN Post 2020 Framework on Avian Influenza held last 14 – 16 March 2023, participants refined such findings and cited the following themes where achievements have been more pronounced, namely: veterinary services, laboratory capacity, movement management including compartmentalization and zoning, surveillance, vaccination, compensation, and farming practices including biosecurity measures. Success stories were also shared in the areas of the disease status of countries, collaboration, laboratory capacity, border control, zoning and compartmentalization, surveillance, vaccination, risk management, farming practices and management and resource planning.

The notable progress of the implementation of the Roadmap for an HPAI-free ASEAN Community 2020 needs to be sustained.

The ASEAN Member States (AMS) also admitted that there were gaps that needed to be addressed as Avian Influenza remains a major challenge to both human and animal health.

The post-2020 framework will focus on three strategic directions: for free Member States to maintain their free status; for Member States experiencing occasional disease incursions to strengthen the capability to immediately control existing outbreaks and recover their free status; and for Member States with the sustained presence of HPAI, to ensure there is the capacity to reduce the impact on the poultry industry and decrease the risk to human health.

Each strategic goal can be effectively achieved by putting in place key technical elements which cut across all three strategic directions and goals as well as foundational elements. In putting these elements in place, the country's context and regional agreements should be taken into consideration.

A list of actions to achieve each strategic goal was then identified and targeted for implementation over an initial five-year period.

I. Overview of Avian Influenza Situation

In Southeast Asia, a wave of Highly Pathogenic Avian Influenza (HPAI) H5N1 infections came through in 2003, affecting Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Thailand and Vietnam.

In Indonesia, H5N1 outbreaks in poultry started in December 2003. And in Vietnam, the virus was introduced from China in late 2003, while outbreaks in poultry were first reported in 2004 and shortly followed by several human cases. Infections in humans were continuously reported throughout 2004–2005; the vaccination of poultry against the H5 virus was initiated in August 2005 with inactivated H5N1 and H5N2 vaccines. The disease was also first detected in poultry in Lao PDR in 2003.

In Thailand, the Avian influenza H5N1 virus was first reported in January 2004, together with Cambodia, where the first confirmed outbreak of HPAI subtype H5N1 in poultry was reported during the same period (January 2004), while Malaysia reported its first outbreaks in poultry in August and September 2004. Myanmar reported its first outbreak of the H5N1 virus in poultry in March 2006. In the Philippines, the first detection of H5N1 was in January 2022.

The virus spread is believed to be influenced primarily by local trade patterns, where large live bird markets may also contribute, the density of wet markets, poultry production structure, and disease control and preventive efforts. Consistent patterns suggest a relationship with the duck density, human population and rice cropping since “grazing” of ducks in rice fields is a common practice in most countries in the region.

A study on the “Genesis of a highly pathogenic and potentially pandemic H5N1 influenza virus in eastern Asia” demonstrates a series of genetic reassortment events that can be traced to the precursor of the H5N1 viruses that caused the initial human outbreak in Hong Kong in 1997. This gave rise to a dominant H5N1 genotype in chickens and ducks that was responsible for the regional outbreak in 2003-2004. The same study suggests that H5N1 viruses with pandemic potential have become endemic in the region and are not easily eradicable. Evidence indicates that domestic ducks had a central role in the generation and maintenance of this virus and that wild birds may have contributed to the increasingly widespread of the virus in Asia.

While there have been significant achievements in the effort to prevent and control HPAI H5N1 in the region, Southeast Asia and the rest of the world continued to report outbreaks of diverse subtypes of avian influenza, particularly H5N1, H5N2, H5N6, H5N8 including low pathogenic H7N9. And where there have been reduced reported outbreaks in Asia between October 2016 and July 2018 (see Figure 1), outbreaks were reported in previously free countries in Southeast Asia. In the Philippines, H5N6 was reported in 2017, 2018 and 2020, and H5N1 in January 2022 that persisted to date. Similarly, the Sabah State of Malaysia reported H5N1 in 2018.

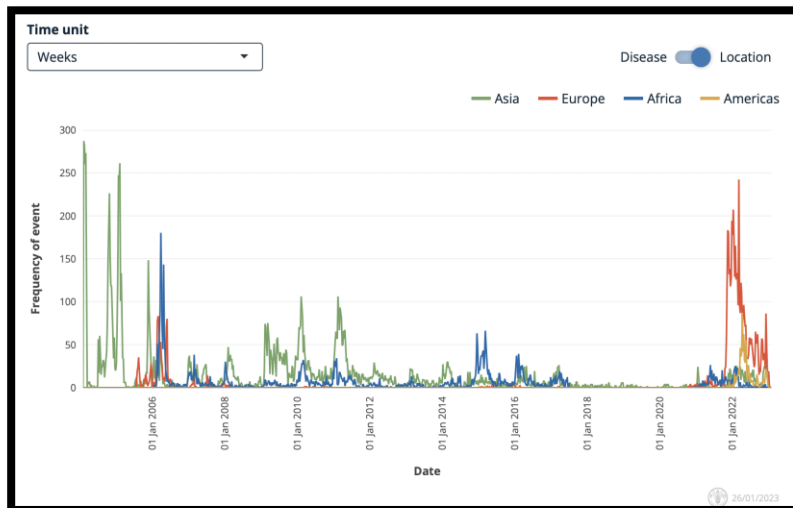


Figure 1. Events of HPAI from 2006-2022

Other HPAI subtypes were also reported in other ASEAN countries. In 2015, two novel reassortant H5N6 influenza viruses were isolated from dead quails during avian influenza outbreaks in central Vietnam and in early 2020 in poultry in its northern province. Lao PDR, on the other hand, reported H5N6 in March 2021, with the first human A(H5N6) infection reported outside of China. The sequenced viruses belonged to clade 2.3.4.4h and were closely related to viruses detected in poultry in Vietnam⁴.

This illustrates “an unprecedented genetic variability of subtypes which has been reported in birds, creating an epidemiologically challenging landscape”. H5N8 viruses re-assorted with other avian influenza viruses and formed H5N1, H5N2, H5N3, H5N4, H5N5, and H5N6 viruses, and the H5N1 viruses bearing the clade 2.3.4.4b HA gene have spread to many countries in Europe, Africa, Asia, and America since they emerged in October 2020⁵.

The number of cases from 2014 to 2022 at the global level (see Figure 2) points to the surge of events in 2022, higher than all prior years in 2014. The same period has also shown that most AMS were affected, with a significant number of affected areas in most countries where the disease has also been labelled as endemic.

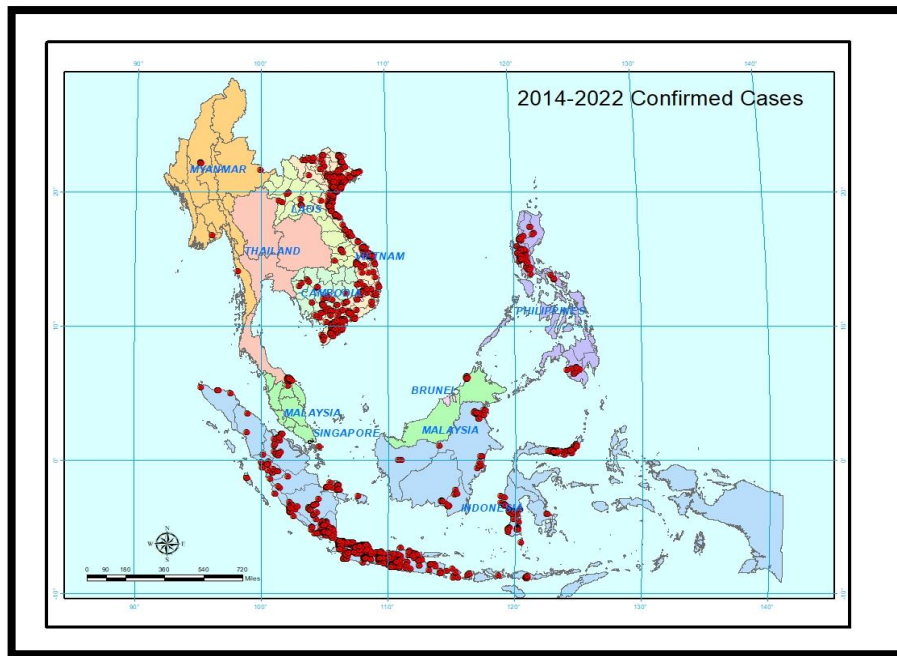


Figure 2. Number of confirmed cases from 2014-2022 (FAO)

Avian influenza virus H5N1 with clade 2.3.4.4b is widely circulating in wild birds and has been responsible for the loss of over 70 million domestic poultry in Europe, Africa, Asia, and North America since October 2020⁵. Since May 2021, more than 40 countries from different regions have confirmed outbreaks of HPAI in poultry and wild birds, and numerous subtypes of the HPAI viruses have been circulating in diverse bird populations on a large geographical scale (WOAH). Risk factors such as introduction by migrating birds, importation, spread from infected poultry, pasture grazing ducks, free range chicken production and the nature of the virus survival in the environment provide avenues for a prolonged and sustained infection of HPAI (FAO).

In addition, avian influenza poses a serious threat to human health, and zoonotic transmission of the disease continues to occur in the region. For example, human cases of influenza A(H5N1) have been recorded in Cambodia (58 cases including 38 deaths), Lao PDR (3 cases including two deaths), and Viet Nam (128 cases including 64 deaths) as of April 2023. Other subclades responsible for human infections in Southeast Asia include A(H5N6), A(H9N2), A(H10N3), A(H3N8), A(H7N4) and A(H7N9).

The majority of humans infected by avian influenza were exposed to live poultry, and to date, no sustained human-to-human transmission has occurred.

The emerging H5 subclade 2.3.4.4b has been involved in several of these zoonotic cases, which warrants robust surveillance, prevention and control measures to mitigate its impacts on both poultry production and human health.

There is also a growing risk that H5N1 may become better adapted to other mammals (e.g. minks), which may serve as mixing vessels for different influenza viruses, leading to the emergence of new strains and subtypes that could spill over to other animals and humans. For marine mammals in particular, this could also be a conservation concern, and where marine mammals are consumed for subsistence, there could be increased risks for humans.

II. Regional Framework for the Control and the Eradication of HPAI in ASEAN

Collectively responding to the emergence of the HPAI in the region in 2003, the Association of Southeast Asian Nations (ASEAN) has launched and implemented various initiatives and programs. Among these include the creation of the ASEAN HPAI Taskforce in 2004, the formulation of the Regional Framework for the Control and Eradication of HPAI in ASEAN in 2005, Regional Strategy 2008-2010, and in 2010, the Roadmap for an HPAI-free ASEAN Community by 2020.

The Roadmap sets a common aspiration for “an ASEAN Community with enhanced capacity to progressively control and eradicate HPAI in domestic poultry and humans, as well as other disease threats, towards food security and public health safety.”

Following its adoption, the Roadmap for an HPAI-free ASEAN Community 2020 has served as a long-term strategic framework towards the prevention, control and eradication of HPAI and other HPEDs in the region by providing directional and action-oriented strategies and a broad vision that integrates lessons learned and key elements with previous regional frameworks and ongoing regional initiatives such as the Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) and the One Health approach.

The notable progress of the implementation of the Roadmap for an HPAI-free ASEAN Community 2020 needs to be sustained considering the increasing poultry population in Southeast Asia at 186 million birds (increased by 6% as of January 2019 and increased by 3 -4 % in 2021).

Initial reviews reported progress on seven strategic goals, namely: strengthening veterinary services, progressive zoning and cross border management, vaccines and vaccination strategy, stamping out and culling, surveillance and monitoring, market chain management and enhanced biosecurity (Review Findings on ASEAN HPAI Roadmap 2020).

Further, to support the implementation of the Roadmap, The Food and Agriculture Organization of the United Nations, with the financial support of Australia’s Department of Foreign Affairs and Trade (DFAT), conducted a review of previous investments aiming at mitigating the risk of infectious diseases along the livestock value chain. The goal was to identify factors that led to effective risk reduction along the livestock value chain and provide recommendations to ACCAHZ on contributing to a healthier, more inclusive, and more resilient ASEAN.

The review included initiatives from four ASEAN MS (Cambodia, Lao PDR, Myanmar, and Vietnam) that aimed at reducing the risk of animal infectious diseases along the livestock value chain, supported by previous investments by DFAT¹.

During the workshop to develop the ASEAN Post 2020 Framework on Avian Influenza held last 14 – 16 March 2023, participants refined such findings and cited the following themes where achievements have been more pronounced, namely: veterinary services, laboratory capacity, movement management including compartmentalization and zoning, surveillance, vaccination, compensation, and farming practices including biosecurity measures. Success stories were also shared in the areas of the disease status of countries, collaboration, laboratory capacity, border control, zoning and compartmentalization, surveillance, vaccination, risk management, farming practices and management and resource planning. Details of these achievements and success stories appear in Annex 1.

¹ The DFAT-funded project “Evidence-Based Risk Management along the Livestock Production and Market Chain” was implemented between May 2017 and December 2019.

In the course of the implementation of the Roadmap for an HPAI-free ASEAN Community 2020, gaps and challenges have been identified and were mostly focused on the following themes and corresponding issues:

- Laboratory
 - Upgrade of equipment.
 - Inter-laboratory PT.
 - BSL3 accreditation.
 - Technical support for AI tests as the virus keeps evolving.
 - Lack of experts to consult on laboratory diagnosis and use of facilities.
- Surveillance
 - Technical support to cover passive and active surveillance.
 - Wildlife surveillance and collaboration are needed to do it.
- Regional collaboration
 - Sustainable resourcing and mechanism to source and tap resources.
 - Wildlife surveillance in the region.
 - Early alert and rapid data sharing amongst AMS of diverse strains to support vaccination programmes.
 - Bilateral agreements need to be guided by WOAHA mechanisms on compartmentalization.
- Administrative support: slow procurement process; emergency funds.
- Legislation for disease control.
- Human resource: same people are looking for after other diseases; recruitment of new personnel to enter government.
- Biosecurity at farms and live bird markets.
- Compensation/Indemnification mechanism to pay and value of compensation not commensurate to the value of the animals.
- Movement/ Border control /Trade: undocumented trade.
- Awareness that would encourage reporting of cases.

Taking into consideration these achievements, success stories and gaps, the post-2020 framework proposed by ASEAN sets more realistic objectives and focused approaches that can be realized through stronger regional collaboration.

The post-2020 framework will focus on the following strategic classifications and directions:

1. For free Member States to maintain the free status of member states,
2. For Member States experiencing occasional disease incursions, to strengthen the capability to immediately control existing outbreaks and recover their free status,
3. For Member States with the sustained presence of AI, to ensure there is the capacity to reduce the impact on the poultry industry and decrease the risk to human health.

III. Strategic Plan

Vision

A food and nutrition secure, healthy and an economically robust ASEAN community

Mission:

To enhance capacity and cooperation to prevent, control and eradicate high-impacting avian influenza viruses, including minimizing their impacts on the domestic poultry industry and public health.

Strategic Goals

Goal 1. Maintain the free status of AI-free countries.

Goal 2. To strengthen the capability to immediately control existing outbreaks and recover the country's free status. This will apply to member states experiencing occasional disease incursions.

Goal 3. To strengthen the capacity to reduce the impact on the poultry industry and decrease the risk to human health. This will apply to member states with the sustained presence of avian influenza.

The above goals are not meant to categorize countries but rather to guide countries on actions to take when they find themselves in these situations.

IV. Cross-cutting technical elements:

Each strategic goal can be effectively achieved by putting in place key technical elements which cut across all three strategic directions and goals. The technical elements listed are described, and implementation approaches are recommended. In putting these elements in place, the country's context and regional agreements should be taken into consideration.

A. Surveillance and Monitoring

Disease surveillance consists of the systematic collection, collation, analysis and dissemination of information to describe the health status of a population and inform evidence-based actions. The main features in most definitions relate to the following:

- systematic collection of relevant information
- timely collection of information
- ongoing or continuous collection of information
- collection of information from populations or subpopulations
- methods that are practicable, uniform and rapid rather than completely accurate
- analysis, interpretation and communication of the collected data
- the nature of the characteristic of interest (clinical disease, presence of a pathogen, evidence of immune response to a pathogen, presence of risk factors for a disease)
- Dissemination of surveillance results to all relevant inform evidence-based actions (e.g. vaccination programmes, guidelines for recommendations, etc.)

Surveillance objectives vary depending on the disease status of the country, and being clear on the objectives would guide countries in designing and implementing a surveillance programme. If the disease is absent, objectives should focus on early detection of disease incursion or demonstration of disease freedom. If the disease is present, surveillance objectives provide the information needed to implement eradication programmes or limit the spread of the infection – this may include determining the prevalence and incidence of the disease. It is recommended that each country individually identify the surveillance objectives that best fit its goals and develop surveillance procedures that specifically reflect these objectives. In other words, effective objectives and protocols should be country-adapted.

In the context of ongoing active surveillance in Asia, member states can refer to the guidelines developed by FAO, which can be adapted by countries' veterinary services to update their AIV surveillance procedures (<https://www.fao.org/3/cb3252en/cb3252en.pdf>)

A functional surveillance system involves:

- a functional coordination mechanism between the national, sub-national and field-level veterinary services (government and private), including key stakeholders (farmers/producers), which will support necessary action in detecting suspicious cases and reporting diseases in susceptible bird species.
- a functional laboratory diagnostic network as identified as a key element in the previous Roadmap that needs to be sustained post-2020 in order to implement an efficient surveillance system.
- strengthened capacities of national and sub-national laboratories in the diagnosis and characterization of the virus.
- The use of innovative and novel tools and approaches in sampling and testing of AIVs in both domestic and wild animals (e.g. <https://www.fao.org/3/a0960e/a0960e00.pdf>)
- a reporting system/network that will allow the capture of immediate and regular reports in a timely and complete manner.
- A robust information management system that allows for the collection, validation and analysis of standardized data from all levels of the surveillance system.
- A feedback system that provides relevant stakeholders at all levels of the country with the necessary information to allow prevention and control actions to be taken.
- sustained funding.

All the elements above should be formalised into surveillance plans that can be used by all actors of the system and that can be reviewed regularly based on the evolving disease situation.

To support surveillance and monitoring activities, the Regional Framework for Epidemiology Capacities Building and Networking and its M&E tool should be linked to support the implementation of this Framework.

B. Laboratory Capacity

Detailed plans should be developed for ramping up laboratory testing capacity requirements to support surveillance and to ensure effective response during an emergency. An adequate staffing level, equipment, and supplies should be available. Regular training should be conducted as and when needed.

The rapid and definitive diagnosis of diseases can only be assured in properly equipped laboratories with trained personnel; hence the region may also agree on contractual arrangements with laboratories inside or outside the region to validate test results or even do the testing if the country is short of laboratory supplies and concerns on the laboratory such as upgrading equipment, laboratory accreditation for quality assurance and bio-risk management, diagnostic tests, training can be forwarded to the ASEAN Laboratory Directors' Forum (ALDF).

The ALDF could recommend creating a pool of experts for countries to consult on technical issues and to maximise the role of ASEAN Reference Laboratories and centres.

To support laboratory activities, the Regional Framework for Laboratory Capacities Building and Networking and its M&E tool should be linked in supporting the implementation of this Framework.

C. Capacity building

A systematic training programme must be designed and implemented at regional and national levels. Trainees must be familiar with what they need to do with the basic clinical, pathological and epidemiological features of AI. Training should be provided on disease investigation

techniques, disease reporting responsibilities and procedures, disease surveillance and other field epidemiology methods, and laboratory diagnosis for laboratory staff.

There are a number of training possibilities which may be selected as appropriate. These include:

- Sending key field or laboratory staff to another country to gain first-hand experience when there is a major disease outbreak in that country.
- Other international training opportunities that may present from time to time.
- National emergency disease training workshops.
- Academic education

Educational campaigns could also be conducted targeting not only farmers but all stakeholders along the poultry value chains to raise awareness about HPAI, its clinical signs, disease impacts, prevention and control measures and the importance of reporting suspected cases.

D. Regionalization/zoning

AMS will explore providing further investments in zoning and compartmentalization strategy and how to develop a certification system based on these zones and compartments, including maintenance of cross-border checkpoints, determining where the critical checkpoints should be situated and strengthening the capacity of the personnel managing the borders.

Bilateral/zonal cooperation mechanisms should be institutionalized among neighbouring countries as it has proven to have contributed to the goal and objectives of controlling AI and other TADs at the borders of ASEAN.

E. Border control/animal movement management

AMS are encouraged to develop regional movement management protocols aligned with the certification system, where the health information of animals is indicated and can be accessed by a country accepting a consignment of animals.

Good Animal Husbandry Practices (GAHP) for poultry, particularly layers and broilers, can be adopted as aligned with the ASEAN GAHP on Broiler and Layer.

Organizing key stakeholders from the private sector as part of industry-wide working groups or consultative bodies would allow private sector participation in policy development to ensure ownership and buy-in for the system.

F. Compensation

It must be stressed that compensation should be seen as mostly an incentive to encourage rapid reporting of disease and not as compensation for all losses.

Compensation or indemnification must therefore be reviewed as a policy since failure or even delay in its delivery will have significant implications for any control efforts.

AMS should revisit its policy on compensation, assess its value at the national level, and explore alternative means of compensation, such as insurance or privately managed funds from the industry as a form of private sector support to the program.

G. Farm biosecurity

Biosecurity requires the adoption of a set of attitudes and behaviours by people to reduce risk in all activities involving domestic, captive exotic and wild birds and their products.

Biosecurity is also one of the areas of importance for GAHP and can be institutionalised and further elevated through the accreditation system for farms and other establishments, such as Live Bird Markets.

The basic principles of biosecurity are segregation, cleansing and disinfection.

1. Segregation is the creation and maintenance of barriers to limit the potential opportunities for infected animals and contaminated materials to enter an uninfected site.
2. Cleaning farm fixtures and materials (e.g. vehicles, equipment) that have to enter (or leave) a site must be thoroughly cleaned to remove visible dirt.
3. Disinfection, properly applied, will inactivate most remaining pathogens which are present on materials that have been thoroughly cleaned.

The initial steps to put biosecurity measures in place are as follows:

- Review biosecurity measures developed for Sectors 1-3 and Sector 4 poultry farms, respectively, as mandated in the previous roadmap.
- Develop Biosecurity Plans for various establishments from farm to market, including shipping/trucking of animals as part of licensing regulatory requirements for these establishments.
- Establish an audit system for the accreditation process that will put high marks on biosecure farms, thus institutionalizing biosecurity measures at the farm level.

Simultaneously implementing changes in biosecurity, reviewed the biosecurity-related national or regional policy and provided policy information briefs to ASEAN Ministers as needed. While such legislation should be aligned with international standards, it must prioritize the local context, including resources from both private and public sectors, to develop legislation that is realistic (*vis-à-vis* the country context) and can be properly implemented despite the limited human and financial resources.

H. Vaccine and vaccination

If vaccination is likely to be used for control, it is important that this vaccine be available in the required type and quantities at an early stage. The type and quantities should be decided, and then a country must either establish a vaccine production capacity and antigen bank locally or source the vaccine from outside the country, either through governmental links or from a private company. Further, to ensure the sufficient availability and accessibility of safe and effective vaccines to meet the demand for disease control, it would be important to collaborate with vaccine manufacturers, international organizations, and research institutions.

Vaccine deployment (including cold chain, targeted species, vaccination teams or brigades, and communication with local authorities and producers) needs to be planned. Consideration should be given to the permanent identification of animals vaccinated and serological monitoring before and after vaccination to evaluate vaccine coverage and efficacy.

I. Contingency plan

The contingency plan is a plan on what the government will do in the event of an incursion of disease. Every country has its own unique set of circumstances; thus, a contingency plan needs to be developed according to the country's requirements and how a disease emergency is managed. A written plan is important so all those involved in managing a disease emergency will know their roles and their points of contact, and that set of actions is clearly laid out and harmonized.

There are certain elements, however, that are required to be present in a contingency plan if it is to have the required effect of enabling rapid control of an outbreak. The following extensive list attempts to show what elements could be covered and countries may decide what to prioritize in their respective plans.

- Legislation
- Finance
- Command and control
- Nature of the disease
- Size, structure and movements and trading patterns of relevant livestock populations
- Wildlife
- Policy
- Resource plans
- Laboratories
- Vaccination
- Public awareness
- Communication
- Establishing disease freedom
- Recovery
- Other possible contingency plan chapters

As in any plan, it must be concise, achievable and readily understood.

J. Simulation

Simulation exercises are extremely useful for testing and refining the contingency plans, including the operations manual (e.g. SOPs), in advance of any disease emergency. They are also a very valuable means of building teams for emergency disease responses and for training individual staff. The scenarios devised for the exercises should be as realistic as possible, using real data where possible.

The training required includes training government veterinarians, private veterinarians and livestock-keepers on epidemiology, disease recognition and reporting procedures; response procedures, including emergency management; outbreak investigations and analyses; undertaking regular desktop and field simulation exercises involving all stakeholders to practice implementation of contingency plans and operations manuals.

K. Recovery plan

A recovery plan is a plan for the safe recovery or restoration of normal activities, although possibly with procedures and practices modified in light of the experience gained during the outbreak.

When infection is believed to have been eliminated, or the disease has been controlled at least, a series of verification programmes should be carried out to provide evidence to the international community that the country has controlled the disease and/or has regained freedom from disease. This may include a demonstration that the country has a capable

veterinary service and comprehensive disease surveillance programmes; statistically based serological surveys, and active clinical surveillance.

Recovery and rehabilitation of affected communities, such as restocking and extending technical and financial support, are just some of the measures that must be put in place towards the end of the programme.

Disease control measures may diminish, such as deciding to stop vaccination; however, there should be a shift of emphasis towards active disease surveillance (e.g. continuing visits, taking samples for testing) to detect any residual infection.

V. Foundational Technical Elements

These elements are considered the backbone of animal health management for the technical elements to be effectively implemented.

A. Strengthening of the Veterinary Services

ASEAN, through the various levels of its governance, will establish appropriate systems for increasing government funding for veterinary services based on PVS and other analyses with the following specific actions:

- ASEAN will advocate decision-makers at the national level for sustained investment in the animal health sector by working with partners and international organizations like FAO, WHO and WOAHA
- AMS will review the results of previous PVS and other analyses and address the points for improvement and strengthen activity pillars already in place.
- ASEAN will support the resource mobilization of Member States, together with partners and donors, in addressing key findings from PVS or other assessment tools.

B. Animal Health Legislation

The previous roadmap indicated the need to strengthen and align the veterinary legislation of AMS for effective prevention and control measures of HPAI. Thus, this foundational element is again emphasized here so countries developing or updating their animal health legislation must consider putting the following points:

- Adopting a systematic approach as part of the implementation of this Framework to mitigate the risk of diseases along the livestock value chain.
- The veterinary services, at all levels, must be provided with a clear mandate, and roles and responsibilities related to surveillance, outbreak investigations, response, and more must be defined between all levels of the countries (e.g. central, intermediate, field) as well as between sectors (livestock, wildlife, public health), including police power to enforce guidelines relating to the prevention and control of HPAI and other TADs.
- Workforce development must be clearly indicated in the legislation or its implementing guidelines.
- HPAI and other TADs that threatens human and animal health and the livelihood of the people must be declared as notifiable.
- AMS policy on compensation and other animal health interventions must be reflected in the legislation to ensure administrative support and ample budget allocation.

C. Advocacy

Advocacy is the active support of an idea or causes expressed through strategies and methods that influence the opinions and decisions of people and organisations.

The aims of advocacy are to create or change policies, laws, regulations, distribution of resources or other decisions that affect people's lives and to ensure that such decisions lead to implementation. Such advocacy is generally directed at policymakers including politicians, government officials and public servants, but also private sector leaders whose decisions impact people's lives, as well as those whose opinions and actions influence policymakers, such as journalists and the media, development agencies and large NGOs.

While the goal is to develop and implement a regional advocacy strategy, AMS should also look into addressing their advocacy capacities by scanning their social and economic development context to determine an effective advocacy strategy.

D. Risk Communication

Risk communication is defined as the real-time exchange of information, advice and opinions between experts or officials and people who face a threat (from a hazard) to their survival, health or economic or social well-being (WHO).

Risk communication is an integral part of disease risk management during animal health emergencies and zoonotic outbreaks. It is particularly important in the ASEAN region where country differences in terms of disease knowledge, attitudes and practices are so unique that varying perceptions would mean success or failure in implementing an animal health program.

A regional risk communication strategy that includes necessary tools (e.g forming a risk communication team, selecting a spokesperson, conveying a message) to communicate disease risks/threats to stakeholders may be developed for the guidance of AMS to develop their own risk communication strategy.

E. Collaboration and Partnerships Multi-sectoral Stakeholder Mobilization

Cultivating partnerships with professional organizations, livestock groups, and development partners to assist in animal health management can achieve optimum participation in the detection, response and management of AI and other emerging disease threats.

Creation and maintaining networks between human health, animal health and the environment sector will add value to technical and policy discussions and hence must be encouraged.

F. One Health

With One Health platforms now being bannered and recognized at national and regional levels, the application of One Health needs to be cascaded down to the field. Operationalization of the One Health approach on the ground will strengthen the whole public health workforce involving human and animal health and the environment.

G. GEDSI (Gender Equity, Disability and Social Inclusion)

The global community recognizes the disproportionate distribution of resources, decision-making power, and educational and economic opportunities, particularly at the expense of women and

girls; people with disabilities, and groups experiencing marginalization due to contextual socioeconomic factors.

AMS recognize the need for greater economic, social, gender, and environmental justice and equity. To address this imbalance, AMS shall endeavour to integrate, embed and prioritize gender equity, diversity, disability, and social inclusion (GEDSI) principles and practices into every ASEAN programme and will take into account the ASEAN Ministers on Agriculture and Forestry (AMAF)'s approach to Gender Mainstreaming in the Food, Agriculture, and Forestry Sectors as well as the ASEAN Gender Mainstreaming Strategic Framework 2021-2025. AMS will support communities with implementing changes to policies, laws, and practices and raise public awareness about issues affecting women, girls, and marginalized groups.

Based on the literature review conducted by the "Strengthening Mechanisms in Animal-health for a Resilient ASEAN" (SMART ASEAN) project that was implemented by the Food and Agriculture Organization of the United Nations (FAO), with the support of the Australian Government, through the Department of Foreign Affairs and Trade (DFAT), in partnership with the ASEAN Secretariat, found the impact of HPAI policies that highlights the impact to GEDSI. A summary of the findings related to HPAI related to women can be seen below. However, it was observed that little had been studied about the impact of HPAI on people with disability in the literature reviewed.

The overall impact of HPAI interventions

- Has left very poor households, mainly headed by women, in the worst and most vulnerable position (Limon, 2009).
- HPAI has had a multidimensional impact on the poorest women (loss of income, reduction of consumption, deterioration of nutrition, loss of livelihood).
- Small farmers depending specifically on poultry for their income were most affected.
- In the poultry value chain, people were affected differently by market restrictions, slaughtering restrictions and culling.

Loss of income, price fluctuation, consumption, nutrition

- Food price increases as a consequence of HPAI affect poor families the most, obliging them to reduce meals and take children out of school (Miers, 2008).

Poultry death and poultry production/marketing restrictions

- Poultry deaths from HPAI or culling, market restrictions and slaughtering restrictions affect small-scale producers the most (Miers, 2008).

Sector restructuring

- Restructuring of the poultry sector particularly affects small-scale actors (Velasco et al., 2008; Miers, 2008). Men tend to take over the chicken when it changes from a backyard to a more intensive system (Velasco et al., 2008).

Communication and training

- Women are not the main recipient of HPAI information and training (Velasco et al., 2008, Dai, 2019b).
- Communication strategies often ignore people's cultural and socioeconomic reality, their beliefs about health, illness, and disease causation, as well as the priorities and constraints that orient their lives.
- Training and information failed to address concerns and the reality of women and poor people and failed to involve them in identifying adequate biosecurity measures that were acceptable.

Based on the literature review conducted, the following recommendations related to HPAI interventions include:

- The most effective behaviour-change communication efforts will be those promoting pro-health behaviours that also carry with them actual socioeconomic benefits for target audiences" (FAO 2015).

- Make the difference between households that rely on poultry as assets and those that rely on poultry for income a primary consideration for the development of all communication strategies and information, education and communication (IEC) materials targeting backyard farmers in Cambodia (Hickler, 2007).
- Women should be made specific targets in training for poultry production and care and in AI infection control methods” (Velasco, 2008; Dai, 2019b).
- Develop a fair compensation policy (one that takes into account ownership of birds by women and children and backyard as well as commercial farmers), with a clear rationale for compensation rates and a clear process for obtaining compensation (AED & UNICEF, 2006).
- Strengthen the capacity of the women’s mass organizations (including women NGOs to effectively disseminate information on AI to rural households, specifically reaching poor women with limited mobility and little schooling (Velasco, 2008).
- Establish measures to improve the gender balance of animal health workers (village livestock agents and extension staff, field/farm veterinarians, animal health volunteers and authorities) (Velasco, 2008).
- Develop a surveillance system that provides a rapid response to reports, clear guidelines about steps to be taken, and quick and fair compensation for birds that are culled” (AED & UNICEF, 2006).
- Ensure that the system taps into motivations for reporting that resonate with communities” (AED & UNICEF, 2006).
- Support producers who are willing to change their livelihood system in order to make it safer from avian flu, for example, by providing subsidies for improved biosecurity systems” (AED & UNICEF, 2006).
- Encourage transparency (AED & UNICEF, 2006).

An example of a GEDSI-sensitive policy related to HPAI would analyse previous compensation practices associated with the culling of birds and acknowledge that they tended to ignore the village poultry owners, who often are women, and failed to compensate them adequately. When done, compensation was given to the man in the household. Consequently, female poultry owners, often among the poorest, saw their livelihoods worsening. A GEDSI-sensitive policy would take into consideration this aspect and provide mechanisms to compensate the female owners of the birds directly.

With the above consideration, the following indicators could be considered in the implementation of the framework for GEDSI:

- Gender and disabled differences in income from the production of poultry and poultry-related products.
- Gender and disabled differences in control and decision-making over poultry resources.
- Gender and disabled differences in AI knowledge and preventive behaviour.
- Level of involvement and participation of women, men and disabled in community-based training and AI communication campaigns.
- Level of women’s, men’s and disabled’s participation in AI surveillance, response and preparedness activities.
- Gender and disabled differences in farmers’ organization’s membership.
- Gender and disabled differences in access to credit.
- Gender and disabled differences in access to technology.
- Gender and disabled differences in village human and animal health workers.
- The extent of use of the participatory approach in AI actions and campaigns.

VI. Actions to meet the strategic goals

A set of tasks or actions are listed to achieve each of the strategic goals over an initial five-year period. The implementation of these actions is guided by the cross-cutting elements identified and the foundational elements needed to be in place for these cross-cutting elements to take place. Briefly, the cross-cutting elements are mentioned per strategic goal.

Goal 1: Maintain the free status of AI-free countries. Since these elements cut across the three goals, a section on cross-cutting elements will cover these elements more thoroughly.

- Surveillance
- Capacity building
- Early warning, early response system
- Simulation
- Awareness
- Regionalization
- Collaboration

Tasks	1	2	3	4	5
Surveillance					
Wildlife surveillance (include collaboration with WL department; ASWGL policy on wildlife surveillance)					
Mechanism to advocate Wildlife surveillance (link with ASEAN body on conservation?)					
Conduct surveillance using Rapid test kit					
Develop a surveillance system that provides a rapid response to reports, clear guidelines about steps to be taken, and quick and fair compensation for birds that are culled					
Cross border surveillance – protect disease introduction; bilateral agreement					
Implementation of strict enforcement at the entry points					
Workforce development: continuous training on diagnosis, epidemiology					
Establish measures to improve the gender balance of animal health workers					
Training of young officers and invite human health sector to observe work of the animal health sector					
Continuous training strengthen lab capacity with support from partners;					
Early warning system improvement: horizon scanning, preparedness					
Simulation to test preparedness					
Awareness campaign that also highlight the role of women and all socioeconomic background					
Procurement mechanism and allocation					

Regionalization concept for trade partners; activities that are national and regional level					
Collaboration to help other AMS during outbreaks					

Goal 2: To strengthen the capability to immediately control existing outbreaks and recover their free status. This will apply to member states experiencing occasional disease incursions.

Technical elements:

- Early detection
- Disease control interventions
- Surveillance
- Laboratory capacity
- Capacity building
- Awareness
- Recovery plan

Tasks	1	2	3	4	5
Early detection and real time					
Reporting improvement					
Disease control at the border					
Strategic Surveillance on poultry and wildlife, flyways, markets					
Laboratory capacity					
Diagnostic capacity(BSL3) bioinformatics, sequencing)					
LMT					
Proficiency testing including differential dx					
AI lab network and role of the reference lab: ALDF, AVEG, OFFLU, TORs to be established for reference lab for AI					
Multisectoral collaboration: OH approach					
Capacity building workforce development					
Awareness					
Legislation					
Sustainability of resources					

Human resource					
Expert pool					
Plan to recover freedom					

Goal 3: To strengthen the capacity to reduce the impact on the poultry industry and decrease the risk to human health. This will apply to member states with sustained presence of avian influenza.

Technical elements:

- Collaboration
- Surveillance
- Compensation
- Laboratory capacity
- Farm biosecurity
- Zoning/compartmentalization/regionalization
- Vaccine and Vaccination

Tasks	1	2	3	4	5
Collaboration					
Replicate approach of other AMS in applying biosecurity: worth to explore Thailand approach					
Access to commercial farms to obtain regular reports					
Developing value chains to determine hotspots to prioritize where movement control should be strengthened					
Surveillance					
Passive and active surveillance					
Wildbird surveillance					
Compensation scheme					
Develop a fair compensation policy (one that takes into account ownership of birds by women and children and backyard as well as commercial farmers)					
Laboratory capacity					
Strengthen reference lab for AI					
Strengthen vaccine assay laboratory					

Enhancing laboratory capacity, invest more on lab equipment, technical training, testing, sequencing and bioinformatics					
Consolidate or set up leading lab on AI for PT and interlaboratory comparison, testing assay					
ABSL3 but not accredited because no regulation to accredit ABSL3. Only MOH accredit BSL3 and none for ABSL3 in Vietnam,					
Farm biosecurity					
Improve poultry movement, hatching , cleaning and disinfecting in the production and supply chains					
Biosecurity in poultry farming by conducting communication and risks to public health					
Control wildlife birds: farm poultry not exposed to wildlife birds, what area have wildlife birds and the fly route					
AI poultry production zones					
Vaccine stockpile consult WOAHA 10.4 for guidelines					
Increase vaccine production					

VII. Implementation Arrangements

A lead country/ies will oversee activities for each identified goal and will be coordinated by ASEAN Coordinating Centre for Animal Health and Zoonoses (ACCAHZ) once it is established.

ACCAHZ is envisioned to be the regional technical arm of ASEAN in its effort to combat the threat of highly pathogenic emerging and re-emerging high-impact transboundary animal diseases, including HPAI. The centre is expected to consolidate and harmonize all efforts in terms of a regional initiative on animal health and zoonoses that impacts the livestock and poultry sector in the region. It is expected to work with partners and donors in the efficient delivery of support in the region, technical and otherwise, as aligned to the regional framework and strategies identified by the Member States. Once established, ACCAHZ is responsible to coordinate the implementation of this Framework.

VIII. Monitoring and Evaluation

An M&E mechanism will be developed once the goals and objectives of the framework are finalized, agreed and adopted by ASEAN.

ASEAN is expected to deliberate on a Monitoring and Evaluation (M&E) platform or process that will serve this purpose.

ASEC will help to track the framework through the identified and agreed indicators. Once ACCAHZ is established, ACCAHZ will be responsible for monitoring and evaluating the implementation of the framework through the agreed M&E tool.

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Annex 1: Validation of Achievements

Laboratory Capacity	Veterinary Service/Policy	Movement / Compartmentalization/ Zoning	Surveillance	Vaccination	Compensation	Farming Practices/
						Biosecurity
Thailand - use HPAI primer from neighbor country to enhance lab detection	Thailand - have own case definition in specific poultry sector in Animal Epidemic Act	Myanmar - progressive zoning - more livestock zone including poultry zone; cross border management - AQS, laboratories at border area	Thailand - Bilateral project on AI Surveillance between Lao PDR - Thailand	<p>Malaysia - Vaccination: reduction of H9N2 cases among poultry farm in the use of aut... vaccine</p> <p>-discussion of vaccine efficacy in scheduled time, analysis of efficacy</p>	Thailand - try to reduce backyard population, we have fund compensation from private organization (poultry exporter association) to buy and culling” these population	Thailand - good farming management (GFM) certified farms our new standard certification for 50-3,000 birds farm
Indonesia - maintaining lab capacity specifically in molecular diagnostic and bio risk management	Myanmar - 6 PVS mission (2009 - 2018)	Indonesia - increasing number of poultry farmers apply for AI compartment	SG - enhanced surveillance programmes targeting high risk areas: poultry farm, bird holding, wild bird surveillance (migratory bird), zoo and wildlife park , border, source accreditation			Malaysia - the use of MyGAP (agriculture, fisheries and veterinary) for the betterment of biosecurity

SG - lab capacity, improve equipment and supply reagent	Malaysia - obtain full commitment from interagency (MOH, local municipal) for AI simulation/table top		Vietnam - LBM Surveillance: become routine work for the veterinary system;			SG - border biosecurity control, biosecurity measures in local establishments (under government legislation); biosecurity training and exercises (ongoing training and engagement with industry; regular continuing training)
			surveillance data is use for epidemiological analysis and risk assessment; surveillance allows us understand more virus circulation			
			Challenges: costly			
Thailand - serology surveillance in targeted population and target area to monitor circulation of virus	Thailand - 600 DVMs work in district level in the last 10 years		Indonesia - active surveillance: risk based surveillance in live bird markets, and collectors has been regularly implemented.			Indonesia - increasing awareness on farm biosecurity for poultry farmers particularly sector 2 and 3
Ph - future plans:	Indonesia - ISIKHNAS that		Indonesia - ISIKHNAS that			

Improvement of facility (BSL 3); Establish new technology (bioinformatics, new assays)	was evolving from PDSR is now expanded at 11 priority diseases and other general diseases		was evolving from PDSR is now expanded at 11 priority diseases and other general diseases			
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Success Stories

Collaboration	Laboratory	Border Control/ Animal Movement	Surveillance	Vaccination	Resources/ Sustainability/ Policy	Risk Management	Zoning and Compartmentalization	Farming Practices and management
SG - One health - intergovernment agency collaboration to address: <ul style="list-style-type: none"> • dead bird surveillance (natural environment agency) • monitor human cases (human health) • farm 	Brunei - Upgraded Lab Capacity (BSL 3, new lab facility)	PH - implementation of local animal movement restriction during outbreak (depends on the type of commodity)	PH - established surveillance system (regular bi-annual surveillance outbreak area - within 1km and 7km as requirement prior to recovery of AI free status of	Vietnam - improved capacity for vaccine efficacy must do virus sequencing to monitor virus changes - selecting representative viruses for	Malaysia - approval from government/ministry for replacement of high risk end equipment (genetic analyzer) and establishment of rapid method for AI -12th Malaysia Budget	SG - adopts a pro-active risk management system to balance control and need to import - multilayered strategy for AI prevention and control: <ul style="list-style-type: none"> • control measures at source • border control • local control measures 	SG - Zoning and compartmentalization applied to imported poultry and ornamental bird sources - surveillance and accreditation for local and overseas imported poultry sources -strict border control surveillance	FAO - Use the success of improving hatchery and breeder poultry farms in Bac Giang, Vietnam

biosecurity, surveillance, communication (food agency)			an affected province	vaccine trial and experiments - issue annual guidelines for vaccine use		• emergency preparedness		
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PH - strong PPP with PCPP as TWG for policy guidelines and policy changers	PH - Enhanced biosafety/biosecurity at the lab	Brunei - Introduce ban from countries with AI on importation of animal/animal products	Brunei - Advantage as small country cover surveillance at all 4 districts commercial and backyard farms		Ph - Prioritization of funding of BAI for AI opens opportunities for collaboration			FAO - Planning and design of the new live bird market in Takeo, Cambodia
PH - network with regional vet services and quick response	PH - Strengthening regional lab capabilities assistance from FAO -		Th - regular collection of samples to have		Brunei - newly gazetted regulation: Animal (Disease and Quarantine) Order, 2021			

team on depopulation, OIM and surveillance	PT, able to submit samples to AAHL, reagents		farms accredited					
	PH - Capacitation of Regional Labs on trainings and reagents		Indonesia - from ISIKHNAS we have integrated information zoonosis called SIZE					

Annex 2: Gaps and Challenges

Maintenance of laboratory equipment and lab budget to upgrade equipment not there; testing fee is not enough to replace equipment; inter-laboratory comparison hence need an expert; need international support for biosafety level 3 accreditation

- Technical support for testing AI since the virus keeps on evolving; hence testing methods need to be updated. PT program for avian disease in general and AI in particular
- Need international support to cover Passive and active surveillance.
- Movement control
- Wildlife surveillance belongs to the wildlife sector, so livestock needs to collaborate with the wildlife sector to conduct surveillance. For the wildlife sector, surveillance is not a priority.
- Sustainable resourcing and mechanism; wildlife surveillance in the region, early alert, reporting of diverse strains impacting vaccination (h5n8, h5n6); bilateral agreements but need mechanisms for WOAHA recognition (compartmentalization);
- Legislation for disease control on AI; slow procurement system; reporting diseases because compensation is, lack of experts like a higher committee to build high-level biosecurity lab; workforce vs samples submitted hence delays release of results; emergency funds; the resistance of the farmer in implementing control measures
- Budget for lab equipment replacement; control of illegal trade; not sufficient public awareness
- Less capacity to monitor vaccine efficacy; human resources, preference of students to go government work but prefer a small animal clinic.
- The backyard sector seldom reports; commercial audit but not enough personnel; compensation scheme; wildlife surveillance; we could offer more on the lab.
- Illegal poultry movement; no compensation; wildlife surveillance; biosecurity at backyard and market; capacity of the lab, vaccination programme; monitoring and surveillance.
- Workforce, same people looking into other diseases; border control improvement; compensation scheme lack; laboratory supplies; lack of expertise.