



MINISTRY OF AGRICULTURE AND
RURAL DEVELOPMENT



MINISTRY OF HEALTH

THE VIET NAM ONE HEALTH STRATEGIC PLAN FOR ZOO NOTIC DISEASES 2016-2020



**THE VIET NAM ONE HEALTH
STRATEGIC PLAN FOR ZOOONOTIC DISEASES
2016-2020**

DECEMBER 2016

ACKNOWLEDGEMENTS

The Viet Nam One Health Strategic Plan (OHSP) for the period from 2016 to 2020 was developed by the Ministry of Agriculture and Rural Development together with the Ministry of Health and other related ministries and agencies, in close cooperation with the national and international members of the Viet Nam One Health Partnership for Zoonoses (OHP).

The OHSP was issued by the Ministry of Agriculture and Rural Development according to Decision No. 5273/QĐ-BNN-HTQT dated December 19, 2016, with the agreement of the Ministry of Health as set out in Official Letter No. 8225/BYT-DP dated November 17, 2016.

In line with the One Health approach, the OHSP was developed with inputs from a wide range of sectors and disciplines, including both national and international experts.

From the Government of Viet Nam, the Ministry of Agriculture and Rural Development, the Ministry of Health, and the Ministry of Natural Resources and the Environment were the primary ministries contributing to the development of the OHSP.

The agencies and units from the Ministry of Agriculture and Rural Development contributing to the development of the OHSP included: the Department of Animal Health, the Department of Livestock Production, the Department of Planning, the Department of Finance, the Department of International Cooperation, the Viet Nam Administration of Forestry and the National Committee for the Convention on International Trade in Endangered Species, the Institute of Policy and Strategy for Agriculture and Rural Development, the National Institute of Animal Sciences, the National Institute of Veterinary Research, the National Agricultural Extension Centre, and the National Agro-Forestry-Fisheries Quality Assurance Department;

The agencies and units from the Ministry of Health contributing to the development of the OHSP included: the General Department of Preventive Medicine, the Medical Services Administration, the National Institute of Hygiene and Epidemiology, and the National Centre for Health Communication and Education;

The agencies and units from the Ministry of Natural Resources and the Environment contributing to the development of the OHSP included: the Department of Pollution Control, and the Centre for Environmental Consultancy and Technology;

The Office of Government, the Ministry of Finance and the Ministry of Planning and Investment were also consulted and had an opportunity to provide comments on the draft OHSP.

International members of the One Health Partnership for Zoonoses and other partners providing contributions to the development of the OHSP included:

International Technical Organisations and Programmes of the United Nations in Viet Nam, including the Food and Agriculture Organisation, the World Health Organisation and the United Nations Development Programme;

Multilateral donors, including the Asian Development Bank and the World Bank;

The Embassy of the United States of America in Viet Nam and its agencies and centers, including: the United States Agency for International Development, the Centers for Disease Control and Prevention, the Defense Threat Reduction Agency, and the United States Department of Agriculture;

The Embassy of France in Viet Nam, the Agence Française de Développement (AFD), and Agricultural Research for Development (CIRAD);

EPT PREDICT/The Wildlife Conservation Society, and EPT Preparedness and Response/Development Alternatives Incorporated;

The International Livestock Research Institute; and

The Oxford University Clinical Research Unit.

Other Vietnamese institutes, organisations and associations providing contributions to the development of the OHSP included: the Vietnam Veterinary Association, the Vietnam Poultry Association, the Viet Nam Red Cross Society, the Viet Nam Public Health Association, and members of the Viet Nam One Health University Network (VOHUN), including: the Viet Nam National University of Agriculture, the Hanoi University of Public Health, and the Hanoi Medical University, etc.

A joint team of national and international experts provided technical and policy recommendations and support to the drafting of the OHSP, including: Dr. Leslie Sims (Asia Pacific Veterinary Information Services Pty Ltd/Independent Consultant), Dr. Ben Coghlan (Burnet Institute/National Health and Medical Research Council (NHMRC), Centre for Research Excellence, Integrated Systems for Epidemic Response), David Payne (International Consultant), Dr. Nhu Van Thu (National Institute of Animal Sciences), and Dr. Pham Duc Phuc (Center for Public Health and Ecosystem Research, Hanoi University of Public Health).

Support for the inputs from the national and international experts, the organisation of consultations on the development of the OHSP as well as the printing of the OHSP was provided by the United States Agency for International Development (USAID) and the United Nations Development Programme (UNDP) through the project ‘Strengthening Capacity for the Implementation of One Health in Viet Nam’ (phase 1 and 2), implemented by the One Health Partnership for Zoonoses (OHP) Secretariat within the International Cooperation Department of the Ministry of Agriculture and Rural Development. Also, the submission process for approval of the OHSP was supported by USAID EPT Preparedness and Response (P&R) project.

DECISION

On issuing the Viet Nam One Health Strategic Plan for Zoonotic Diseases 2016–2020

MINISTER OF AGRICULTURE AND RURAL DEVELOPMENT

Pursuant to Decree No. 199/2013/ND-CP dated November 26, 2013 of the Government defining the functions, tasks, powers and organizational structure of the Ministry of Agriculture and Rural Development;

Pursuant to Decree No. 16/2016/ND-CP dated March 16, 2016 of the Government on the management and use of Official Development Assistance (ODA) and concessional loans granted by foreign donors;

Pursuant to Circular No. 12/2016/TT-BKHDT dated August 08, 2016 of the Ministry of Planning and Investment on issuing guidelines for the implementation of Decree No. 16/2016/ND-CP dated March 16, 2016 of the Government on the management and use of Official Development Assistance (ODA) and concessional loans granted by foreign donors;

Pursuant to Official Letter No. 8225/BYT-DP dated November 17, 2016 of the Ministry of Health on approving the contents of the Viet Nam One Health Strategic Plan for Zoonotic Diseases 2016 – 2020;

According to the proposal of Director-General of the International Cooperation Department,

DECIDES:

Article 1. To issue the Viet Nam One Health Strategic Plan for Zoonotic Diseases, 2016–2020 (the Plan is attached).

Article 2. Implementation of the Plan:

The Ministry of Agriculture and Rural Development will assume the prime responsibility for and coordinate with the Ministry of Health on the implementation of the Strategic Plan, with the following tasks:

- To play a role as national focal point for international cooperation in zoonotic diseases prevention and control, guiding, monitoring, inspecting and urging the implementation of the Strategic Plan by related ministries, sectors and local authorities.

- To organize the specific monitoring and assessment of the implementation of the Strategic Plan by agencies.

- To coordinate closely with ministries and sectors whose mandates are related to zoonotic diseases prevention and control.

Based on the framework of the Strategic Plan, relevant agencies working in this area will formulate specific strategies, programs and action plans for their own agencies.

Supervision of the progress in implementing the Plan will take place through the annual national One Health Forum hosted by the Ministry of Agriculture and Rural Development and the Ministry of Health with the participation of related ministries, sectors and signatories to the One Health Partnership Framework.

Article 3. This Decision comes into force from the date of signing. The Head of the Ministry Administrative Office, the Directors-General of the International Cooperation, Finance, Planning, Animal Health, and Livestock Production Departments; and the Director of the National Agricultural Extension Centre, the Director of the Viet Nam One Health Partnership for Zoonoses Secretariat and the Heads of related units are responsible to carry out this Decision.

Recipients:

- As listed in Article 3;
- The Prime Minister (for reporting);
- The Government Office;
- Ministries: the Ministry of Health, the Ministry of Planning and Investment, the Ministry of Finance, the Ministry of Natural Resources and Environment, the Ministry of Education and Training, the Ministry of Science and Technology, the Ministry of Defense, the Ministry of Public Security, and the Ministry of Industry and Trade;
- Associations/Unions: the Viet Nam Farmers Union, the Viet Nam Red Cross Society, the Viet Nam Veterinary Association, the Viet Nam Animal Husbandry Association, the Viet Nam Animal Feed Association, and the Viet Nam Women's Union;
- The OHP Secretariat;
- Archive: Ministry Archive, ICD (LMT 30).

**ON BEHALF OF THE MINISTER
THE VICE MINISTER**

**Vu Van Tam
(Signed and sealed)**

MINISTRY OF HEALTH

No.: 8225/BYT-DP
Providing remarks on the National
One Health Strategic Plan,
2016–2020.

SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

Hanoi, November 17, 2016

To: The Ministry of Agriculture and Rural Development.

In response to Official Letter No. 9151/BNN-HTQT dated October 28, 2016 of the Ministry of Agriculture and Rural Development on requesting comments on the Draft Viet Nam One Health Strategic Plan for Zoonotic Diseases, 2016–2020, after reviewing the Draft, the Ministry of Health has the following remarks:

1. The Ministry of Health agrees on the contents of the Draft Viet Nam One Health Strategic Plan for Zoonotic Diseases, 2016–2020, which has been developed by the Ministry of Agriculture and Rural Development in cooperation with relevant agencies of the Ministry of Health, the Viet Nam One Health Partnership for Zoonoses (OHP) Secretariat, and related ministries and agencies.

2. The Ministry of Health concurs with the Ministry of Agriculture and Rural Development issuing the Viet Nam One Health Strategic Plan for Zoonotic Diseases, 2016–2020.

The Ministry of Health shall cooperate closely with the Ministry of Agriculture and Rural Development and other related ministries and sectors during the implementation of inter-sectoral activities within the framework of the Plan.

The Ministry of Health would like to share the above-mentioned remarks as a basis for the Ministry of Agricultural and Rural Development to consolidate and carry out the required procedures according to the regulations.

With gratefulness.

Recipients:

- As mentioned above;
- Minister Nguyen Thi Kim Tien (for reporting);
- Archive: Ministry Archive, GDPM.

**ON BEHALF OF THE MINISTER
THE VICE MINISTER**

**Nguyen Thanh Long
(Signed and Sealed)**

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ABBREVIATIONS

ADB	Asian Development Bank	JE	Japanese Encephalitis
AI	Avian Influenza	JICA	Japan International Cooperation Agency
AIPED	Viet Nam National Integrated Operational Program on Avian Influenza, Pandemic Preparedness and Emerging Infectious Diseases (2011-2015)	MARD	Ministry of Agriculture and Rural Development
AMR	Antimicrobial resistance	MERS	Middle East Respiratory Syndrome
ANSORP	The Asian Network for Surveillance of Resistant Pathogens	MOD	Ministry of National Defense
APSED	Asia Pacific Strategy for Emerging Diseases	MOF	Ministry of Finance
ASEAN	Association of Southeast Asian Nations	MOH	Ministry of Health
AVET	Applied Veterinary Epidemiology Training	MOIT	Ministry of Industry and Trade
CDC	U.S. Centres for Diseases Control and Prevention	MONRE	Ministry of Natural Resources and Environment
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement	MPI	Ministry of Planning and Investment
DAH	Department of Animal Health, Ministry of Agriculture and Rural Development	NIHE	National Institute of Hygiene and Epidemiology
DAI	Development Alternatives Incorporated	NSCAI	National Steering Committee for Avian Influenza Prevention and Control
DARD	Provincial Department of Agriculture and Rural Development	NSCHP	National Steering Committee for Human Influenza Pandemics Prevention and Control
DLP	Department of Livestock Production, Ministry of Agriculture and Rural Development	OHCN	One Health Communications Network
DOD	U.S. Department of Defense	OHP	One Health Partnership
EOC	Emergency Operations Centre	OHSP	Viet Nam One Health Strategic Plan for Zoonotic Diseases 2016 - 2020
EPT	Emergency Pandemic Threats, USAID program	OIE	World Organization for Animal Health
EU	European Union	OPI	Viet Nam National Integrated Operational Program for Avian and Human Influenza 2005 - 2010
FAO	United Nations Food and Agriculture Organization	OUCRU	Oxford University Clinical Research Unit
FETP	Field Epidemiology Training Program	PEP	Post exposure prophylaxis
FSWG	Food Safety Working Group	PrEP	Pre-exposure prophylaxis
GAHP	Good Animal Husbandry Practices	PVS	Performance of Veterinary Services
GARC	Global Alliance for Rabies Control	SARS	Severe Acute Respiratory Syndrome
GARP	Global Antibiotic Resistance Partnership	SDGs	Sustainable Development Goals
GDPM	General Department of Preventive Medicine	SEAOHUN	South East Asia One Health University Network
GHSA	Global Health Security Agenda	UNDP	United Nations Development Program
GoV	Government of Viet Nam	USAID	United States Agency for International Development
HAEI	Human-Animal-Environment Interface	USDA	United States Department of Agriculture
HIV	Human Immunodeficiency Virus	VILAS	Viet Nam Laboratory Accreditation Scheme
HMU	Ha Noi Medical University	VINARES	Viet Nam Resistance Project
HPAI	High Pathogenic Avian Influenza	VNUA	Viet Nam National University of Agriculture
HSPH	Ha Noi School of Public Health	VOHUN	Viet Nam One Health University Network
IHR	International Health Regulations	WB	World Bank
ILRI	International Livestock Research Institute	WCS	Wildlife Conservation Society
IMCAPI	Interministerial Conference on Animal and Pandemic Influenza, 2010	WHO	World Health Organization
IPC	Infection Prevention and Control	ZDAP	Zoonotic Disease Action Package

SUMMARY PLAN

The Viet Nam One Health Strategic Plan for Zoonotic Diseases 2016-2020

Background

In Viet Nam, zoonotic diseases pose a constant threat and have already caused major health, economic and social impacts. As local and global environments undergo rapid transformations, the risk of zoonoses and emerging diseases appears to be increasing.

The current consensus is that these diseases are best managed using a **One Health**, multi-sectoral approach that encompasses prevention and response (see box). Viet Nam is already applying this approach.

Scope and purpose

This One Health Strategic Plan (OHSP) sets out a 5-year plan for the continued development of Viet Nam's One Health capacities for reducing the health and other impacts of zoonotic diseases. The emphasis is on further development of core One Health competencies and selected attention on nationally defined priority areas and diseases.

This document pulls together the various strands of current and planned work on zoonoses in Viet Nam where a One Health approach will be applied, illustrates where multi-sector involvement is required and describes the activities that will be undertaken. It also highlights gaps in funding or areas where donor support will be required.

One Health approaches to manage diseases of animal origin include:

- Activities where inter-sectoral and interagency collaboration has occurred or should occur to provide the best chance of improving health for humans, animals and the environment
- Activities using Ecohealth approaches to tackle complex disease problems. Ecohealth approaches consider environmental and social factors, and actors from various disciplines work together with local stakeholders to devise and implement solutions to these problems

Both are related and both activities are needed to optimise the likelihood of containing and preventing diseases at the human-animal-environment interface. A One Health approach to zoonotic diseases does not mean that different departments/players must work together to conduct all activities. There will be situations where a multidisciplinary team is best equipped to resolve problems, but in many cases One Health is about ensuring common goals, timely sharing of knowledge and ensuring that the most appropriate people, organisations and agencies are engaged to find solutions to zoonotic disease control and prevention.

The OHSP:

- Builds on previous plans - the Viet Nam National Integrated Operational Program for Avian and Human Influenza (OPI), 2006-2010, and the Viet Nam National Integrated Operational Program on Avian Influenza, Pandemic Preparedness and Emerging Infectious Diseases (AIPED), 2011-2015
- Provides a One Health interface for national plans (including those still under development) that connect with this 5-year plan such as those to strengthen health systems and to address specific diseases
- Includes the priority actions for addressing health threats posed by zoonotic diseases identified at the International Conference on Zoonotic Disease Prevention and Control, Ha Noi, August 2015 (ZDAP Conference).
- Is consistent with international and regional plans for specific zoonotic diseases and health issues (e.g. WHO Antimicrobial resistance, WHO/OIE/FAO rabies)
- Aligns with other international and regional initiatives that include One Health activities on zoonotic diseases such as the International Health Regulations (IHR 2005), the Asia Pacific Strategy for Emerging Diseases (APSED 2010), and the Global Health Security Agenda (GHSa) (See Figure 1, page 19).

Target audience

The OHSP provides a framework for anyone with an interest or stake in the control and prevention of zoonotic diseases in Viet Nam - this includes government and non-government agencies, teaching and research institutions, international financial institutions, donors and the public. Although this plan principally details activities for government and key partners, many of the underlying drivers of disease are related to human actions that can only be addressed with the participation of all parts of society in Viet Nam, particularly those involved in rearing domestic and wild animals, and handling animals and animal products.

Actions will be taken in seven focus areas described below. Additional information on each of the elements of the plan is provided in expanded sections in the attached document.

Guiding principles

The 4 guiding principles for the OHSP are:

1. That it builds on work already undertaken through the OPI and AIPED on zoonotic diseases using a One Health approach.
2. That it is an integrative framework (rather than an operational plan) that overlies and links the various extant and planned programs and activities aimed at addressing zoonotic diseases using a One Health approach.
3. That One Health approaches require shared objectives among different partners and, in some cases, shared activities when this is the most efficient way to prevent disease and protect health.

4. That strengthening capacity alone is not enough – improved capacity must be applied to tackle specific diseases of local concern.

Governance of the plan

Governance of this plan will occur through:

- An annual assembly with partners hosted by MARD and MOH with the participation of MONRE and other related ministries, sectors and stakeholders to report on progress. This assembly will be incorporated into the annual national One Health Forum of the One Health Partnership for Zoonoses. In this way, the partnership itself led by the key government ministries (MARD, MOH, MONRE) is formally responsible for achieving the objectives of the plan through **collaborative governance**.
- An annual written report produced by the One Health Partnership for Zoonoses summarising progress against key targets - this report will be used to facilitate action to overcome barriers to One Health approaches to zoonotic diseases.

Goal, objectives and areas of focus (See Figure 2)

To achieve the **goal** of reducing the health and other impacts of zoonotic diseases and diseases of animal origin origin, the OHSP has the following 3 objectives:

- A. Strengthen One Health capacity for the prevention and control of all zoonotic diseases
- B. Enhance preparedness for a human emergency of animal origin
- C. Apply One Health principles to limit the public health impact of current priority zoonotic diseases

Seven One Health **focus areas** have been identified to achieve these objectives by 2020 (Figure 2):

1. Building One Health capacity
2. One Health approaches for managing human disease emergencies of zoonotic origin
3. One Health approaches for managing zoonotic agents with pandemic potential that are yet to emerge
4. One Health approaches for managing zoonotic influenza viruses with pandemic potential
5. One Health approaches for managing rabies
6. One Health approaches for managing antimicrobial resistance
7. One Health approaches for managing other priority zoonotic diseases

Figure 1: Relationship between the GHSA, IHR, APSED & the Viet Nam One Health Strategic Plan

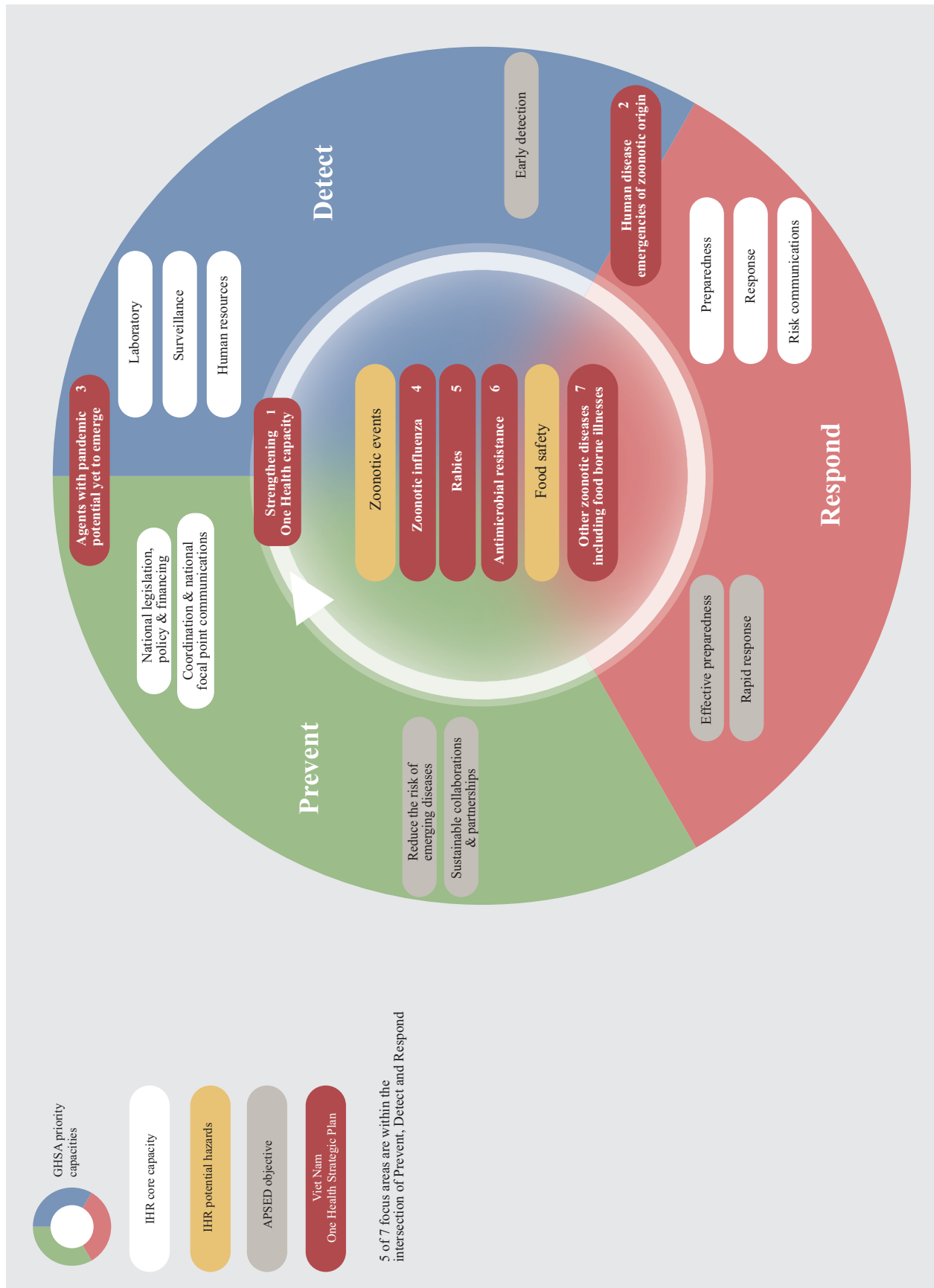
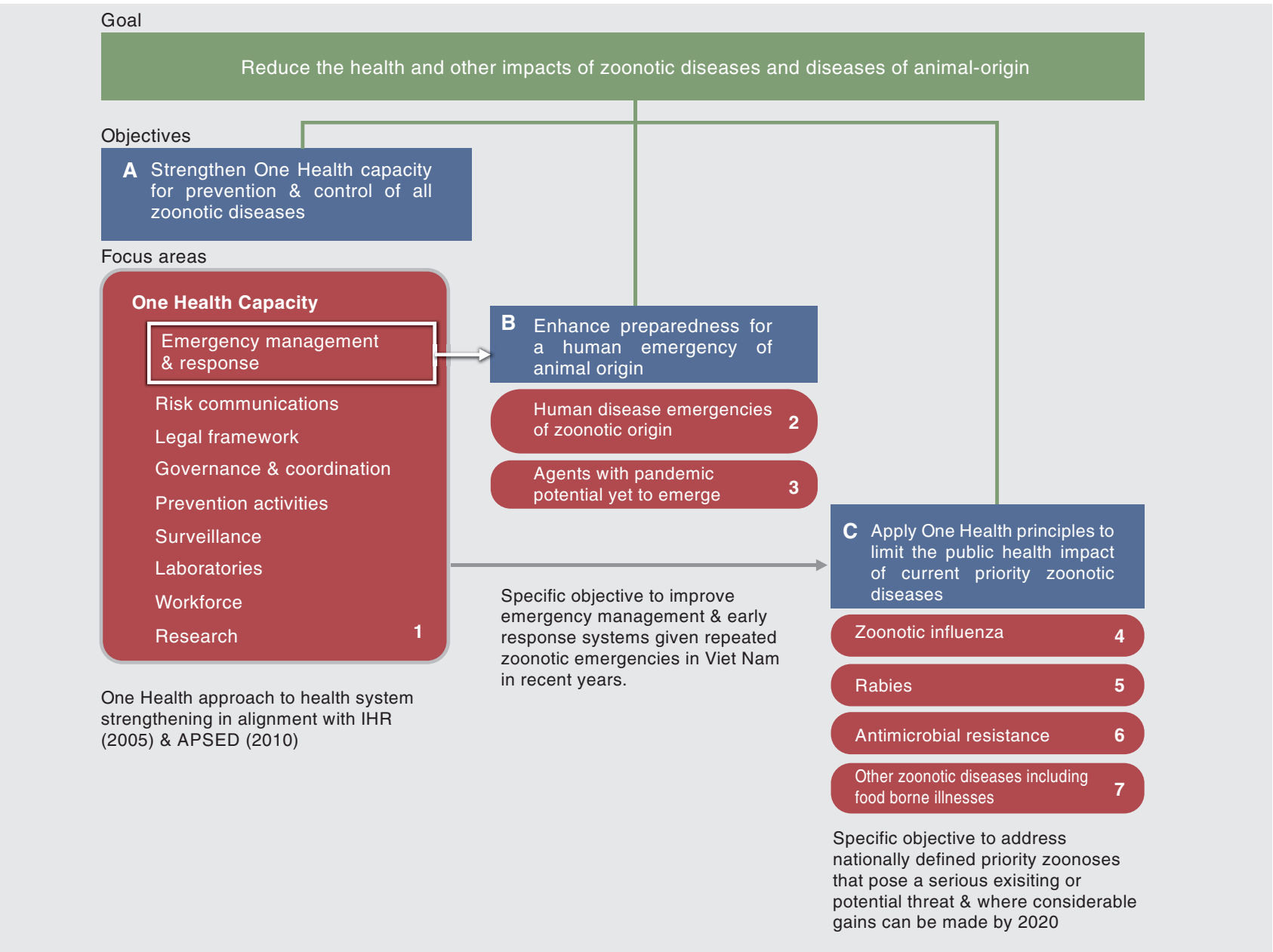


Figure 2: Viet Nam One Health Strategic Plan 2016 -2020: goal, objectives and focus areas



1. Building One Health capacity



Why is this necessary?

Although much has been achieved in developing One Health capacity in Viet Nam - through work on avian influenza and other diseases supported by government, international agencies and donors - gaps remain. Work conducted in this focus area over the next 5 years will aim to fill these gaps, strengthening the platform on which One Health approaches to specific zoonotic diseases are built. This platform includes high-level coordination and support, suitably trained and resourced teams, as well as the legal framework and formal direction for different sectors to work together. Without these elements, One Health approaches are unlikely to be adopted and opportunities to prevent and control diseases at the human-animal-environment interface will be missed.

The capacity to undertake risk assessments on potential drivers for emergence and re-emergence of zoonotic diseases and appropriate research are needed to advance One Health approaches to zoonotic diseases in Viet Nam. In addition, risk communications that raise awareness and result in appropriate behavioural change are essential to prevent emergence of new potential pandemic threats from farmed and wild animals, and in managing disease emergencies. Surveillance systems that can identify zoonotic and potential pandemic agents in both animals and humans are critical for One Health responses. These systems need to provide accurate and timely data that are fully analysed and shared.

What will be done, how will it be done and who will do it?

1. GOVERNANCE AND COORDINATION - mechanisms to coordinate action across sectors including greater involvement of the environmental sector

What	How	Who
Well-defined national coordination mechanisms for zoonotic diseases linking animal health, human health, wildlife, environment and other government sectors that function during emergency and non-emergency periods	Establishment of a new, unified, overall national steering committee Clarification of the role of the environmental health sector in One Health activities addressing zoonotic diseases Application of Circular 16/2013 on zoonotic diseases	MARD, MOH, Office of Government, MONRE, OHP USAID/P&R

<p>Engagement by government partners with key civil society organisations and external stakeholders for specialised information and advice (e.g. clinical, public health, laboratory, risk communications, private sector, international partners etc.) and as partners in disease control and prevention programs</p>	<p>Ensuring industry, subject and discipline specialists are identified and included in One Health approaches to control and prevention of zoonotic diseases through advisory panels and networks.</p>	<p>MARD, MOH, MONRE, NIHE, other members of the OHP Civil Society USAID/P&R</p>
<p>Maintaining the One Health Partnership on Zoonoses and secretariat to ensure it can continue to act as a national platform for policy dialogue and knowledge management of One Health and zoonotic diseases, and to facilitate coordination of One Health stakeholders</p>	<p>Provision of support for the One Health Partnership including involvement in OHP activities organised</p>	<p>MARD, MOH, MONRE, other members of the OHP UNDP, USAID/P&R</p>
<p>Conducting joint investigations into zoonotic disease outbreaks whenever this is appropriate (including development of guidelines for situations where joint investigations should be conducted)</p>	<p>Application of relevant provisions of Circular 16/2013</p>	<p>MARD, MOH at national and equivalent agencies at provincial level VOHUN, FAO, WHO, OIE, ADB, USAID/P&R</p>

2. LEGAL FRAMEWORK - the legislative framework to facilitate multi-sectoral cooperation

What	How	Who
<p>Measures to ensure wider adoption of Circular 16/2013 that provides a basis for enhanced collaboration between Ministries and Departments on zoonotic diseases, especially at provincial and sub-provincial levels</p>	<p>Training in implementation of Circular 16/2013</p>	<p>MARD, MOH, MONRE and provincial counterparts, WHO, FAO</p>
<p>Additional legislation/directives/circulars for coordination and formal engagement of the environmental sector and in particular MONRE</p>	<p>Preparation of appropriate directives under the Animal Health law and consideration of extending relevant features of Circular 16 to include MONRE</p>	<p>MARD, MONRE</p>

3. RISK ASSESSMENTS AND COMMUNICATIONS to target upstream determinants of disease emergence

What	How	Who
Build capacity to undertake risk assessments at the human-animal-environment interface	Training programs in joint risk assessments through AVET and FETP and other programs	MARD, MOH, MONRE USAID/P&R, VOHUN, WHO, FAO, OIE, ADB
Improve risk communication between authorities and to the public on microbial hazards emerging at the human-animal-environment interface	Training in risk communication for disease emergencies and prevention of diseases	MOH, MARD, MONRE One Health Communications Network, farmers, animal traders FAO, WHO, ADB, USAID/P&R, donors

4. LABORATORIES AND SURVEILLANCE SYSTEMS that support testing programs

What	How	Who
Enhance laboratory capacity and quality management systems	Provide appropriate resources for undertaking tests and for application of quality management systems	MOH, MARD, NIHE WHO, FAO, OIE, USAID, ADB, WCS, US CDC, donors
Enhance data management systems to allow rapid analysis and sharing of new findings within and across sectors as well as across borders	Established following the GHSA Roadmap	As above
Conduct well designed surveillance to ensure early detection of zoonotic pathogens especially those with pandemic potential	See focus area 3	See focus area 3

5. TRAINED ONE HEALTH WORKFORCE - a cadre of qualified staff to implement One Health activities

What	How	Who
Sufficient numbers of trained professional staff are proficient One Health practitioners	Adopt curriculum for One Health training and include One Health as an integral part of FETP and AVET training	MARD, MOH, MOF, MONRE, MPI, VOHUN FAO, WHO, US CDC, USAID EPT-2

6. APPROPRIATE ONE HEALTH RESEARCH

What	How	Who
Undertake appropriate research to fill gaps in application of One Health approaches to policy and practice including research on specific diseases	Identify gaps in knowledge, obtain funding, conduct research and regularly share findings with stakeholders including policy makers (annual meetings)	MARD (research centres), MOH, MONRE, NIHE, OHP OUCRU, CIRAD, ILRI, Universities including those in VOHUN
Undertake selected environmental health research aimed at understanding the drivers of disease emergence and measures to reduce risk to guide practice, for example, enhanced land use planning for the livestock sector (see focus area 3)	Farm locations assessed for potential hotspots for pathogen emergence, amplification and transmission (e.g. effects of developing new livestock production zones)	MARD (DLP), MONRE

How will gains be measured?

Success will be measured by the extent of change in each of the areas above and, more importantly, in decreases in case numbers, fatalities, and the number and size of outbreaks for the priority zoonotic infections/diseases.

It is also expected that by 2020:

- All operational plans for zoonotic diseases will be aligned with the **One Health Strategic Plan 2016-2020** with defined actions for relevant sectors of government at all levels and other partners. This includes clarification of the precise role of MONRE who are now a major partner.
- Government will progressively increase the **share of financing** for core programs related to zoonotic disease prevention and control (including human-animal-wildlife surveillance activities for priority zoonotic diseases) and development of IHR/PVS core capacities.
- Dedicated **contingency funding** for infectious diseases emergencies will have been identified, including exploration of opportunities presented by the World Bank's Pandemic Emergency Financing Facility.

Annual One Health meetings will be held supported by the One Health Partnership to share information on programs and projects and progress towards objectives.

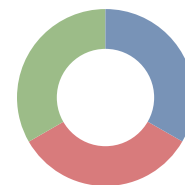
Funds required

The expected cost of these One Health activities over the 5 years of the plan is approximately USD 10,000,000.

Funding for these activities is expected to come from a mix of government and donors (including USAID) with many of the activities falling within the EPT-2 program and plans of other donors such as the ADB, World Bank and via the GHSA funding envelope. For instance, the *ADB Greater Mekong Subregion Regional Health Security Project (2016-2020)* is expected to support MOH activities related to:

- Cross-border collaboration for communicable disease control in border areas [USD 3.8M] - this will encompass development of risk assessment tools and risk communications for mobile populations that may be relevant to other populations in Viet Nam and may address priority zoonoses such as rabies - this supports focus areas 1, 2, 3, 4, 5.
- Surveillance and outbreak response systems [20.8M] - this supports focus areas 1, 2, 3, 4
- Laboratory services and hospital infection prevention and control measures [USD 46.2M] - this supports focus areas 1, 5, 6.

2. One Health approaches for managing human disease emergencies of zoonotic origin



Why is this necessary?

Viet Nam must be prepared to manage any severe pandemic disease in humans resulting from the spillover of an animal pathogen. These events are rare but can have major, whole-of-society effects (even with relatively short local transmission chains) as illustrated by SARS, MERS and Ebola virus disease.

A One Health approach involving coordinated inter-sectoral collaboration can mitigate the impact of these events. Well-designed and tested systems are required. Building on previous efforts, Viet Nam has indicated plans to establish an ongoing prime ministerial-level steering committee to coordinate responses and an Emergency Operations Centre is expected to become fully functional by 2020.

Appropriate activation of the Emergency Operations Centre relies on high quality, timely surveillance systems.

What will be done, how will it be done and who will do it?

In the period from 2016-2020, the following will be developed to enhance the structures and processes critical for One Health approaches for emergency zoonotic diseases in humans:

What	How	Who
Steering committee for emergency diseases will be operational	Decisions at Prime Ministerial level required on the nature of the coordinating mechanism	Office of Government, OHP, MARD, MOH, MONRE USAID/P&R
Role of Ministries other than MOH is fully defined	Determine the role of other Ministries in the event of a disease that is yet to spillover to humans in Viet Nam (e.g. if H7N9 is detected in poultry but not yet in humans)	MARD, MOH, MONRE
A fully functional emergency management centre suitable for responding to all hazards	Established following the GHSA Roadmap	MOH, MARD, MONRE US CDC, US DoD

Revised and tested whole-of-society pandemic preparedness plans	Existing plans renewed and exercises or live outbreaks used to test these	MOH, MARD, OHP US CDC, USAID/ P&R, donors FAO, WHO
Appropriate surveillance systems for disease emergencies	Established following the GHSA Roadmap	MARD, MOH
Risk communication for outbreaks	Build appropriate risk communication packages in the event of any disease emergency by staff trained in this discipline	MARD, MOH, One Health Communications Network, WHO, FAO, US CDC, USAID/P&R

How will gains be measured?

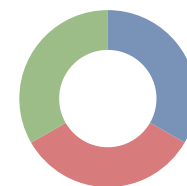
The two major objectives will be that the emergency management centre is fully operational and that pandemic preparedness plans have been revised and tested.

Funds required

Approximately USD 2,000,000 will be required (excluding funds required for any actual emergency disease outbreak – see focus area 1 regarding dedicated funding for severe disease outbreaks).

Resources are expected to be provided by government and through the GHSA funding envelope, ADB (risk communications, surveillance and outbreak response) and the World Bank.

3. One Health approaches for managing zoonotic agents with pandemic potential that are yet to emerge, especially in wildlife



Why is this necessary?

Viet Nam has been classified as a global hotspot for the emergence of novel zoonotic agents with pandemic potential and has recognised the importance of decreasing the risks of disease emergence. Through the GHSA and the linked EPT2 programme of USAID, Viet Nam is working to identify potential zoonotic agents in high-risk species and settings, and to put in place measures to reduce the risk of their emergence. Environmental factors play an important role in these diseases and a broad One Health approach is needed to ensure success in preventing spill over and controlling them if they do.

What will be done, how will it be done and who will do it?

In the period from 2016-2020, the following will be undertaken to find out more regarding viral pathogens in important wildlife and farmed animals and to reduce the risk posed by these agents (see also focus area 4 for work done on zoonotic influenza viruses):

What	How	Who
Complete planned work on the identification of zoonotic and potential pandemic agents in animals prior to their emergence	Undertake testing of a range of animals for viruses with pandemic potential	MARD and provincial DARDs WCS, Livestock farmers and traders, Wildlife farmers and traders USAID/P&R, PREDICT-2
Improve capacity for early detection of spillover to humans of potential pandemic infectious agents	Undertake testing of humans working in association with animals, especially clinical cases	MOH plus above
Implement measures to reduce the risk of emergence of novel agents for specific industries	Develop and introduce industry/sector specific guidance on preventive measures	MARD, MOH, MONRE, DIE FAO USAID/P&R, PREDICT-2

How will gains be measured?

In the next 5 years through the EPT-2 programme and other activities it is expected that Viet Nam will have identified most of the potential zoonotic and pandemic risks in important wildlife species and will have introduced behavioural change programmes for selected sectors and “industries” to reduce the risk of disease emergence.

Funds required

The budget required for this work is approximately USD 3,000,000.

Most of the funding is expected to come from government including through ADB support for risk assessments in border areas and enhanced surveillance. Additional contributions will be provided by USAID through the EPT-2 program.

4. One Health approaches for managing zoonotic influenza viruses with pandemic potential



Why is this necessary?

Zoonotic influenza viruses pose a major pandemic threat. Since 2003 when Influenza A(H5N1) virus became widespread in Viet Nam, many actions have been taken to contain it. The virus has not been eliminated and new, related strains have been repeatedly introduced to the country over the past 12 years. The risk of exposure of humans to the virus persists and, therefore, so too does the risk of emergence of a human-adapted pandemic strain of virus.

H7N9 avian influenza, which has already been confirmed in more than 700 people in China, poses a major risk to Viet Nam and active surveillance programs for this disease will continue until such time as the agent is contained in China. It has not yet been detected in Viet Nam despite intensive risk-based surveillance. Swine influenza viruses can become human pandemic agents as demonstrated by H1N1 pdm (2009) and it is important to understand the risk posed by local strains of virus in pig populations.

What will be done, how will it be done and who will do it?

In the period from 2016-2020, the following will be undertaken to gain a greater understanding of zoonotic influenza viruses and to minimise the threat they pose to human health (see focus area 2 for actions that will be taken if a human influenza pandemic emerges):

What	How	Who
Monitoring programs for avian H5 HPAI and H7N9 (and other) influenza viruses in poultry and other birds, and swine influenza virus in pigs	Regular surveillance in high risk areas and species	MARD FAO USAID
Effectiveness of vaccination programs in poultry	Vaccination programs will be reviewed and studied to determine whether vaccination is reducing shedding of virus in vaccinated ducks	MARD FAO USAID
Progress towards elimination of H5Nx highly pathogenic avian influenza virus	Necessary work to determine the feasibility of an H5 infection-free zone will be undertaken and, if feasible, measures will be implemented to develop a virus-free zone in the south eastern region	MARD FAO USAID
Surveillance of cases of human respiratory illness for novel influenza viruses of animal origin	Human surveillance programs will be reviewed and consolidated	MOH, Hospitals, Sentinel sites OUCRU

How will gains be measured?

In the next 5 years, Viet Nam will consolidate monitoring programs that can detect and characterise changes in the nature of local influenza viruses or incursions of virus (H7N9) so that control and prevention programs can be modified. Poultry vaccination programmes for H5 influenza will be reviewed and, as necessary, modified. Viet Nam will have undertaken work to establish the feasibility of an H5 infection-free zone and, if feasible, will have commenced work to establish a zone. Surveillance of cases of human respiratory illness will continue with testing for influenza viruses of animal origin. All cases of zoonotic influenza will be investigated for evidence of sustained human-to-human transmission and to identify the source of the outbreak.

Funds required

The funding required for these activities is approximately USD 35,000,000 including the cost of poultry vaccination, half of which is expected to be paid for by the private sector. The ADB sub-regional health security project is expected to contribute to strengthened surveillance.

5. One Health approaches for managing rabies



Why is this necessary?

Rabies is recognised as a high priority zoonotic disease for which a One Health approach should be applied. It is a disease that can be eliminated with a concerted, coordinated effort. Viet Nam will continue to attempt to control this disease in line with national plans, the ASEAN regional plan for rabies elimination, and the GHSA. Currently, less than 100 human cases are reported each year but there is a very high cost associated with the delivery of some 400,000 courses of post exposure prophylaxis.

What will be done, how will it be done and who will do it?

The main activities will be increased canine rabies vaccination, responsible dog ownership programs to reduce the number of wandering dogs in high risk areas, human post exposure prophylaxis for those exposed to a potentially rabid dog and also selective use of pre-exposure prophylaxis for high risk groups.

What	How	Who
Increased canine vaccination (including improved data on dog populations)	Support for vaccination campaigns at provincial and district level so that levels of vaccination coverage are maintained above 70%	MARD, Provincial DARD, OHCN WHO, FAO, OIE, GARC, donors
Responsible dog ownership	Behavioural change communications to reduce the number of free wandering dogs and to increase vaccination uptake and dog registration	MARD, Provincial DARD, OHCN WHO, FAO, OIE, GARC, donors
Post-exposure prophylaxis (PEP) for all humans bitten by a dog (or other mammal) that could have rabies	Introduction of district treatment centres to all high risk areas to reduce the need for travel for those requiring PEP	MOH, provincial and district level health services, OHCN
Pre-exposure prophylaxis (PrEP) for high risk groups including dog vaccinators, dog handlers and where necessary children in high risk areas	Identification of high risk groups and implementation of a vaccination program	MOH, MARD, provincial and district level health services
Improved capacity to diagnose rabies	Establishment/maintenance of quality assured testing capacity for rabies in humans and animals	MOH, MARD, NIHE FAO, WHO, OIE Donors

How will gains be measured?

Viet Nam is aiming to have no new human cases¹ of rabies in Viet Nam by 2020. This ambitious target will only be achieved if full cooperation is obtained from all stakeholders, in particular dog owners (who are required to pay for vaccination).

Progress towards this goal will be measured by reductions in 3 year rolling averages of human cases.

Funds required

A minimum of USD 24,800,000 will be required, however, this does not cover many of the costs that will be borne by the general public which is expected to be USD 40-45,000,000 (e.g. costs to dog owners for canine vaccines and PEP for bites caused by their dogs). However, sufficient stocks of vaccine and PEP will be required. Funds from ADB may be required to support supplementary activities such as PrEP for children in high-risk border areas.

¹ As human clinical cases are invariably fatal once clinical signs develop, cases equates to deaths.

6. One Health approaches for managing antimicrobial resistance



Why is this necessary?

Resistant bacteria and viruses can arise in any place where there is indiscriminate use of antimicrobial drugs. Preliminary research and assessments suggest that Viet Nam already has major concerns with antimicrobial resistance (AMR) in hospitals, in the community and in livestock farms and aquaculture. A One Health approach is needed to protect existing antimicrobials given that resistance is transmissible between bacteria and resistant bacteria can be transmitted from one host to another. The overall goal is to reduce the quantities of antimicrobials used, institute systems of antimicrobial stewardship, improve infection control, and limit the use in animals of critically important antimicrobials for humans.

What will be done, how will it be done and who will do it?

Plans for containing AMR, based on the WHO global plan, have been developed and will be implemented during the next 5 years.

What	How	Who
Reduced use of antibiotics in animals including improved controls on antibiotics critical for human use	Assess likely effectiveness and feasibility of bans on the use of medically important antibacterial agents for growth promotion in livestock and drugs critical for human treatment. Where feasible, introduce and enforce bans and require purchase by prescription only	MARD, Provincial DARDs FAO, Feed industry, farmers (livestock and aquaculture)
Reduced and improved use of antibiotics in humans	Widespread implementation of antibiotic stewardship programs and behavioural change campaigns for the public	MOH, Hospitals General public, pharmacists
Improved data on antimicrobial use and antimicrobial resistance	Relevant information collected following the GHSA Roadmap	MARD, MOH, NIHE OUCRU, CIRAD
Improved infection control and prevention (IPC) programs in hospitals	Widespread implementation of IPC programs in hospitals	MOH, Hospitals ADB
Enhanced laboratory capacity for testing for AMR using quality assured programs	Fund existing and new AMR testing laboratories	MARD, MOH, NIHE ADB, donors
Reduced environmental contamination with antibiotics	Reduced use of AM compounds in farms and animals, and improved waste disposal	MARD, MOH, MONRE Donors

How will gains be measured?

Gains over the next 5 years will be measured by reductions in quantities of antibiotics used and through the number of effective antimicrobial stewardship and infection prevention and control programs in place.

Funds required

Much of the work on antimicrobial resistance is cost neutral, nevertheless there will be a need for funds for communications, enforcement of existing and new legislation, and antibiotic stewardship and IPC programs.

It is estimated that USD 20,000,000 will be required for AMR activities. Funds are expected to be provided by government, the GHSA funding envelope, ADB (IPC programs) and other partners.

7. One Health approaches for managing other zoonotic diseases



Why is this necessary?

A number of other zoonotic diseases are present in Viet Nam and cause significant health and economic losses but with little or no potential to become pandemic agents. During the next 5 years, work will progress on reducing the impact of the priority diseases - anthrax, leptospirosis and *Streptococcus suis* - using a One Health approach.

Foodborne diseases of animal origin also cause a substantial burden of disease in Viet Nam and can best be tackled with a One Health approach. These diseases are caused by zoonotic agents such as Salmonella, Campylobacter, Listeria as well as parasitic diseases/agents like cysticercosis, hydatidosis, and fish-borne trematodes.

Chemical contamination of animals and animal products represent a major food safety challenge and solutions require involvement of the environmental sector. These diseases are managed through mechanisms other than the One Health Partnership and are not considered in depth in this plan. Nevertheless some of the measures needed to improve food safety such as animal identification systems are also highly relevant for addressing chemical contamination of food.

What will be done, how will it be done and who will do it?

What	How	Who
Anthrax control	Improved public awareness in high risk areas and enhanced vaccination	MARD, Provincial DARDs, OHCN, NIHE Farmers
<i>Streptococcus suis</i>	Behavioural change (where possible) especially consumption of raw pig products	MOH, OHCN
Leptospirosis	Community awareness of the dangers of leptospirosis in periods of heavy rainfall	MARD, MOH, MONRE, NIHE, OHCN
Enhanced traceability of animals and residue testing	Practical animal identification systems such as pig tattoos linking animals in slaughterhouses to individual farms or small scale traders	MOH, MARD Farmers, traders Food safety working group
Risk assessment of food borne illness of animal origin	Conduct a risk assessment to help justify investments in this area	MARD, MOH, NIHE World Bank, Food safety working group
Circular 16 will be fully implemented	See focus area 1	MARD, MOH, (MONRE)

How will gains be measured?

Gains will be measured through assessment of progress in application of Circular 16/2013, through reductions in the number of cases of anthrax, and through assessment of adoption of behavioural change for risk factors for *Streptococcus suis* and leptospirosis.

Gains in food safety are expected to be measured by progress towards animal identification systems and changes in case numbers for food-borne diseases of animal origin.

Funds required

Approximately USD 5,000,000 will be required for activities on other zoonotic diseases over the next 5 years (this figure does not include costs to manage human cases of these diseases). Funds for control, diagnosis and prevention of these diseases are anticipated to largely come from government but may be supplemented by funds from ADB, GHSA and the World Bank.

TECHNICAL ANNEX

Introduction and background information

Microorganisms have always been crossing from animals to humans, occasionally causing serious illness. This process appears to have accelerated over the past 50 years with a steady stream of novel and re-emerging infectious agents crossing from wild and farmed animals in different parts of the world to cause severe and widespread disease in humans (SARS, HIV, Nipah virus, MERS, Ebola virus disease and many others). Each year one or more new diseases emerge that threatens global health.

Avian influenza (H5N1), first detected in China in 1996, appeared as an urgent problem in Viet Nam and several other countries from late 2003 through 2005. Not only did this virus cause severe disease in poultry, it also resulted in serious disease in humans, raising concerns of a potential severe human influenza pandemic. To address this threat, Viet Nam produced the National Integrated Operational Program for Avian and Human Influenza (OPI) that guided control and prevention activities during 2006-2010. The Viet Nam Integrated National Operational Program on Avian Influenza, Pandemic Influenza and Emerging Infectious Diseases (AIPED) expanded the scope of actions beyond zoonotic avian influenza to cover potentially serious emerging and re-emerging diseases during the period 2011-2015. Under these programs, significant progress has been made from 2006 to 2015 in containing avian influenza and in preparing for disease emergencies in line with the overall objective of reducing the risk to humans and animals from avian influenza A(H5N1) and other emerging infectious diseases.

The AIPED adopted a One Health approach as recommended by the International Ministerial Conference on Animal and Pandemic Influenza (IMCAPI), held in Ha Noi in April 2010. The One Health approach to disease control and prevention at the human-animal-environment interface is now recognised globally as the best method for effective control of emerging infectious diseases. Viet Nam is seen as a One Health leader because of its early adoption of this approach for the control of avian influenza.

ii. Scope of this document

This document provides additional information to support the **Summary Plan** on activities to be undertaken during 2016 to 2020 to achieve the **goal** of reducing the health and other impacts of zoonotic diseases and diseases of animal origin using a One Health approach. Activities are divided into the following seven focus areas, discussed in more detail in individual chapters:

1. Those activities aimed at general strengthening of capacity to control and prevent zoonotic diseases using a One Health approach to consolidate the One Health platform that has been established in Viet Nam over the last 10 years.

i. Purpose

This plan aims to reduce the health and other impacts of zoonotic diseases and animal-origin health concerns in Viet Nam through achieving the following objectives:

- Strengthened One Health capacity for zoonotic disease control and prevention.
- Enhanced preparedness for a human emergency of animal origin and improved control of zoonotic disease outbreaks.
- Application of One Health capacity to limit the public health impact of zoonotic influenza viruses, antimicrobial resistance, and rabies, and reduce the risk posed by agents in animals with pandemic potential that are yet to emerge.

And those activities required to make progress against specific diseases or groups of diseases including:

2. One Health approaches to human disease emergencies of recent animal origin (managing major health security threats from zoonotic diseases).
3. One health approaches to managing pandemic threats that are yet to emerge.
4. One Health approaches to managing zoonotic influenza (e.g. H5N1, H7N9, swine influenza viruses).
5. One Health approaches to managing rabies
6. One Health approaches to antimicrobial resistance (e.g. multi-drug resistant organisms such as extended spectrum beta-lactamase resistant organisms, plasmid-mediated colistin resistant enterobacteria)
7. One Health approaches to other important zoonotic diseases/agents with little or no pandemic potential such as anthrax, leptospirosis, *Streptococcus suis*, brucellosis and others

One other group of diseases – foodborne illnesses of animal origin including diseases caused by chemicals and by pathogens such as Salmonella, Campylobacter, Listeria, cysticercosis, hydatidosis, fish-borne trematodes - is briefly discussed because:

- There are likely to be benefits from a One Health approach
- Control measures for these diseases have many links to those for the zoonotic diseases
- The One Health Partnership is increasingly playing a role in supporting these activities

This approach of covering general and specific aspects was adopted because both strategies are needed to make progress in preventing, detecting and responding to zoonotic diseases. The Government of Viet Nam has defined zoonotic disease priorities and identified the major gaps in zoonotic disease

Major achievements (2011-15)

Legislation to facilitate animal and human health sector collaboration and information sharing (Circular 16/2013).

Passage of veterinary legislation that provides greater scope for controlling zoonotic diseases and the use of antimicrobials.

Meeting minimum IHR standards for core capacities in 2014.

High-level political engagement with the Global Health Security Agenda (GHSA) including as a lead country for the Zoonotic Disease Action Package (ZDAP) and a contributing country for the Emergency Operations Centre (EOC) action package, resulting in the establishment of an emergency operations centre.

Exercises to test national pandemic planning and risk communications.

Commitment to global plans on AMR and rabies.

Drafting of a national plan to address antimicrobial resistance (AMR).

Rapid legislative and administrative responses to prepare for Ebola virus disease and Middle East Respiratory Syndrome-Coronavirus (MERS-CoV).

Evolution of the national One Health platform to a One Health Partnership that now includes wildlife and environment stakeholders including the

responses; it was therefore considered necessary to demonstrate the achievements expected in these specific areas by 2020. Comprehensive zoonotic disease control plans under each of these specific focus areas, however, requires action across the spectrum of prevent, detect and respond as described in the GHSA. This is illustrated in Figure 2 of the Summary Plan – each of the focus areas contains 2 to 3 elements of the GHSA.

This plan does not cover diseases that originated in animals but which have become well established as human pathogens such as vector-borne diseases where the transmission cycle has shifted to humans as the predominant host (e.g. dengue, chikungunya, yellow fever). Management of these diseases is best achieved using an Ecohealth approach. Nonetheless, these diseases can still require an emergency response as seen, for example, with the teratogenic effects of infection with Zika virus during pregnancy in South America and the Pacific.

More broadly, strengthened national One Health capacity may benefit efforts to control a range of other diseases of humans and animals given the crucial role of environmental factors and human behaviour in the emergence and persistence of many diseases.

iii. Achievements

Considerable progress was made against the objectives of AIPED to control infectious diseases at source and implement measures to prevent disease emergence, detect and respond rapidly to new high impact diseases in both animals and humans, and enhance preparations for the consequences of pandemic disease of humans. Major achievements over the period of AIPED (2011-15) are listed in the box.

iv. Target audience

The **One Health Strategic Plan (OHSP)** provides a framework for anyone with an interest or stake in the control and prevention of zoonotic diseases in Viet Nam - this includes government and non-government agencies, teaching and research institutions, international financial institutions, donors and the public. Although this plan principally details activities for government and key partners, many of the underlying drivers of disease are related to human actions that can only be addressed with the participation of all parts of society in Viet Nam, particularly those involved in rearing domestic and wild animals, and handling animals and animal products.

Ministry of Natural Resources and Environment (MONRE).

Improved capacity to detect potential zoonotic and pandemic agents in wildlife and initial surveys on wildlife for these agents.

Enhanced surveillance for avian influenza and other influenza viruses at the animal-human interface.

Improved control of avian influenza and no known incursion of H7N9 virus.

Changes to poultry markets, slaughter points and farms aimed at improving food safety and disease control.

Developing an online reporting system for nationally notifiable communicable diseases.

Enhanced laboratory capacity and improved turnaround times for specimens.

Establishment of VOHUN in 2011 to train a One Health workforce.

v. Guiding principles

The 4 guiding principles for the OHSP are:

1. That it builds on work already undertaken through the OPI and AIPED on zoonotic diseases using a One Health approach.
2. That it is an integrative framework (rather than an operational plan) that overlies and links the various extant and planned programs and activities aimed at addressing zoonotic diseases using a One Health approach.
3. That One Health approaches require shared objectives among different partners and, in some cases, shared activities when this is the most efficient way to prevent disease and protect health.
4. That strengthening capacity alone is not enough – improved capacity must be applied to tackle specific diseases of local concern.

vi. Governance of the plan

Given the many stakeholders as well as the numerous plans referred to and activities listed under this framework, strong coordination is essential to achieving the objectives of the OHSP. The Viet Nam One Health Partnership for Zoonoses (OHP) and the OHP Secretariat played a critical role in facilitating coordination during the period of the OPI (2006-2010) and the AIPED (2011-2015) - it is expected that they will continue to facilitate coordination during the period of the OHSP (2016-2020).

Governance of this plan will occur through:

- An annual assembly with partners hosted by the Ministry of Agriculture and Rural Development (MARD) and the Ministry of Health (MOH) with the participation of the Ministry of Natural Resources and Environment (MONRE) and other related ministries, sectors and stakeholders to report on progress. This assembly will be incorporated into the annual national One Health Forum of the OHP. In this way, the partnership itself led by the key government ministries (MARD, MOH, MONRE) is formally responsible for achieving the objectives of the plan through collaborative governance.
- An annual written report produced by the One Health Partnership for Zoonoses summarising progress against key targets - this report will be used to facilitate action to overcome barriers to One Health approaches to zoonotic diseases.

vii. Goal, objectives and areas of focus

Figure 1 illustrates the relationship between the focus areas of the OHSP and 3 important regional and international initiatives that include One Health activities on zoonotic diseases - the International Health Regulations (IHR 2005), the Asia Pacific Strategy for Emerging Diseases (APSED 2010), and the Global Health Security Agenda (GHSA).

Figure 2 summarises the goal, objectives and focus areas of the OHSP and the Global Health Security Agenda (GHSA).

1. Building One Health capacity



1.1. Background

General strengthening of One Health capacity is vital to allow Viet Nam to detect, prevent and respond to zoonotic diseases. As described in the Summary Plan, One Health approaches are now recognised as the best way to achieve gains in these areas. Building One Health Capacity is not an end in itself – the capacity has to be used for action against specific zoonotic diseases. Strengthening is needed in a number of areas described in the Summary Document and this Technical Annex.

1.2. Strategic directions

- Continue to move towards a comprehensive, integrated approach to zoonotic disease threats through the development of legal and administrative structures and the inclusion of One Health approaches in all relevant government sectors.
- Establish the national governance, financial and coordination mechanisms for all hazards including disease emergencies as well as sustained mechanisms for longer-term prevention and control of priority zoonotic diseases.
- Move beyond self-reporting of IHR and PVS core capacities and regularly test functional capacities and planning including whole-of-society pandemic plans.
- Build on existing structures for developing, coordinating and sharing communications to the public during emergencies and non-emergency situations.
- Review, refine and fund surveillance programs for zoonotic diseases and institutionalise cross-sectoral information sharing including microbiological data from laboratories and epidemiological data from public health units.
- Carry on refining and upgrading national human and animal laboratory networks including linkages, diagnostic capacity for priority diseases and biosecurity and biosafety.
- Improve sharing of disease intelligence data with neighbours at key points of entry.
- Improve infection prevention and control in health facilities and at key points in the livestock production and marketing chain.
- Bring to bear the expertise of the environmental health sector in addressing environmental aspects critical to zoonotic disease emergence and prevention.
- Improve communications between authorities as well as to and from the public for disease emergencies and for risk reduction messaging for better control of zoonotic infections.
- Maintain progress on the development of a One Health literate workforce.
- Ensure that research is focused on answering key clinical, epidemiological, public health and policy questions, is shared among stakeholders, and applied to policy and practice.

1.3 Achievements in establishing One Health approaches in Viet Nam

1.3.1. One Health coordination

Since 2003, Viet Nam has made successive improvements toward a multi-sectoral approach to address zoonotic diseases in response to domestic threats such as strains of highly pathogenic avian influenza, external threats such as Ebola virus disease, and global initiatives to promote One Health and health security such as the Manhattan Principles on “One World, One Health”, the International Health Regulations (IHR), the Performance of Veterinary Services (PVS) and the new Global Health Security Agenda (GHSa).

National planning has progressed from coordinated animal and human health activities to address avian influenza virus A/H5N1 under the OPI, 2006-2010, to a broader focus on emerging and re-emerging diseases under AIPED, 2011-2015, and then to a national One Health roadmap, 2015-2016, that outlines collective engagement across sectors to prevent and control zoonotic diseases. A new One Health forum for policy dialogue and information sharing, the Viet Nam One Health Partnership for Zoonoses (OHP), brings together 27 national and international partners including the Ministry of Agriculture and Rural Development (MARD), the Ministry of Health (MOH), and the Ministry of Natural Resources and Environment (MONRE). This is indicative of high-level multi-sectoral commitment to managing the risks of disease at the human-animal-environment interface and extends the local One Health approach beyond the “four-way linking model” of GDPM, DAH, WHO and FAO.

Two national steering committees - the National Steering Committee for Avian Influenza Prevention and Control (NSCAI, 2004) chaired by the Minister of MARD and the National Steering Committee for Human Influenza Pandemics Prevention and Control (NSCHP, 2006) chaired by the Minister of MOH – have been the principal mechanisms for national coordination of responses to zoonotic diseases during the periods covered by the OPI and the AIPED. Establishment of a new, unified, overall national steering committee has been proposed, with chairing at the level of Deputy Prime Minister. Design of this committee is currently under consideration. A range of other national steering committees is responsible for related areas where application of a One Health approach for additional health concerns at the human-animal-environment interface is highly relevant including the Steering Committee for Drug Resistance, the Central Steering Committee for Food Safety and Hygiene, and the National Committee for Climate Change.

1.3.2. Legislation to support One Health approaches

Legislation has fostered cooperation between the animal and human health sectors with decrees and circulars governing surveillance, epidemiological investigations, biosafety in laboratories, and prevention, quarantine and other measures during major epidemics. The guidelines for coordinated prevention and control of zoonotic diseases (inter-ministerial circular No. 16/2013/TTLT-BYT-BNN&PTNT, dated May 27, 2013) are a key legal advance towards multi-sectoral cooperation. Viet Nam has built a legislative framework for the reporting of nationally notifiable infectious diseases in the public and private sectors, aspects of animal health (animal disease management, animal slaughter, processing of animal products, veterinary inspection procedures), and food standards and safety (chemical and veterinary medicine residues, microbiological contaminants). The legal basis for the diagnosis, management and response to potential novel pathogens, like Ebola virus and Middle East Respiratory Syndrome (MERS) coronavirus, was promptly issued. Legislation has also been passed to regulate the management of captive wildlife, prohibit trafficking, and protect wildlife and biodiversity.²

² Strengthening Capacity for the Implementation of One Health in Viet Nam. State management of captive wildlife in relation wildlife health and the risk of interspecies and zoonotic disease transmission. Report commissioned by the One Health Partnership for Zoonoses Secretariat Office, MARD. 2015

1.3.3. Core capacities to support a One Health approach

Viet Nam has achieved core capacities for identifying and responding to disease outbreaks and public health events stipulated under the International Health Regulations (IHR, 2005), and has implemented a number of recommendations from past evaluations of the Performance of Veterinary Services (PVS)³ including bolstering the legislative foundation for these services (particularly the Veterinary Law, 2015). In addition to the passive surveillance systems for people and animals, sentinel surveillance systems have been established for priority diseases in key sites. For example, border and market surveillance for avian influenza in poultry, and a national sentinel surveillance system in provincial health facilities for influenza-like-illness and severe acute respiratory infections. A large network of human health laboratories is part of the national communicable disease surveillance network including two national reference laboratories, 63 provincial public health laboratories and more than 200 health facility laboratories. Progressive improvements of diagnostic capacity, standards and biosafety have been made under the Viet Nam Laboratory Accreditation Scheme (VILAS), with some laboratories also seeking ISO certification. A framework for cross-sectoral laboratory information sharing is now in place.

1.3.4. One Health workforce

A well-trained workforce capable of preventing and managing diseases of animal origin and working in multi-disciplinary teams is required. The Hanoi School of Public Health (HSPH), Hanoi Medical University (HMU), and the Faculty of Veterinary Medicine of the Viet Nam National University of Agriculture (VNUA) are foundation members of the South East Asian One Health University Network (SEAOHUN) supported through the EPT and EPT-2 programs. This academic network aims to build trans-disciplinary capacity to “respond to emerging and re-emerging infectious and zoonotic diseases”. 17 universities throughout Viet Nam are now part of the Viet Nam One Health University Network (VOHUN) and include faculties of medicine, public health, veterinary and animal sciences. In addition, the Field Epidemiology Training Program within MOH and the AVET program within MARD provide well-established in-service training schemes.

1.3.5. One Health activities

An audit of One Health projects and programs in Viet Nam completed in 2015 identified 62 separate but related activities beginning in 2005 (see Appendix 1). These activities focused on strengthening capacities common to the prevention and control of all emerging or zoonotic diseases, as well as specific activities for avian influenza, antimicrobial resistance, rabies, diseases of poultry and pigs, and various zoonotic bacterial pathogens. Many of these activities will continue into the next 5-year period. The One Health Communications Network (OHCN), a working group within the One Health Partnership, provides a platform for experts from human health, livestock, wildlife and eco-health to share information and promote public awareness about reducing the risks and drivers of zoonotic diseases.

1.4. Work underway

Viet Nam is a lead country in developing and implementing the Zoonotic Disease Action Package (ZDAP) of the **Global Health Security Agenda (GHSA)** and is a contributing country for the Emergency Operations Centres Action Package. This global partnership of almost 50 countries aims to drive progress to full implementation of IHR and the PVS pathway utilising the prevent-detect-respond framework. Local adaptation of these two action packages is in progress and is expected to

³ OIE PVS reports: [2006](#), [2010](#)

complement other national One Health planning activities to address zoonotic diseases. While Viet Nam has put herself forward to achieve specific targets related to zoonotic diseases (prevent) and a national public health Emergency Operations Centre (respond), many of the other action packages are also important for functional 'One Health' capacity. Action packages related to prevention include antimicrobial resistance, biosafety and biosecurity, immunization; those related to detection support strengthening of national laboratory systems, real-time surveillance, disease reporting, and workforce development; and those related to response include linking public health with law and multi-sectoral responses, medical countermeasures and personnel deployment. It would be useful to regularly review developments made by GHSA member countries on these other action packages.

A related endeavour, Phase Two of the **Emerging Pandemic Threats Programme** (EPT-2) that began in 2014, is supporting three main areas: the development of a Vietnamese One Health workforce (OHW) via the established VOHUN (see 1.3.4); preparedness and response functions (P&R) such as approaches to strategic planning, promoting a positive policy environment, sharing information across sectors, harmonising systems and assessing national capacity; and monitoring viruses with pandemic potential to guide surveillance and risk mitigation strategies (PREDICT-2, described in more detail in focus area 3, One Health approaches for managing zoonotic agents with pandemic potential that are yet to emerge, especially in wildlife.). EPT-2 builds on EPT-1 (2009-2014) and activities on avian influenza that predominantly focused on controlling the threat posed by HPAI as well as identifying other potential threats at their source. Funded by USAID, EPT-2 is being implemented by a number of partners with technical collaboration from the U.S. Centers for Disease Control and Prevention (US CDC), the World Health Organization (WHO) and the Food and Agriculture Organization.

Viet Nam is ahead of the curve in terms of having a well-established domestic One Health Platform, the One Health Partnership for Zoonoses. This partnership is continuing to work towards enhancing its role in coordination, policy dialogue and knowledge management for zoonotic diseases and will receive additional support via EPT-2. The involvement of MONRE provides an opportunity for greater inclusion of agro-ecosystem health elements in local One Health approaches with the potential to embrace a longer-term, more strategic approach to national health security.

1.5. Alignment with existing policies & strategies

A number of domestic, regional and international plans provide an opportunity to align work on zoonotic diseases with other health system activities. Some of these plans specifically adopt a One Health approach for preventing and controlling zoonotic diseases; others are focused on different but interrelated areas. See Figure 1 in the Summary Plan for a diagrammatic representation of how the major international initiatives relate and overlap, and Figure 2 for how the OHSP links with these.

1.5.1. Domestic plans

The Ministry of Health (MOH) has submitted the next 5-year plan preventive health for Government approval; MARD's 5-year plan for the animal health sector was approved in 2014. This means that One Health activities related to zoonotic disease control will continue to be fitted to existing health priorities. An online human communicable disease notification system (Circular 54/2015/TT-BYT) is anticipated to be up and running from July 2016; this is expected to improve disease reporting and create new demands for public health protective action. Table 1 lists some of the current national plans that relate to One Health.

Table 1. Selected list of government plans related to One Health

Type	Plan	Period
General health plans	The Vietnam national strategy on preventive medicine to 2010 and orientations towards 2020 (Decision 225/2006- QĐ-TTg)	2010-20
	Health Master Plan for the period 2016-2030 with a vision to 2050 (forthcoming)	2016-30
	National Program on occupational health (Decision 05/2016/QĐ-TTg)	2016-20
	National public health laboratory plan (forthcoming late 2016)	
Emergencies	All-hazards contingency plan (forthcoming late 2016)	
Zoonoses	Comprehensive Plan for Influenza/(re) Emerging Infectious Disease Pandemic Preparedness and Response in the Health Sector 2011 – 2015 with a vision to 2020	2011-15
	The national program to control and eliminate rabies (Decision 2731/QĐ-BNNTY)	2011-15
	Guidelines for coordinated prevention and control of zoonotic diseases (Inter-ministerial Circular No.16/2013/TTLT-BYT-BNN&PTNT)	2013
	National One Health Roadmap	2015-16
	National HPAI Plan	2013-17
	National Agriculture sector plan for avian influenza prevention and control	2014-18
	National plan on prevention and control of avian influenza H5N1 (438/QĐ-BNN-TY)	2014-18
	Regulations on the prevention and response to zoonotic diseases in terrestrial animals (07/2016/TT-BNNPTNT)	2016
	Action Plan for emergency response to influenza viral strains capable of causing human disease	2014
	Action plan for preventing and controlling avian influenza A/H7N9 (No 1126 /QĐ-BYT)	2013
AMR	National action plan on against drug resistance (2174/QĐ-BYT)	2013-20
	List and level of antibiotics permitted in feed for growth promotion (06/2016/TT-BNN)	2016
	Guideline on the implementation of infection control in health facilities (18/TT-BYT)	2009

Food safety	Ensuring food safety in the transport, slaughter cattle, poultry (66/QĐ-BNN)	2014-20
	The restructuring of husbandry sector towards increasing the added value and sustainable development (984/QĐ-BNN-CN)	2014-20
	National Strategy for food safety 2011-2020 and a vision toward 2030 (20/QĐ-TTg)	2011-20
	Regulations on the control of slaughtering and veterinary hygiene inspection (09/2016/TT-BN)	2016
	Allocation of tasks and cooperation among regulatory agencies in food safety management	2014
Environment	National Program on pollution and environmental improvement	2016-20
	The plan for implementation of national environmental protection strategy by 2020 with a vision to 2030 (Decision 166/QĐ-TTg)	2020-30

1.5.2. Regional and international strategies

The International Health Regulations (IHR, 2005) commit states to develop eight core capacities to identify, investigate and respond to public health events that may constitute an emergency of international concern: (1) national legislation, policy and financing; (2) coordination of nationwide resources and multi-sectoral partnerships; (3) surveillance; (4) response; (5) preparedness; (6) risk communications; (7) human resources; (8) laboratory. Viet Nam has met minimum (self-reported) core requirements and is now considering how to assess functional performance of national capacities against the updated IHR monitoring and evaluation framework.

The World Organization for Animal Health (OIE) provides a similar framework for the progressive improvement in veterinary services with the tool for the evaluation of Performance of Veterinary Services (PVS). Unlike IHR, this assessment process has not yet evolved into a review of functional capacity.

The Asia Pacific Strategy for Emerging Diseases (APSED) provides a strategic framework for advancing national core capacities required under IHR (2005) through focus on eight areas: (1) surveillance, risk assessment, and response; (2) laboratories; (3) zoonoses; (4) infection prevention and control; (5) risk communications; (6) public health emergency preparedness; (7) regional preparedness, alert, and response; and (8) monitoring and evaluation. The aims are to reduce risk, strengthen early detection, rapid response and preparedness, and build sustainable partnerships. APSED is currently in the process of being updated for the next 5-year period and will be a key document for the national zoonotic disease action plan to be aligned with.

As discussed, the Global Health Security Agenda promotes the One Health model to prevent, detect and respond to emerging diseases. The tailoring of action packages on zoonotic diseases and

emergency operations centres is still in progress and will incorporate realistic targets for the next 5-year period. These are described in the GHSA roadmap for Viet Nam – the first version of which was released in September 2015.⁴

The 2010 ASEAN Ministerial Statement on “Cooperation on Animal Health and Zoonoses: HPAI and Beyond” provides a similar framework for animal and human health cooperation for priority zoonotic diseases including avian influenza, rabies, leptospirosis, food-borne salmonellosis and brucellosis among others.

The Asian Development Bank (ADB) is assisting Viet Nam through the Greater Mekong Subregion Health Security Project (2017-2022) to improve: (1) cross-border communicable diseases control particularly for mobile populations and along economic corridors; (2) surveillance for communicable diseases including electronic notification systems and capacity for outbreak response; and (3) district laboratory services and infection prevention and control procedures in district hospitals. The project is intended to support elements of APSED.

1.5.3. One Health and the environment

The newly adopted Sustainable Development Goals (SDGs) for the period 2016 to 2030 have a broader agenda than the previous Millennium Development Goals (MDGs). In addition to calling for strengthened country capacities for early warning, risk reduction and management of national and global health risks, the SDGs set targets related to social and environmental determinants of health that are relevant to the One Health approach. The following are examples of pertinent targets:

- Conservation, restoration, and sustainable use of ecosystems;
- Ecosystem and biodiversity values integrated into national and local planning, development processes, and poverty reduction strategies;
- Enhanced support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities;
- Enhanced inclusive and sustainable urbanisation and capacity for participatory, integrated and sustainable human settlement planning and management;
- Environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduced release into the air, water and soil to minimise their adverse impacts on human health and the environment;
- Climate change measures integrated into national policies, strategies and planning

These targets implicitly recognise that changes to ecosystems can result in the emergence of zoonotic diseases and other diseases linked to animal products. Loss of biodiversity due to habitat fragmentation has been identified as the main driver for the marked increase of cases of Lyme disease in North America. Changes in climate will alter the distribution of vector-borne diseases adding to the other health and socio-economic problems that will occur as greenhouse gas concentrations rise. The environments in which livestock are reared and sold influence the types of diseases that occur and their potential for transmission to humans, as demonstrated by human infections of H5 and H7 influenza in improperly managed live poultry markets. Human modifications to ecosystems

⁴ See GHSA Roadmap at <https://ghsagenda.org/docs/Vietnam-GHSA-5-year-RoadMap-2015.pdf>

facilitated the spread of Nipah virus from bats to pigs and then to humans in Malaysia; contact between humans and bats in caves is now recognised as the main source of spillover of Marburg virus in Africa; and preparation of wild animals for food resulted in transmission of viruses such as SARS and Ebola virus from animals to people. Pollution of the environment with persistent organic pollutants can result in the accumulation of these chemicals in livestock products.

Development in Viet Nam with changes to both natural and man-made ecosystems will increase the probability of emergence of new agents and risks from pollutants. For this reason, MONRE is an important partner in One Health activities aimed at control and prevention of diseases of animal origin, reflected in their active support for the One Health Partnership.

SDG targets on supporting research and development of vaccines and medicines and providing access to affordable essential medicines and vaccines offer scope for applying the best possible resources to address zoonotic and neglected diseases for the human and animal health sectors.

The Sendai Framework for Disaster Risk Reduction 2015-2030⁵ will contribute towards achievement of the SDGs and applies to “*small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters caused by natural or man-made hazards, as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors.*” This framework therefore has direct relevance to zoonotic disease prevention and response. The four priorities for action are: (1) understanding disaster risk; (2) strengthening disaster risk governance to manage disaster risk; (3) investing in disaster risk reduction for resilience; (4) enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.

1.6. Key factors for success

- Government commitment and leadership at all levels
- Strengthened governance structures with clear roles and responsibilities
- A strong legal framework and positive policy environment to facilitate inter-sectoral collaboration
- Inclusion of environmental health aspects for a more strategic application of One Health principles
- Close coordination between sectors and timely sharing of information
- Community engagement and mobilisation is critical to optimising zoonotic disease prevention and control efforts
- Technical and financial contributions of international partners are indispensable
- Incorporating research findings into policy and practice

1.7. Challenges & constraints

- The Ministry of Planning and Investment (MPI) has described general limitations of state structures that have relevance to key government One Health actors:

*“State fragmentation refers to the lack of clear hierarchy and assignment of roles and responsibilities both within the central government and between the centre and the provinces – and the inertia and inefficiencies this generates in formulating and implementing policy. Horizontal and vertical fragmentation of power has resulted in overlapping mandates with conflicting rules and decisions.”*⁶

⁵ http://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

⁶ Page xxvii, International Bank for Reconstruction and Development/The World Bank and the Ministry of Planning and Investment of Viet Nam. Viet Nam 2035: Toward Prosperity, Creativity, Equity and Democracy. 2016.

In particular, outside of emergency situations formal channels for human and animal health sectors to communicate, share data and plan action are still being developed, despite the issuance of the inter-Ministerial Circular 16/2013. A review of agencies involved in the protection of wildlife indicated the need for improved clarity in roles and responsibilities of related agencies at all levels.⁷ Even sharing of information between departments within a single ministry can be problematic, particularly between departments with limited crossover in much of their work e.g. CITES administration and Department of Animal Health within in MARD. Another example of inefficiency could be the large number of public health laboratories throughout Viet Nam, which poses challenges to laboratory accreditation and sharing information across laboratories and to public health authorities.

- The 2015 Joint Annual Health Review noted the continued burden of communicable diseases including emerging diseases and antimicrobial resistance, weak surveillance systems, poor sharing of data between curative and preventive sectors, and the need for further development of preparedness plans and response capacity. This review also pointed to a number of underlying drivers of disease including climate change, urbanisation, industrialisation, and environmental pollution. As noted in the AIPED, the transformation of Viet Nam to a modern industrialised country by 2020⁸ carries with it the potential for “increased anthropogenic stress on already over-burdened regional ecosystems (including agro-, aquatic, forest, wetland, coastal, and urban ecosystems). Unless managed, the “result is continued elevated risks to human health not only from zoonotic diseases, but also from a wide range of threats, including deterioration in water quality and air quality and ongoing loss of biodiversity”.
- There is still only limited recognition of the importance of upstream practices on downstream infectious disease risks. For example, developments and restructuring of the livestock industry with changes to land use, production zones or the distribution of livestock can introduce new risks from livestock waste including environmental damage and introduction of potential pathogens such as AMR bacteria. The current national plan is expected to result in an increase in livestock in the Central Highlands, which requires a proper assessment of the implications for the environment. Inadequate biosecurity measures in intensive production systems can amplify infectious diseases risks given the high number of uniform animals kept in confined spaces (e.g. swine and avian influenza). This risk can be exacerbated for livestock farms situated in areas with large numbers of wild animals, particularly where there is contact between poultry and wild birds. Wildlife farming also poses a potential threat. Farming of bar headed geese in China may have been a factor in the emergence of H5N1 in places such as Qinghai Lake with subsequent spread to other countries. Dong Nai province has a high concentration of wild life farms and a large livestock sector. The co-location of livestock and wildlife industries in this province, as well as the expectation that DongNai will form part of the H5 influenza free zone, warrants close attention to ensure pathogens do not spillover in either direction.
- Coupled with these risks is a limited capacity to enforce regulations and prosecute breaches that influence the risks of zoonotic diseases e.g. animal products with microbiological or chemical

⁷ Strengthening Capacity for the Implementation of One Health in Viet Nam. State management of captive wildlife in relation wildlife health and the risk of interspecies and zoonotic disease transmission. MARD. 2015

⁸ 11th Vietnam Communist Party Congress: “striving by 2020 to fundamentally transform Vietnam into a modern industrialized country 2020”

contamination above standards, use of banned medications in livestock, dispensing of human antibiotics without a prescription, maintenance of sound biosecurity practices etc. Large-scale livestock farming can reduce the risk of certain diseases through improved management and biosecurity when compared with small-scale commercial production but needs to be well managed – regulation can play a role in ensuring this happens.

- Limited engagement with social sciences and the non-government sector to develop effective communications to change behaviours for improved prevention and control of zoonotic diseases. Health education and communications has been identified as a key aspect of responding to emerging disease threats such as avian influenza. However, there is a general acknowledgement that health education and communications are “fragmented and have low effectiveness”⁹ and there is a risk that communications during crises that are not sufficiently clear or timely may increase rather than allay community concerns.
- Uncertain funding for core functions related to zoonotic disease control such as the national sentinel surveillance systems for influenza-like illness and severe acute respiratory infections.
- Overload of existing staff in MARD and MOH. For this reason, the plan focuses on a small number of important or potentially important zoonotic diseases.

1.8. Targets

The principal targets for the next 5 years (as outlined in the Summary Plan) are as follows:

Area	Description	Target
Governance & coordination	Well-defined national coordination mechanisms for zoonotic diseases linking animal health, human health, wildlife, environment and other government sectors that function during emergency and non-emergency periods	Establishment of a new, unified, overall national steering committee Application of Circular 16/2013 on zoonotic diseases Clarifying the role of MONRE
	Engagement by government partners with key civil society organisations and external stakeholders for specialised information and advice (e.g. clinical, public health, laboratory, risk communications, private sector, international partners etc.) and as partners in disease control and prevention programs	Ensuring industry, subject and discipline specialists are identified and included in One Health approaches to control and prevention of zoonotic diseases through advisory panels and networks.

⁹ Health Partnership Group (2011). Joint Annual Health Review 2011. Strengthening management capacity and reforming health financing to implement the five-year health sector plan 2011–2015. Viet Nam Ministry of Health. Ha Noi

<p>Governance & coordination</p>	<p>Maintaining the One Health Partnership on Zoonoses and secretariat to ensure it can continue to act as a national platform for policy dialogue and knowledge management of One Health and zoonotic diseases, and to facilitate coordination of One Health stakeholders</p> <p>Conducting joint investigations into zoonotic disease outbreaks whenever this is appropriate (including development of guidelines for situations where joint investigations should be conducted)</p>	<p>Provision of support for the One Health Partnership including involvement in OHP activities organised</p> <p>Application of relevant provisions of Circular 16/2013</p>
<p>Legal framework</p>	<p>Measures to ensure wider adoption of Circular 16/2013 that provides a basis for enhanced collaboration between Ministries and Departments on zoonotic diseases, especially at provincial and sub-provincial levels</p> <p>Additional legislation/directives/circulars for coordination and formal engagement of the environmental sector and in particular MONRE</p>	<p>Training in implementation of Circular 16/2013</p> <p>Preparation of directives under the Animal Health law & consideration of extending features of Circular 16 to include MONRE</p>
<p>Risk assessments & communications</p>	<p>Build capacity to undertake risk assessments at the human-animal-environment interface</p> <p>Improve risk communication between authorities and to the public on microbial hazards emerging at the human-animal-environment interface</p>	<p>Training programs in joint risk assessments through AVET and FETP and other programs</p> <p>Training in risk communication for disease emergencies and prevention of diseases</p>

<p>Laboratories</p>	<p>Enhance laboratory capacity and quality management systems</p> <p>Enhance data management systems to allow rapid analysis and sharing of new findings within and across sectors as well as across borders</p> <p>Conduct well designed surveillance to ensure early detection of zoonotic pathogens especially those with pandemic potential</p>	<p>Provide appropriate resources for undertaking tests and for application of quality management systems</p> <p>Established following the GHSA Roadmap</p> <p>See focus area 3</p>
<p>Trained One Health workforce</p>	<p>Sufficient numbers of trained professional staff are proficient One Health practitioners</p>	<p>Adopt curriculum for One Health training and include One Health as an integral part part of FETP and AVET training</p>
<p>Appropriate One Health research</p>	<p>Undertake appropriate research to fill gaps in application of One Health approaches to policy and practice including research on specific diseases</p> <p>Undertake selected environmental health research aimed at understanding the drivers of disease emergence and measures to reduce risk to guide practice, for example, enhanced land use planning for the livestock sector (see focus area 3)</p>	<p>Identify gaps in knowledge, obtain funding, conduct research and regularly share findings with stakeholders including policy makers (annual meetings)</p> <p>Farm locations assessed for potential hotspots for pathogen emergence, amplification and transmission (e.g. effects of developing new livestock production zones)</p>

In addition to these principal targets, other targets that are expected to be met during the 5 years of the strategic plan include:

Area	Target
<p>Legal framework</p>	<p>Review multi-sectoral legislative framework and regulatory guidelines to address zoonotic disease emergence and multi-sectoral responses to zoonotic diseases and address gaps. This includes incorporating environmental protection additions to veterinary and agricultural legislation.</p>

<p>Governance and coordination</p>	<p>Improved and timely information sharing between human and animal health sectors using established formal channels of communication (e.g. reporting of human cases of zoonoses to MARD and reporting of animal disease outbreaks of zoonotic potential to MOH) in line with Circular 16/2013.</p> <p>Improved information sharing and cooperation between MARD, MONRE, and MOH to prevent and control environmental pollution from livestock production and the prevention of zoonotic disease transmission</p> <p>Defined indicators for monitoring and evaluation of central, regional, provincial and district level zoonotic disease coordination mechanisms</p> <p>Defined roles and responsibilities of agencies involved in managing and regulating wildlife farming, disease surveillance, conservation and trafficking, and agencies involved in environment and forest protection</p>
<p>Prevention activities</p>	<p>Infection control processes and antibiotic stewardship programs established in all reference and provincial hospitals</p> <p>Biosecurity measures established and enforced in large livestock and wildlife farms and for animal transport, and enhanced cleaning and disinfection of farms and markets</p> <p>Development of antibiotic stewardship guidelines for the livestock sector and improvement and enforcement of regulations of antibiotic use in animals</p> <p>Reduce illegal wildlife trafficking</p> <p>Improved risk assessment tools for the environment and the emergence of zoonotic diseases. Application of tools to define high-risk settings and to inform economic development projects, livestock restructuring and land-use changes</p> <p>Defined national environmental standards in relation to agricultural land use and agreed on methodology for assessing the receptive capacity of land for safe agricultural production</p> <p>Assessment of the excretion of heavy metals and dangerous substances from industry and its impact on the environment and the health of animals and people. Implement measure for control and management</p> <p>Strengthen capacity for pollution control and environmental protection in human and animal disease prevention and control units</p>

<p>Surveillance and reporting</p>	<p>Improved surveillance systems:</p> <ul style="list-style-type: none"> • Established electronic communicable disease reporting system for human laboratories & public health units • Established indicator-based surveillance for 42 priority human diseases • Established event-based and syndromic surveillance system with evidence of animal and human health investigations of detected events/syndromes • Established enhanced and sentinel surveillance among people and animals (including wildlife) for 5 priority zoonotic diseases and selected surveillance of high-risk animal groups <p>Improved information sharing:</p> <ul style="list-style-type: none"> • Improved compatibility of animal and human health diagnostic and surveillance data collection systems to enhance rapid information sharing and move towards interoperable systems • Improved information sharing across borders at key points of entry and joint planning to reduce the spread of disease across borders • Reporting to OIE of detected listed diseases and to WHO of public health emergencies of international concern within designated time periods • Improved capacity to analyse and interpret surveillance data in both the animal and human health sectors
<p>Laboratories</p>	<p>All human and animal health laboratories meet national accreditation standards and biosafety/biosecurity requirements and all reference laboratories meet appropriate international accreditation (e.g. ISO 15189, 17025, 17043) with established procedures for ongoing external quality assurance</p> <p>A public health laboratory network that meets national standards for minimum reporting requirements for nationally notifiable communicable diseases (diagnostics, specimen referral pathways, quality assurance, data collection, reporting)</p> <p>Review of the structure of the public health laboratory network including the functions and number of laboratories and assessment of how to improve efficiencies</p> <p>Established mechanism for sharing information between animal and human health laboratories</p>

Emergency management and response	<p>Established emergency operations centre at national level with an equivalent structure established in all regions</p> <p>Exercise(s) to test function of emergency operations centre and national pandemic/all hazards plans including at least one national disease emergency exercise that tests non-health impacts and whole-of-society responses</p> <p>At least one IHR joint external evaluation (coupled with a similar or preferably linked assessment of veterinary services)</p> <p>Evidence of joint outbreak investigations and management for zoonotic diseases</p> <p>Updated clinical and standard operating guidelines for the management of priority zoonotic diseases</p>
Workforce	<p>Separate and joint FETP and AVET training programs that are integrated into the staffing structure of MOH and MARD and other relevant institutions</p> <p>Completion of VOHUN curricula development for undergraduate and postgraduate courses including the addition of risk and behaviour change communications modules</p> <p>Continuing to increase the number of people trained in One Health approaches via VOHUN with the support of EPT-2 including expanding training for students who will work in the environment health sector and in-service training on One Health core competencies for preventive medicine and veterinary practitioners, as well as rangers responsible for managing the farming and transport of wild animals. Assess the impact of this training on practice and zoonotic disease outcomes</p> <p>Nationally defined number of human health and animal health epidemiologists to be trained in IHR and PVS core competencies by 2020</p>
Risk communication	<p>Lines of communication during health emergencies:</p> <ul style="list-style-type: none"> • Established mechanisms for communications across and to lower levels of government during different phases of health emergencies • Established mechanisms for communication between government and external agencies (e.g. NIHE) that can contribute specific expertise for the development of public health messages • Established mechanisms for communicating to the public during health emergencies and for gathering information from the public to refine public messaging <p>Involvement of social sciences in the development and assessment of joint risk and behaviour change communications for priority zoonoses to reduce the drivers of disease emergence and transmission at the human-animal-environment interface</p> <p>The One Health Communications Network continues to meet and develop appropriate communications material that is assessed for impact once delivered and used both in peace time and during disease outbreaks</p>

Research	<p>Nationally defined research priorities for zoonotic diseases including research on health and livestock systems, social and Ecohealth aspects critical to zoonotic disease emergence, prevention and control, and the application of new tools to track and minimise the development of antimicrobial resistance</p> <p>Established mechanism for researchers and academics to periodically inform policy makers of new developments and apply research findings to policy and practice</p> <p>Annual national One Health Forum meetings</p> <p>Participation in key regional and global meetings and conferences to further refine the application of the One Health approach</p>
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1.9. Budget

The breakdown of the minimum funds required for general strengthening of One Health capacity in Viet Nam is outlined below by area. At the district level, ADB is supporting the Viet Nam government with an USD 80 million loan through the Greater Mekong Subregion Health Security Project (2017-2022) to develop the public health workforce including training in outbreak response, risk analysis, risk communication and managing disease control campaigns. This project also supports the strengthening of district surveillance systems, district hospital infection prevention and control processes, and district laboratories.

Governance and coordination - mechanisms to coordinate action across sectors, including greater involvement of the environmental sector.

Contents	Estimated minimum funds for 5 years
Well defined national coordination mechanisms for zoonotic disease	\$100,000 [GoV]
Engagement by GoV partners with key civil society organisations & external stakeholders	\$200,000 [GoV and donors]
Maintaining One Health Partnership on Zoonoses and secretariat	\$1,000,000 [GoV and donors]
Conducting joint investigations into zoonotic disease outbreaks	\$500,000 [GoV and donors]

Legal framework - the legislative framework to facilitate multi-sectoral cooperation (and application of the framework)

Contents	Estimated minimum funds for 5 years
Measures to ensure wider adoption of Circular 16/2013	\$300,000 [GoV and donors]
Additional legislation / directives / circulars	\$200,000 [GoV]

Risk assessments & communications to target upstream determinants of disease emergence

Contents	Estimated minimum funds for 5 years
Build capacity to undertake risk assessment at the human-animal-environment interface	\$1,000,000 [GoV and donors]
Improve risk communication on microbial hazards emerging at the HAEI	\$1,200,000 [GoV and donors]

Surveillance systems & laboratories that support testing programs

Contents	Estimated minimum funds for 5 years
Enhance laboratory capacity & quality management systems	\$2,000,000 [GoV and donors]
Enhance data management systems to allow rapid sharing & analysis of new findings	\$600,000 [GoV and donors]
Conduct surveillance to ensure early detection of zoonotic pathogens especially those with pandemic potential	See focus area 3

Atrained One Health workforce

Contents	Estimated minimum funds for 5 years
Adequate numbers of professional staff are trained in One Health practices	\$1,000,000 [GoV and donors]

Appropriate One Health research

Contents	Estimated minimum funds for 5 years
Undertake appropriate research to fill gaps in application of One Health approaches including research on specific diseases	\$2,500,000 [GoV and donors]
Enhance land use planning for the livestock sector	\$400,000 [GoV and donors]

2. One Health approaches for managing human disease emergencies of zoonotic origin



2.1. Background

All countries need to be prepared to manage a severe pandemic disease resulting from the spillover of an animal virus (or other agent) into the human population. Severe pandemics, such as those caused by influenza, are rare events but when they occur will have major whole-of-society effects. A number of other diseases that emerged from animals and crossed to humans, such as SARS, MERS and Ebola virus disease, have posed and remain a threat to all countries, including Viet Nam; experiences demonstrate the extreme economic and social consequences of even relatively short local transmission chains of these diseases (e.g. SARS in 2003, MERS in South Korea in 2015).

Preparation offers the best chance of averting prolonged crises and preventing avoidable morbidity and mortality. Ebola virus disease in West Africa demonstrated the challenges of coordination within government ministries and between government and international agencies, NGOs and the private sector. A One Health approach involving coordinated intersectoral collaboration is required for effective management of these events. Able command and control systems need to be well designed and regularly tested; rapid responses rely on efficient surveillance and data management systems to detect and report cases. The Ebola emergency also highlighted the initial failure of public communications to reduce the risk of transmission because messages were inadequately tailored to local communities.

2.2. Strategic directions

Preparedness for disease emergencies requires:

- Appropriate coordination systems from the highest level of government
- Emergency management systems to identify and rapidly respond to outbreaks of human disease from zoonotic origin
- Dedicated funding independent of normal budgets

2.3. Achievements

Viet Nam has previously established inter-ministerial steering committees to coordinate intersectoral responses to specific human disease emergencies of zoonotic origin, such as SARS and avian influenza H5N1, and other disease emergencies. The Prime Minister has been directly involved in chairing these mechanisms in peak outbreak risk periods. Emergency response plans have been drafted (e.g. the action plan for the prevention and control of influenza A(H7N9) in Viet Nam, decision No. 1126/QĐ-BYT, dated 5 April 2013) and some aspects have been tested in simulations and exercises with the support of the US-CDC and WHO. The development of an ongoing national inter-ministerial steering committee to deal with prevention and control of public health emergencies, including zoonoses, is currently under consideration.

2.4. Work underway

Viet Nam has already built the physical infrastructure of the EOC within GDPM and commenced workforce training. Planning for activities in the next 5 years has commenced with the first iteration

of the GHSA roadmap for Viet Nam produced in September 2015. This is in the process of being updated and will provide the operational plans for building the capacity and functions of the EOC.

2.5. Alignment with existing strategies

The **Global Health Security Agenda** was developed based on the recognition that the effects of infectious diseases emergencies can be mitigated through strengthened national and global capacity to prevent, detect and respond. This initiative aims to accelerate achievement of the core capacities required by the IHR and PVS frameworks. Viet Nam is leading the Emergency Operations Centre action package which has the following targets: (1) a public health EOC functioning according to minimum common standards; (2) trained EOC staff capable of activating a coordinated emergency response within 120 minutes of the identification of a public health emergency; (3) maintain trained, functioning, multi-sectoral rapid response teams; and (4) ‘real-time’ biosurveillance laboratory networks and information systems.

2.6. Key factors for success

The main factors for success in this area are commitment from all players likely to be involved in an emergency response, appropriately trained staff at all levels; regular testing of emergency responses either through exercises or actual events; and, access to high-quality, timely surveillance data.

2.7. Challenges and constraints

- No specific contingency funds to manage disease emergencies (although funds are allocated for this purpose in the case of actual outbreaks or high risk of an outbreak and the World Bank’s Pandemic Emergency Financing Facility may provide external financial assistance).
- Ensuring the work of the emergency management centre remains relevant to those outside of MOH. For example, it is not yet clear how the EOC would operate if H7N9 virus was detected only in poultry before any human cases occurred.
- Maintaining sufficient numbers of trained staff to operate the EOC at all times.
- Coordinating with lower levels of the health system particularly given the non-uniform training of provincial and district response teams to conduct investigations, analyse data and institute control measures.
- Limited materials such as personal protective equipment and logistical support to conduct rapid responses.
- Sustaining surge capacity in public health laboratories for extended periods.
- Disease outbreaks are rarely as straightforward to manage as emergency plans suggest. Even in places with established emergency plans these are often found to be imperfect, as was the case with a number of developed countries that had imported cases of Ebola virus disease. The H1N1 pandemic in 2009 also demonstrated that plans had to be flexible and adapted as the outbreak continued, especially with the shift from containment to mitigation.

2.8. Targets

Expected outcomes as described in the Summary Plan are listed below. The GHSA Roadmap also

sets out Intermediate targets for this focus area.

Description	Target
Steering committee for emergency diseases will be operational	Decisions at Prime Ministerial level required on the nature of the coordinating mechanism
Role of Ministries other than MOH is fully defined	Determine the role of other Ministries in the event of a disease that is yet to spillover to humans in Viet Nam (e.g. if H7N9 is detected in poultry but not yet in humans)
A fully functional emergency management centre suitable for responding to all hazards	Established following the GHSA Roadmap
Revised and tested whole-of-society pandemic preparedness plans	Existing plans renewed and exercises or live outbreaks used to test these
Appropriate surveillance systems for disease emergencies	Established following the GHSA Roadmap
Risk communication for outbreaks	Build appropriate risk communication packages in the event of any disease emergency by staff trained in this discipline
Steering committee for emergency diseases will be operational	Decisions at Prime Ministerial level required on the nature of the coordinating mechanism

2.9. Budget

The expected expenditure in this area is estimated to be a minimum of USD 2 million. It will include funds from GoV and the GHSA funding envelope but does not include funds for actual outbreak responses.

A portion of the USD 20.8 million funds allocated by the ADB Greater Mekong Subregion Health Security Project to improve surveillance and outbreak response capacity will be used to achieve targets in this focus area particularly related to staff training, exercises and the development of electronic notification systems that can provide more timely data.

3. One Health approaches for managing zoonotic agents with pandemic potential that are yet to emerge, especially in wildlife



3.1. Background

Infectious agents have crossed over from animals to humans for millions of years. However, this process appears to have accelerated over the past 50 years as a steady stream of infectious agents carried by wild and farmed animals have crossed over and caused severe disease in humans.

Most of these diseases have caused only localised disease outbreaks rather than global pandemics (e.g. Ebola virus¹⁰, Nipah virus). Those that have spread globally, even if only responsible for few human cases relative to other diseases, have caused immense economic disruption (e.g. SARS in 2003¹¹, MERS in South Korea). Tremendous human health impacts have also been caused by vector borne agents transmitted by mosquitoes that thrive in urban environments (such as Zika virus), especially those that have developed human-to-human infection cycles largely independent of the original animal host species.

The emergence of human immunodeficiency virus (first detected in the 1980s), Influenza A(H5N1) (1997 onwards), Nipah virus in Malaysia (1998), and SARS (2002-03) catalysed work to understand the drivers of disease emergence, recognition of global hotspots, and identification of potential agents and species that pose a threat to global health. These diseases also spurred development of One Health approaches.

Viet Nam has experiences with a number of these diseases and the disruption that they can cause (e.g. Influenza A(H5N1), SARS) and is located within one of several identified global hotspots for disease emergence. For the past five years, Viet Nam has supported studies to identify potential pathogens, develop interventions that would help prevent emergence of new agents and prevent existing agents from re-emerging, and focused on building One Health capacity. This work has been supported by the USAID emerging pandemic threats programs (EPT-1, EPT-plus and EPT-2) as well as work on avian influenza.¹²

By gaining a greater understanding of the key risks at the human-animal-environment interface and the nature of these risks, Viet Nam can build better systems for prevention and response to these diseases of animal origin with pandemic potential.

3.2. Strategic directions

- Identifying potential pandemic agents before they emerge
- Detecting evidence of spillover from animals to humans of zoonotic agents, including newly emerging agents
- Preventing emergence through broad scale interventions

¹⁰ Although the Ebola virus disease outbreak in West Africa affected 3 nations severely with considerable concerns about the poor response to the outbreak in those countries, the nature of the causative agent meant that it could be prevented even if cases are imported. None of the 7 other countries that had imported cases experienced extensive outbreaks.

¹¹ SARS was responsible for far fewer human deaths than the 2009 H1N1 pandemic, despite the latter often being described as a 'mild' pandemic.

¹² <https://www.usaid.gov/sites/default/files/documents/1864/EPT2-Narrative-508.pdf>

3.3. Achievements

Among the many achievements in this area are the identification in Viet Nam of high risk practices such as bat guano farming, characterisation of areas with intensive wildlife farming, understanding patterns of trade, training in wild animal handling and sample collection, and the identification of a number of potential high risk agents. There has also been a shift in attitudes towards One Health and a greater acceptance of the importance of One Health training including consolidation of the Viet Nam One Health University Network (VOHUN). Laboratory capacity for detection of these agents has been enhanced and specific tests for a range of agents introduced to two laboratories, one in Ha Noi, at the Viet Nam National Agricultural University (VNUA) and one in Ho Chi Minh City, at the Regional Animal Health Office (RAHO6).¹³ Information has been collated on the regulation of wildlife in a project supported by the One Health Partnership. Information on risks associated with livestock and poultry production and market chains have been better defined.

3.4. Work underway

The tightly linked EPT2 and GHSA programs are expected to extend throughout the 5-year period from 2016 to 2020 and to include activities aimed at understanding, preventing and controlling these agents in animals (domestic and wild) before they pose a threat to global health. The three overarching objectives of EPT-2 are: (1) prevention of the spillover, amplification, and spread of new zoonotic viruses; (2) early detection of new viruses when they do emerge; and (3) their timely and effective control.

EPT-2 has 7 areas of strategic focus of which the following are directly related to detection and control of infectious agents that pose a threat to health security:

- Developing longitudinal data sets for understanding the biological drivers of viral evolution, spillover, amplification, and spread;
- Understanding the human behaviours and practices that underlie the risk of “evolution, spillover, amplification and spread” of new viral threats; and
- Promoting policies and practices that reduce the risk of virus evolution, spillover, amplification, and spread.
- Generic guidance on reducing the risk for new development projects have been produced¹⁴ and should be used for all new projects in which contact between wild animals and humans or livestock is expected to occur.

3.5. Alignment with existing strategies

Work on emergence of zoonotic agents will align with the GHSA, APSED, the IMCAPI ministerial declaration and the activities of the international human and animal health agencies (WHO/FAO/OIE). These Tripartite agencies are developing risk assessment tools for assessing and managing risks at the human-animal-environment interface (HAEI).¹⁵ WHO HQ has outlined the following objectives for work on zoonotic diseases at the HAEI:¹⁶

¹³ The full range of achievements through EPT’s Predict project in Viet Nam are available here http://www.vetmed.ucdavis.edu/ohi/local_resources/pdfs/chapters/35_predict_vietnam.pdf

¹⁴ See <http://www.usaid.gov/what-we-do/global-health/pandemic-influenza-and-other-emerging-threats/programs/extractive-industry-engagement> and

<http://www.chathamhouse.org/about/structure/global-health-security/extraction-industry-infectious-disease-risk-assessment-and-management-idramproject>

¹⁵ http://www.rr-asia.oie.int/fileadmin/Regional_Representation/Programme/JTF_One_Health/2015_6th_Tripartite_Sapporo/Presentations/11_JRA_on_Zoonotic_influenza_WONGSATHAPORNCHAI.pdf

¹⁶ http://www.who.int/foodsafety/about/flyer_zoonoses.pdf?ua=1

- Strengthen national public health systems for existing and emerging threats at the HAEI
- Assist in assessing and managing health threats at the HAEI
- Provide frameworks, tools and international political support for cross-sectoral approaches
- Build national mechanisms for information sharing and joint risk assessment for zoonotic influenza and other threats at the HAEI, including sustainable inter-ministerial communication and collaboration
- Assess global public health risks posed by endemic, epidemic, and potential pandemic events
- Ensure coordination between WHO and international animal health organisations

Viet Nam is one of the two lead countries for the Zoonotic Disease Action Package (ZDAP) of GHSA, and is playing a major role in its development and coordination. ZDAP provides guidance for Viet Nam and other countries on activities in this area. The five-year target for ZDAP is to adopt measured behaviours, policies and/or practices that minimise disease risk and the spillover of zoonotic diseases from wild and domestic animals into human populations.

3.6. Key factors for success

The key factors required for success are sustained surveillance at the HAEI and sharing of information across sectors, successful engagement across sectors including trade, wildlife and land use sectors, and the application of new understandings of the drivers of disease to policy and practice.

3.7. Challenges and constraints

The following constraints are expected to affect Viet Nam's capacity to understand and contain potential emerging agents:

- Finding sufficient animals from each class to test and testing enough animals for early detection (short shedding time of some agents also affects the sensitivity of the system);
- Finding sufficient clinically affected humans in contact with animals;
- Finding culturally appropriate behavioural change strategies that can be applied successfully in a particular industry or sector (e.g. extractive industries);
- Distinguishing pathogens likely to result in health security events from organisms that will not cross the species barrier or cause significant disease in humans;
- Economic drivers of wildlife trade that promote risky behaviour;
- Mismatch between the rate of development of wildlife farming and capacity to regulate and provide appropriate technical services especially in the area of animal health;
- Challenges of data sharing between ministries and even within ministries;

3.8. Targets

The main objectives as presented in the Summary Plan are as follows:

Description	Target
Complete planned work on the identification of zoonotic and potential pandemic agents in animals prior to their emergence	Undertake testing of a range of animals for viruses with pandemic potential
Improve capacity for early detection of spillover to humans of potential pandemic infectious agents	Undertake testing of humans working in association with animals, especially clinical cases
Implement measures to reduce the risk of emergence of novel agents for specific industries	Develop and introduce industry/sector specific guidance on preventive measures

Other targets include:

- Tests for a minimum of 4 virus families will be conducted in all relevant animal taxa – coronaviruses, filoviruses, paramyxoviridae and influenza viruses (see also the specific section on zoonotic influenza viruses);
- Established enhanced and sentinel surveillance among people and animals for 5 priority zoonotic diseases and selected surveillance of high-risk animal groups;
- Evidence of collection, recording, sharing and analysis of data across sectors.

3.9. Budget

The minimum funds required to conduct this work over the next 5 years is estimated to be USD 3 million. The majority of the budget falls within the EPT-2 project supported by USAID with contributions from the GoV.

4. One Health approaches for managing zoonotic influenza



4.1. Background

Influenza viruses in animals represent an important on-going zoonotic and potential pandemic threat in Viet Nam. Each of the last three human pandemic influenza viruses involved either avian or swine influenza viruses in some way and Viet Nam already has almost 15 years of experiences in dealing with the pandemic threat posed by avian influenza viruses of the H5 subtype.

Avian influenza (AI) viruses remain the main concern for Viet Nam. A number of different AI virus subtypes are involved - some are present in Viet Nam (e.g. H5N1, H5N6) and some occur in neighbouring countries or elsewhere (e.g. H7N9). The capacity of avian influenza viruses to evolve rapidly through point mutations and gene reassortment plus the many susceptible avian hosts that share environments (domestic and wild birds in farms and markets) allow new strains of influenza to emerge frequently in the region.

H5N1 AI virus became widespread in Viet Nam in 2003-2004 resulting in the death or destruction of some 45 million head of poultry. It also caused serious disease in humans, raising concerns about its potential to cause a severe influenza pandemic if it developed the capacity to transmit readily between humans. This concern persists but the level of fear has diminished due largely to the fact that the virus remains (genetically) an avian virus. Although experimental studies suggest only a few mutations are required to allow airborne transmission in a mammalian model, the virus has not yet acquired this capability despite over 20 years of human exposure to this virus.

All highly pathogenic H5 avian influenza viruses in Viet Nam are related to the Goose/Guangdong H5N1 AI virus detected in China in 1996. However, H5 AI viruses have evolved, forming different clades and genotypes, a number of which have become established in Viet Nam. Since 2013, new H5 subtypes have emerged, including H5N6, which are the dominant strain in China in 2016 (and have caused some human cases in China since 2014). Viruses of this subtype have also been found in Viet Nam and appear to be displacing earlier H5N1 strains. No human cases associated with this strain have been reported in Viet Nam. Human cases associated with H5N1 AI virus have decreased dramatically since the peak from 2003 to 2005 (Table 2). Much of this is attributed to the enhanced control of these viruses in poultry but some may be due to changes in pathogenicity of recent viruses for humans.¹⁷

Table 2. Human cases of influenza A(H5N1)

2003 - 05	2006 - 09	2010 - 14	2015 - June 2016	Total since 2003
93 (42 fatal)	19 (15 fatal)	15 (7 fatal)	0	127 (64 fatal)

H7N9 viruses emerged in China in 2013 as a cause of severe zoonotic disease associated mainly with live poultry markets. Many more human cases and fatalities have been recorded in China as a result of infection with H7N9 virus than from H5 infection. So far, no cases of H7N9 infection

¹⁷ There have been few human cases of H5 avian influenza due to Clade 2.3.2.1c which has been the dominant strain in the past few years and despite being widespread and poorly controlled in China there have only been 16 cases of Clade 2.3.4.4 Influenza A(H5N6) to end-April 2016, despite circulating for several years. Given the differences in population (both human and avian) between China and Viet Nam the expectation is that there would be few H5N6 human cases in Viet Nam. Scientific studies on Clade 2.3.4.4 viruses demonstrate lower pathogenicity for mammals.

have been detected in Viet Nam (in poultry or humans), but if the virus remains poorly contained in China it will almost certainly enter Viet Nam based on previous experiences with H5 AI viruses.¹⁸ If this virus were to become established locally, it would trigger a major disease emergency and would almost certainly result in human cases if it were not identified soon after it enters the country. Unlike H5 viruses, the H7N9 virus has not been shown to cause clinical disease in infected poultry and detection requires active surveillance.¹⁹ Measures being implemented to prevent smuggling will reduce the risk of introduction to Viet Nam but it is unlikely that all illegal imports of poultry can be prevented as long as price differentials exist across the border between China and Viet Nam for the same product (e.g. day old chicks, spent hens). H5N6 virus, which emerged at about the same time as H7N9, still gained entry to Viet Nam despite the crackdown on smuggling to prevent spread of H7N9.

Other avian influenza virus subtypes have also crossed the species barrier between animals and humans, including H9N2 (present across much of mainland Asia but so far not causing severe disease in humans), H6N6 and H10N8 (both causing a few human deaths in China). H9N2 AI viruses are regarded as important because they were the source of viral genes that are in part responsible for the high virulence of some H5 and H7N9 viruses in humans.

Swine influenza viruses are widespread globally. The 2009 H1N1 swine influenza pandemic demonstrated that a swine influenza virus can cross the barrier to humans and cause a human influenza pandemic (albeit one that in that case was not particularly severe).

Swine influenza viruses in the region, especially in China, are already showing signs of divergence away from human seasonal influenza strains and could once again emerge as a threat to human health as they did in 2009.²⁰ The biology of swine influenza is complex with infection of pigs by human-adapted strains of virus also occurring, thereby adding to the influenza gene pool in swine.²¹ Avian influenza viruses have also been detected in swine on occasions providing opportunities for reassortment between mammalian and avian viruses if two viruses infect the same animal cells simultaneously.

Influenza viruses in other species also need to be monitored. Farmed dogs in China have been found to harbour H3N2 viruses that were derived originally from avian viruses but which have obtained genes from human H1N1 2009 influenza virus. Other reassortant influenza viruses have also been detected in dogs in the Republic of Korea.²²

4.2. Strategic directions

Progressive control of infection and prevention/early detection and response to novel zoonotic influenza viruses with pandemic potential.

¹⁸ It is noteworthy that H5N1 virus was first detected in China in 1996 but the first human cases of disease in Viet Nam did not occur until 7 years later.

¹⁹ H5 AI viruses generally cause disease in infected chickens but infection can occur silently in domestic ducks and in poultry markets. Active surveillance is needed for all avian influenza viruses – passive surveillance systems will not detect a significant proportion of cases.

²⁰ Yang H. Prevalence, genetics, and transmissibility in ferrets of Eurasian avian-like H1N1 swine influenza viruses. *Proc Natl Acad Sci USA*. 2016; 113(2):392-397

²¹ <http://elifesciences.org/content/5/e12217v1>

²² <http://www.ncbi.nlm.nih.gov/pubmed/27138550>

4.3. Achievements in establishing One Health approaches in Viet Nam

The containment of H5N1 highly pathogenic avian influenza in Viet Nam is recognised globally as a One Health success. Despite having more human cases than any other country by the end of 2005, a marked increase in the total poultry population including domestic ducks (from 220 million in 2005 to over 300 million in 2016), as well as conditions that facilitated transmission and persistence of these viruses such as the structure of the poultry industry, Viet Nam succeeded in reducing the number of human cases and the number of avian outbreaks. Containment was achieved through strong leadership from the highest levels of government, strong intersectoral coordination and strong support from donors and international agencies. Viet Nam has modified production and marketing practices in many areas so as to reduce the risk posed by these viruses. Vaccination is still being used as a tool for management of this disease and the vaccination programme is subject to regular reviews.

H5N1 avian influenza was the catalyst for the production of the OPI (Green Book) covering activities from 2006 to 2010. This was followed by the AIPED for the period from 2011 to 2015 which expanded the scope of the programme to other emerging diseases as the importance of One Health approaches to disease management became evident.

Viet Nam has recognised that virus elimination is a longer term objective and one that will only be achieved when the factors that allowed the virus to gain entry and persist change. The threat of resurgence remains given zoonotic avian influenza viruses continue to circulate in Viet Nam and the broader region. Circular 16/2013 also identifies zoonotic influenza as one of the priority zoonotic diseases for which information sharing is required.

Based on experiences, studies and prevention and control efforts over the past decade, Viet Nam also now has a much greater understanding of the biology of H5 AI viruses including much better information on the genetic relationships between strains of virus in and outside of Viet Nam. Maps are being produced that demonstrate the location of outbreaks and these are tied to the clade of virus involved. (see Fig. 3)

4.4. Work underway

AIPED pointed out that Viet Nam was in the consolidation phase for avian influenza control, having gone through a control phase in which emergency responses to outbreak were the main activity (as was the case in 2003-2004 when 45 million poultry were culled or died from the disease). The outbreak control activities have continued during the consolidation phase as required, but outbreaks were generally small and resulted in only relatively few birds being culled.

The goal of the consolidation phase is to maintain the gains made in the control phase, and to reduce further the levels of circulating virus (in part through changes to the manner in which poultry are

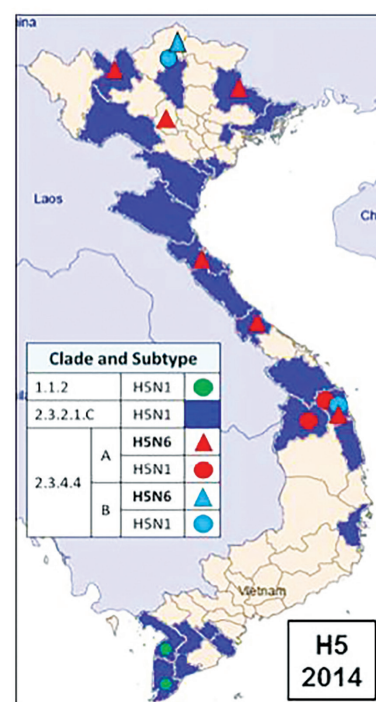


Figure 3. H5 viruses in Viet Nam in 2014 - an example of the genetic information on these viruses (courtesy of FAO Viet Nam)

reared and sold but also from other activities such as vaccination). Certain well managed farms were expected to demonstrate freedom from infection.

The five-year period covered by AIPED resulted in a number of significant changes to some live poultry markets and to farm biosecurity that reduced the risk of infection. During this time many commercial chicken farms have remained free from evidence of infection and disease, as planned.

During the five-year period from 2016 to 2020 it is expected that parts of the country will move to the eradication (elimination) phase. Viet Nam has already made some progress towards virus elimination, with a number of large commercial farms recognised as being and remaining free from H5 virus infection. The number of farms determined to be free from infection or disease will gradually increase, although this will require strengthening of passive surveillance systems so that any increase in mortality on farms is accompanied by submission of samples so that virus, if present, is detected. However, virus is still circulating, especially in the domestic duck population, and this will be more difficult to prevent unless greater controls are placed on the movement of ducks, thereby reducing the risk of onward transmission to other duck flocks and other types of poultry.

So far, moves to produce a better commercial vaccine for ducks have not yielded a suitable product despite considerable global research into this area. A viral vector vaccine based on duck virus enteritis was expected to be available by 2015 but has still not been used widely in China. Nevertheless, vaccination remains one of the measures used to reduce viral shedding by ducks.

The eradication phase is costly because of the increased surveillance requirements to ensure freedom,²³ the increased costs associated with culling any infected flocks (regardless of whether they are showing signs of disease) and the cost of stringent movement controls. It will only be successful in places where there is relatively low heterogeneity in the poultry sector and is facilitated by centralised slaughtering of poultry rather than sale through traders and markets.

Planned activities are laid out in the action plan for H5 avian influenza in the poultry sector for the period from 2014 to 2018. This plan recognises that provinces have different risk factors for and prevalence of H5 avian influenza (based on findings from active surveillance in markets and reports of disease through passive surveillance systems).

At any point in time, provinces in Viet Nam fall within one of three categories:

- High risk - outbreaks detected in the past two years and/or high levels of virus contamination detected via active surveillance. This covers most of the provinces in the Red River and Mekong Deltas
- Low risk - no outbreaks reported for two years, some infection detected in active surveillance. This covers a number of provinces in the central and northern parts of Viet Nam
- Temporarily disease free - where outbreaks have not been reported for 5 years and active surveillance finds no or only occasional virus. This describes a number of provinces including some in the south east region and the central coast.

The status of provinces will change over time as a result of increased/decreased rates of detection

²³ When an exporting country makes a claim of disease freedom based on surveillance results, importing partners must have confidence that the claim is valid and that the surveillance has been carried out in such a way as to meet certain basic requirements. (Cameron 2012). This means that the demands for surveillance for disease freedom are usually greater than routine surveillance.

of virus and/or outbreaks of disease attributed to H5 virus. The five-year goal is to reduce the number of provinces categorised as high-risk. By 2018, Viet Nam is also aiming to establish disease free zone(s) in the south-eastern region, a site of marked increase in intensive poultry production in the period from 2010 to today. When the 2014-2018 plan was produced, these provinces were already regarded as being either free from infection or had limited evidence of infection; however several provinces in this area experienced outbreaks in 2014 and again in 2015-2016. Therefore, it is unlikely that zonal freedom from the virus will occur until at least 2020.

The proposed free zone also includes Ho Chi Minh City, which responded aggressively and (largely) successfully to the H5 AI problem when it emerged by closing urban live poultry markets and shifting to sale of chilled poultry from centralised slaughter facilities.

Development of this infection-free zone will need to be supported by strict control measures on poultry production, marketing and movements in the free regions and an appropriate combination of active and passive surveillance providing a high degree of confidence in claims regarding freedom from infection. The first step in this process is to ensure that development of a disease free zone is feasible and whether the resources needed to support it are available. This is only likely if the formation of a disease free zone provides access to lucrative export markets.

Other elements of the poultry sector plan include on-going vaccination (focusing on ducks), which remains one of the largest costs of the programme, rapid response to disease outbreaks, continuing communication campaigns, and enhanced biosecurity measures. If monitoring and evaluation show that the situation is not improving as expected, it will be possible to reassess whether changes in the approach are needed. The effectiveness of vaccination programmes will need to be assessed (i.e. the extent to which they are reducing viral loads), especially given the large amount spent on this aspect, building on results from earlier studies including USAID's GETS project. This is not currently included in the existing surveillance programme.

On the **human health** side, all suspected cases of avian influenza will be tested and managed according to appropriate, standardised infection control procedures. MOH will inform MARD of the case and field investigations will be conducted to determine the source of infection, to assess whether other cases have gone undiagnosed and to ensure that onward transmission is not occurring (at present onward transmission of zoonotic avian influenza viruses in humans occurs sporadically and chains of transmission rarely extend beyond one generation). Investigations will be conducted as joint investigations where this avoids duplication and is cost effective.

H7N9 - Plans for H7N9 avian influenza have also been prepared that cover scenarios ranging from no local infection to avian and human cases. Once human cases occur it is expected that this will be regarded as a disease emergency and will be managed accordingly (see focus area 2). At present the virus has not been detected and surveillance activities will continue in areas identified as being at high risk of introduction of the virus (mainly in northern provinces). If H7N9 were to occur it is likely that it would involve live poultry markets (as seen in China).

Swine influenza - Some work has already been conducted through the EPT+ program to detect and characterise swine influenza viruses. This work will continue.

4.5. Alignment with existing strategies

In 2010 ASEAN released an ambitious plan for elimination of H5N1 (and related) avian influenza from the region by 2020. Elimination by 2020 from ASEAN is a challenging target, but improvements

are occurring in disease control that will bring some countries, including Viet Nam, closer to this goal. The reality is that these viruses are likely to be present for at least another 10 to 15 years or longer unless there are major changes to the virus or in production and marketing systems and if neighbouring countries also managed to control the disease. Three key factors in the persistence of the virus are the smuggling of poultry from endemically infected countries; a large population of free-running ducks vaccinated with products that do not necessarily prevent virus shedding (if a vaccinated duck is subsequently infected)²⁴; and poorly controlled movement and sale of poultry. At present there are too many niches where this virus can survive, including sufficient avian host species.

The cost of a countrywide virus elimination programme would likely be over USD 100 million,²⁵ with no guarantee of long term success. Even if it were possible to eliminate H5 virus from Viet Nam the risk of reinfection would remain very high. Changes are occurring in the poultry sector in Viet Nam but there are still hundreds of millions of poultry reared and sold under conditions of relatively weak biosecurity. It is possible for well managed farms to remain free from infection and it may be possible to develop disease free zones with an effective approach.

The ASEAN H5 plan has seven strategic goals, all of which are included in activities to control H5 AI in Viet Nam:

1. Strengthening Veterinary Services for capacity development to prevent, control and eradicate animal diseases of economic and public health importance.
2. Achievement of disease-free status in progressive manner at compartment, zone, region and country levels.
3. Effective reduction of circulating HPAI virus in the environment leading to its progressive control and eradication.
4. Effective and rapid containment of infections and outbreaks in affected flocks or zones.
5. Effective surveillance capacity to detect and respond appropriately to the presence of H5N1 virus infection and other disease threats.
6. Sustainable market chain policies and intervention in reducing risks of spreading and contamination to poultry and human populations.
7. Enhancing and promoting biosecurity as a long term cost effective preventive measure to keep HPAI virus out of farms/flocks.

4.6. Key factors for success

Viet Nam has a long history of dealing with zoonotic influenza and has learnt many lessons on how to minimise the risk of transmission to humans. Among the key factors needed for success are buy-in from all stakeholders to any new measure; the importance of recognising and gradually addressing constraints to virus elimination or control and enhancing the quality of support services, including veterinary services to the poultry sector.

²⁴ This can occur with ducks given one dose of vaccine

²⁵ The current plan for 5 years - which will not achieve freedom - is costed at \$38 million. To achieve freedom while the current production systems are in place would require a major test and slaughter programme for duck flocks that could result in the destruction of 20 to 30 million head of ducks and other poultry.

4.7. Challenges & constraints

- Effectiveness of vaccination and vaccination programme in ducks

The AIPED pointed out that one of the main constraints to effective control of H5 HPAI is that existing duck vaccines, although able to reduce shedding and to protect ducks from disease, were still imperfect. One of the cornerstones of control of the disease in Viet Nam is the vaccination of ducks, aimed at reducing shedding of virus by these birds. This strategy is sound provided the effectiveness of the vaccination matches that of laboratory studies.

Further work is still needed to determine the extent to which the existing vaccination programme is reducing viral shedding. The current programme relies on a single dose given to birds every 6 months (although there is variation in the field). Surveillance from markets suggest that a considerable number of ducks are still shedding virus (although the vaccination status of these birds is not always known) indicating that more work is required to ensure vaccination is achieving the expected result. Changes in the antigenic characteristics of viruses as new strains become established also make vaccination harder to apply. Studies to assess the effectiveness of vaccination need to be continued and will require support from donors.

- Illegal movements will be difficult to eliminate

Long land borders and cross-border price differentials make it difficult to prevent all smuggling. The risk of a new strain of zoonotic avian influenza virus being introduced to Viet Nam is still high, including the risk of H7N9 introduction.

In Viet Nam the movement of large consignments of poultry can be managed better through check points at farms and at the final destination as well as sealing of consignments, but small volumes of poultry transported by motor cycle are much harder to regulate and control. Experiences with Clade 2.3.2.1c and Clade 2.3.4.4 viruses demonstrate that viruses can move from the north to the south of the country (which was not a feature when the AIPED was prepared). If disease-free zones are to be developed it will be essential to prevent the uncontrolled movement of poultry into and through the zones.

- Wild birds could potentially carry virus into Viet Nam or into disease free zones

It is considered highly likely that most H5 AI viruses in the past were introduced and spread within the country through trade in poultry, however the close association between wild birds and domestic poultry in places where birds are not confined allows for potential transfer between the two. In other parts of the world wild birds have played an important role in introduction of virus (e.g. South Korea).

- Few incentives to acquire status as being free from avian influenza

Unless there are sound commercial reasons for establishing disease free zones, such as development of export markets for certain products (e.g. duck meat), then it may be difficult to convince provinces to invest the necessary resources to maintain freedom from infection within the zone.

- Difficulties of detecting H5 avian influenza infection in infected duck flocks or vaccinated chicken flocks

Active surveillance in markets shows that some otherwise healthy birds sent to market are infected. The absence of clinical signs in many infected ducks means that intensive active surveillance is required to assess the status of infection on farms and to verify infection status in provinces aiming for freedom from disease. Experiences from earlier projects (e.g. GETS) suggest that it is easier to

detect virus in markets than it is in farms. Even when sentinel ducks were being monitored on farms few positive results were obtained when using virus isolation.

- The need for active surveillance to detect infection (H5 and H7N9 viruses) and the cost associated with collection and testing of samples

Surveillance is expensive and this limits the number of samples that can be collected and tested. This has implications for testing to confirm “freedom from infection” especially if using virological testing for this purpose. The number of tests required to have a high degree of confidence of claims to “freedom” will be much higher than that currently being undertaken in these provinces.

The cost of surveillance also has implications for the detection of H7N9 virus. Given the limited number of samples that can be collected and tested it may be possible for the virus to circulate for some time before being identified, complicating efforts to eliminate the virus.

- Quality of veterinary services

Veterinary services still require additional strengthening and resources based on the results from the OIE PVS reviews. All provinces that are aiming for freedom from infection would need to commit sufficient resources to veterinary services to ensure that the standards have been met and followed. If international trade in products is to occur from a zone, then it will be necessary to demonstrate to trading partners that the area is free from infection. Additional resources will be required to meet this requirement.

- The nature of the poultry sector

The poultry sector in Viet Nam is changing with greater intensification and a gradual shift away from live bird sales to centralised slaughtering (especially in the south of the country). There is still a large population of mobile ducks that move through the Mekong Delta, including cross-border movement between Viet Nam and Cambodia, and many millions of households still rear poultry.

- Limited possibilities for pre-emptive action in the event of detection of a potentially pandemic swine influenza virus

Even if a swine influenza virus is found that has characteristics suggesting it might become a human pandemic agent it is doubtful that action will be taken to eliminate the virus given that the virus is likely to be widespread and the uncertainty about the actual (rather than potential) effects. The main response will be production of a pre-pandemic vaccine antigen for humans.

- Buy in from poultry traders to market closures in the event of human or avian H7N9 infections

Control of avian influenza (H7N9) depends on support from market traders who will be required to close market stalls temporarily and in some cases permanently. Traders may not see the importance and value of this measure especially given the short-term costs.

4.8. Targets

The major outcome by 2020 of the national plans as described in the Summary Plan are as follows:

Description	Target
Monitoring programs for avian H5 HPAI and H7N9 (and other) influenza viruses in poultry and other birds, and swine influenza virus in pigs	Regular surveillance in high risk areas and species
Effectiveness of vaccination programs in poultry	Vaccination programs will be reviewed and studied to determine whether vaccination is reducing shedding of virus in vaccinated ducks
Progress towards elimination of H5Nx highly pathogenic avian influenza virus	Necessary work to determine the feasibility of an H5 infection-free zone will be undertaken and, if feasible, measures will be implemented to develop a virus-free zone in the south eastern region
Surveillance of cases of human respiratory illness for novel influenza viruses of animal origin	Human surveillance programs will be reviewed and consolidated

Other important targets include:

- Continue efforts to reduce smuggling of poultry either through enforcement or creating cost-neutral legal trading channels;
- Management of any incursion of H7N9 virus in accordance with contingency plans;
- Better understanding of the range of swine influenza viruses in Viet Nam, including their pandemic potential;
- Investigate all human cases of zoonotic influenza assessing for source and onward transmission;
- Application of the Tripartite risk assessment tool for selected high-risk industries to assess risks and develop risk management plans.

Additional targets from national strategies are listed below.

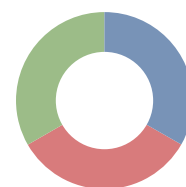
Area	Target
1. Status of provinces	1.1 Annual revision of status (high risk, low risk, interim disease-free) 1.2 Reducing the number of high risk provinces by 80%
2. Surveillance	2.1 Conduct passive surveillance on farms (poultry) 2.2 Conduct passive surveillance in zoos 2.3 Conduct planned active surveillance in markets 2.4 Conduct planned active surveillance on farms in H5 free area (poultry) 2.5 Conduct active surveillance on farms or slaughterhouses for swine influenza virus 2.6 Obtain information on genetic information on all virus isolates 2.7 Obtain information on antigenic characteristics of viruses especially those from fully vaccinated poultry and, as necessary, update vaccine antigens 2.8 Conduct appropriate surveillance to detect zoonotic influenza in humans including close contacts of confirmed cases

<p>3. Outbreak response</p>	<p>3.1 Rapid culling of affected and in contact poultry with payment of compensation</p> <p>3.2 Movement management</p> <p>3.3 Thorough investigation of all outbreaks to determine the source</p> <p>3.4 Reporting to human health authorities of all human cases (this includes reports from clinicians and from laboratories to reduce the chance of missed reports)</p> <p>3.5 Reporting to MARD of suspected and confirmed human cases</p> <p>3.6 Provide appropriate communications to inform the public about risk and ways they can reduce the spread of disease, as well as actions the authorities are taking to protect the public</p>
<p>4. Poultry vaccination</p>	<p>4.1 Mandatory duck vaccination completed in selected provinces</p> <p>4.2 Conduct appropriate post-vaccination monitoring to demonstrate the extent of the response to vaccination in selected provinces</p> <p>4.3 Biennial reviews of results from vaccination to determine whether changes are needed to the programme</p> <p>4.4 Introduction of new vaccine antigens when required</p>
<p>5. Quarantine & movement management</p>	<p>5.1 Restricted movement of poultry from areas where virus exists and especially into disease free areas</p> <p>5.2 Enhanced border controls to minimise smuggling</p>
<p>6. Biosecurity</p>	<p>6.1 All poultry farms with > 2000 head meet biosecurity standards</p> <p>6.2 Enhanced cleaning and disinfection of farms and markets</p>
<p>7. Communications</p>	<p>7.1 Produce appropriate materials to facilitate behavioural change</p> <p>7.2 Share effective strategies/materials across sectors</p>
<p>8. Research</p>	<p>8.1 Conduct relevant research into H5 and other zoonotic influenza viruses to facilitate understanding of their ecology in Viet Nam</p> <p>8.2 Determine the extent of circulation of low pathogenicity H5 viruses</p> <p>8.3 Undertake research on the effectiveness of control measures, especially vaccination</p> <p>8.4 Undertake research into any cases that occur in disease free zones to determine the likely source(s) of the virus</p> <p>8.5 Support sharing of current knowledge among human and animal health providers, researchers, laboratory staff, and industry</p>
<p>9. Human infections</p>	<p>9.1 Test all suspected human cases of AI</p> <p>9.2 Manage suspected and confirmed human cases of AI with appropriate infection control measures</p> <p>9.3 Conduct contact tracing and investigate source of infection</p> <p>9.4 Advise MARD (and other sectors/stakeholders as needed) of human cases of zoonotic influenza (+/- conduct joint field investigation to determine source of infection)</p>
<p>10. Monitoring & evaluation</p>	<p>10.1 Measure progress towards indicators established under specific work plans and targets</p>

4.9. Budget

The minimum funds required for activities related to zoonotic influenza over the next 5 years is estimated at USD 45 million assuming that vaccination of poultry remains a core part of control and prevention. Most of this will be spent in the agriculture sector. The GoV will provide most of the funds with contributions from donors, especially for surveillance activities, and from the private sector (vaccination).

5. One Health approaches for managing rabies



5.1. Background

Rabies is an important zoonotic disease in Viet Nam responsible for 78 recorded human deaths in 2015 (Table 3).²⁶ The majority of cases occur in the north of the country often in remote communities although cases of rabies in dogs were detected in 23 provinces in 2014, including lowland provinces. Disease is more frequent during hot seasons.

Table 3. Reported rabies cases in humans, 2006-2015

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
82	131	91	68	78	110	58	105	67	78

Canine rabies is not a disease with pandemic potential but is of considerable significance regionally with all countries in the region committed to enhanced control and virus elimination. Rabies is also one of five priority zoonoses in Viet Nam.²⁷ It is highly suited to a One Health approach, and provides a practical opportunity to develop effective inter-sectoral coordination and collaboration in Viet Nam. The main cost associated with rabies prevention are the direct and indirect costs of post-exposure prophylaxis for those potentially exposed to a rabid animal with some 400,000 courses administered each year at a cost exceeding USD 100 per course.

5.2. Strategic directions

Elimination of human rabies cases in Viet Nam and the broader region depends on:

- Control of rabies in dogs, coupled with
- Universal post-exposure prophylaxis (PEP) in humans exposed to potentially rabid animals.

Both aspects need to be addressed for sustainable control of the disease. Most human cases in Viet Nam occur as a result of contact with rabid dogs but cats can also play a role. Some cases have occurred via preparation of rabid dogs for food. Other wild mammals can also be infected with rabies virus but are not regarded as an important source of disease for humans. The focus of control should be on dogs (and to a lesser extent cats) but monitoring of other animal populations will continue. Rabies tends to be seasonal so public awareness campaigns need to be targeted to periods of high risk (hotter months).

It is estimated that there are some 8 to 10 million dogs in Viet Nam. Dogs in villages are owned but are allowed to wander during the day. Turnover of dogs is relatively high, which has the potential to affect population immunity once intensive vaccination campaigns are implemented. Most cases of human rabies occur in remote communities.

Control of rabies represents an important area for One Health activities in Viet Nam in the period from 2016-2020 and one for which significant measurable gains are expected to be made.

²⁶ There is a possibility of under-reporting. See: <http://www.who.int/wer/2016/wer9102.pdf>

²⁷ Circular No. 16/2013/TTLT-BYT-BNN dated on 27 May 2013.

5.3. Achievements in establishing One Health approaches in Viet Nam

Already a number of steps have been taken to improve rabies control in Viet Nam but more needs to be done to further reduce the number of cases and eventually eliminate the disease. Human rabies cases, a more accurate indicator than canine cases due to better reporting, has fallen from 400-500 people in the early 1990s to 78 cases in 2015. This reduction in human cases has been achieved through enhanced awareness, some improvements in dog vaccination coverage especially in high-risk provinces, and improved uptake of PEP with some 400,000 courses given each year following dog bites.

Table 4 provides details of activities undertaken on rabies in Viet Nam in the recent past, some of which are on-going.

Table 4. Reported rabies cases in humans, 2006-2015

Activity	Donor	Period	Themes
ASEAN Rabies		2015-2020	Regional strategy (development)
Rabies transmission from neighbouring countries	NAFOSTED	2015-2017	Surveillance, laboratory, research
Standard operating procedures for rabies prevention and response in coordination between Animal and Human Health sectors	FAO	2015-2016	Information sharing, reporting, communications, control, risk reduction
Workshop on rabies 2016-20	FAO, WHO	2015-2016	Reviewing 2016-20 plan ²⁸
Institutional and inter-sectoral strengthening for rabies control	AusAID	2014-2015	Surveillance, control, communications
National Program on rabies prevention & control	GoV	2011-2015	Response, behaviour change, coordination
Highly pathogenic emerging and re-emerging diseases (HPED)	EU	2010-2014	Dog vaccination, risk reduction, communication
Partnership on global animal health & biosecurity	DRAFF	2009-2013	Prevention, risk reduction, communications training

5.4. Work underway

Viet Nam has made a number of commitments internationally and regionally to work towards canine rabies elimination making rabies control one of the most important goals for zoonotic diseases in the period from 2016 to 2020. A 5-year One Health operational plan for rabies control to 2020 (see expected outcomes below) has been drafted. This plan has as its strategic objective the

²⁸ <http://www.fao.org/vietnam/news/detail-events/en/c/409842/>

elimination of human cases by 2020, an ambitious objective that can only be achieved if there is strong commitment from stakeholders at all levels of the plan, including funding commitments for canine vaccination and improved access to PEP in remote communities.

Viet Nam's action plan for rabies control for the period from 2016-2020 adopts a One Health approach and covers all pillars of disease control for MARD and MOH and other involved partners. The goal is to have one overall plan for rabies control and prevention and a single steering committee. The implementation of this plan will include many partners including relevant government departments from central to local level, international agencies/partners, mass organisations, NGOs and the public.

Joint training has been conducted²⁹ and Circular 16/2013 includes rabies as one of the five diseases for which information will be shared and joint investigations conducted.

5.5. Alignment with existing policies & strategies

WHO, OIE and other agencies have singled out rabies as a priority through the global strategic framework for rabies elimination released in 2015. The overall strategic goal of this framework is elimination of human rabies by 2030. The global strategic framework comprises five pillars – sociocultural, technical, organization, political and resources - each of which includes a number of elements. Table 5 summarises these and indicates progress in Viet Nam: (+) areas where there has been good progress; (+/-) areas where some work has been done but where more work is required; (-/+) areas where limited progress has been made; and (-) areas where major action is needed to fulfil requirements.

Table 5. Progress in Viet Nam against the global strategic framework for rabies

Pillars	Elements	Progress in Viet Nam
Socio-cultural (covers a wide range of stakeholders including the general public)	Building awareness	+/-
	Promoting responsible dog ownership	-/+
	Bite prevention and treatment programmes	+/-
	Providing post-exposure prophylaxis	+/-
	Ensure community engagement	-/+
Technical	Need effective human and animal health services (fill the gaps)	-/+
	Vaccination – mass dog vaccination is the most cost effective intervention	+/-
	Logistics – collect data on needs and meet these needs	-/+
	Diagnostics – appropriate lab support	+/-
	Surveillance – support improved systems	+/-
	Technical support	+/-

²⁹ Nguyen KA et al. Knowledge of rabies prevention in Vietnamese public health and animal health workers. Zoonoses Public Health. 2016

Organization	The need for a One Health approach	+
	Promote intersectoral collaboration	+
	Establish good governance	+/-
	Align work plans with national and regional priorities	+
	Coordinate and combine human resources infrastructure and logistics	-/+
	Identify targets and their indicators	+/-
	Monitor and evaluate national plans to ensure cost-effective, timely delivery	-/+
Political	Success depends on political will and support for elimination	+/-
	Encourage request for a resolution through WHO and OIE assemblies on elimination	-
	Establish and enforce appropriate legal frameworks	-/+
	Demonstrate the case for mass dog vaccination	+/-
	Support active national and regional engagement	+
Resources	Elimination spans several years and resources are required for the duration of the campaign	-/+
	Demonstrate the case for investment	+/-
	Prepare business plans based on the global framework	-/+
	Encourage different forms of investment including private sector	-/+

Although the categories used in Viet Nam's integrated plan are not an exact match for the five pillars of the global strategic framework, all elements are present. Viet Nam has also aligned its national plan with the Stepwise Approach to Rabies Control developed by FAO and GARC,³⁰ is the lead country for the ASEAN regional strategy on canine rabies elimination, and, with Indonesia, is also one of the two lead countries for the Zoonotic Diseases Action Package under the GHSA.

5.6. Key factors for success

Key factors identified for success as described in the global strategic framework include:

- Long term political and social commitment.
- Community engagement.
- Sustainable vaccination of 70% of the at-risk dog population (reliant on an accurate dog register).
- Demonstrate that the system works by starting small and working up (e.g. one to two provinces).

³⁰http://caninerabiesblueprint.org/IMG/pdf/stepwise_approach_toward_rabies_elimination_sept_2014.pdf

- Promote vaccine banks and other strategies to ensure sufficient supply of vaccines (human and canine) and immunoglobulin.
- Reaching remote, poor and vulnerable communities.
- Measurement of performance.
- Maintain trained and motivated personnel for implementation.

5.7. Challenges & constraints

The main constraints for rabies control and elimination in Viet Nam include:

- Limited implementation of existing regulations.
- Limited political commitment and funding commitment at provincial levels.
- Difficulty in mobilising funds by provincial sub-departments of Agriculture.
- Ensuring provincial support for the programme which includes buy in by local authorities.
- Limited laboratory capacity for rabies diagnosis (three labs).
- Poor information on dog numbers, non-registration of dogs and allowing dogs to roam freely.
- Low canine vaccination coverage with only a few districts approaching required coverage levels.
- Ensuring sufficient resources to maintain high-level vaccination coverage for a number of years.
- The relatively short life span of dogs in Viet Nam that will rapidly reduce population immunity.
- Illegal imports of unvaccinated dogs from countries with poorly controlled rabies.
- Relatively high awareness about rabies at community level (despite limited outreach and education for dog owners and the general public) that does not convert to appropriate behaviours.
- Low proportion of bites treated with post-exposure prophylaxis which is a function of low community awareness and limited access to PEP.
- Rural and remote communities face particular challenges in accessing rabies post-exposure prophylaxis which is predominantly available in urban areas³¹.

These constraints are linked. The most important constraints relate to ensuring buy in at all levels of the importance of canine virus control and eventual elimination from Viet Nam which, in turn, requires funding for canine vaccination and funds for delivery of PEP at least until the disease is very well controlled in dogs. Rabies vaccination of dogs will be required well beyond the 5-year time frame of this document. A share of the funds will need to be sourced from dog owners to continue this essential control measure beyond 2020 otherwise gains made in control will be lost, especially if neighbouring countries do not control rabies and illegal imports of live dogs from these countries continues to occur.

A review of the program after the first 1-2 years of implementation will identify areas where progress

³¹Nguyen TH (2013). Rabies in Vietnam: Situation, Challenges and Prevention Strategies. Presentation given at the 9th Asian Rabies Expert Bureau Meeting cited in www.who.int/rabies/epidemiology/Rabies_CP_Vietnam_09_2014.pdf

is not being made. Behavioural change programs will need to be carefully monitored and adapted if targets are not being achieved. Ecohealth approaches may be applied, involving local dog owners and other stakeholders, to understand the drivers of existing behaviours and measures that might result in appropriate modifications.

5.8. Targets

The current objective of the Viet Nam national plan as listed in the summary plan is to strive for eliminating human rabies deaths/cases by 2020.³² This is an ambitious target given the challenges in sustaining vaccination coverage among canine populations of over 70% unless there is full commitment from all parties and sufficient funds provided by owners for canine vaccination. In other words, rabies may still be only partially controlled in canine populations by 2020, which will mean continued reliance on PEP and PrEP for disease prevention in humans.

WHO has noted that the costs for post-exposure management account for nearly half of the total costs associated with rabies, so cost savings are only anticipated with sustained vaccination coverage among dogs.³³ However, demand for PEP is unlikely to fall until there is confidence in rabies control measures in dogs, including evidence of very low prevalence, specific information on the vaccination status of dogs that bite and measures in place to monitor dogs that bite, as well as high levels of PrEP in high-risk communities. In addition, because many of the rabid dog cases occur in remote communities not all people bitten by a potentially rabid dog will choose to receive PEP and not all potential rabid dogs will be identified.

The principal targets outlined in the Summary Plan are as follows:

Description	Target
Increased canine vaccination	Support for vaccination campaigns at provincial and district level so that levels of vaccination coverage are maintained above 70%
Responsible dog ownership	Behavioural change communications to reduce the number of free wandering dogs and to increase vaccination uptake and dog registration
Post-exposure prophylaxis (PEP) for all humans bitten by a dog (or other mammal) that could have rabies	Introduction of district treatment centres to all high risk areas to reduce the need for travel for those requiring PEP
Pre-exposure prophylaxis (PrEP) for high risk groups including dog vaccinators, dog handlers and where necessary children in high risk areas	Identification of high risk groups and implementation of a vaccination program
Improved capacity to diagnose rabies	Establishment/maintenance of quality assured testing capacity for rabies in humans and animals

³² By 2017, it may be necessary to review and revise this goal perhaps to aim for no human cases in a smaller number of high risk provinces in which pilot programmes are well implemented with strong provincial and district support, and to revert to the strategic vision of the OIE/WHO global framework of year 2030 for no human cases. It is noteworthy that Thailand, despite its marked reduction in canine rabies cases over the past 10 years, is yet to achieve the target of no human cases.

³³ Rabies vaccines: WHO position paper. Weekly epidemiological record. No. 32, 2010, 85, 309–320

Other specific targets are, that by 2020:

- 70% of communes manage dog populations (through implementation of dog population management and responsible dog ownership programs);
- At least 70% of dogs are vaccinated at communal level;
- 70% of provinces report no rabies cases in animals;
- 20% decrease in human rabies cases annually (best measured using 3 year rolling averages).

5.9. Budget

The minimum funding required for rabies control programs in Viet Nam over the next 5 years is approximately USD 24.8 million. This does not include the costs borne by the private sector (PEP for those bitten by potentially rabid dogs and payment for dog vaccination by dog owners which is estimated to be in the order of USD 40-45 million per annum). Funds from ADB may be available to support supplementary activities such as PrEP in children in high-risk border areas.

A breakdown of budget by area is presented below:

Area	Estimated minimum funds for 5 years
One Health approaches (including relevant meetings at local level)	\$2,250,000 [GoV]
Information and communications	\$1,860,000 [GoV]
Technical training	\$1,340,000 [GoV]
Improved dog population management	\$11,600,000 [GoV]
Strengthening Border controls	\$225,000 [GoV]
Vaccines for humans and animals (high risk occupations and poor communities)	\$3,800,000 [GoV]
Understanding the epidemiology of rabies	\$1,440,000 [GoV]
Strengthen laboratory capacity	\$707,000 [GoV]
Diagnosis and treatment of human cases	\$23,000 [GoV]
Scientific research into rabies	\$1,500,000 [Donors]
Developing policy and legislation	\$150,000 [GoV]

6. One Health approaches to managing antimicrobial resistance



6.1. Background

Antimicrobial resistance (AMR)³⁴ is a growing concern globally³⁵ with Asia acknowledged as an “epicentre of antimicrobial resistance”.³⁶ Some of the highest rates of hospital and community-acquired resistant infections in Asia have been reported in Viet Nam.³⁷ A paper published in 2013 from Viet Nam suggests that:

*“Antimicrobial resistance may represent the greatest global threat by an Emerging Infectious Disease issue. Its insidious nature may not have the cachet of SARS, pandemic influenza or Ebola but its impact on public health is likely to be far greater. Like other Emerging Infectious Diseases, drug resistance can quickly spread from one country to another and hence the need for concerted national and international action.”*³⁸

Antimicrobial resistance can arise in any place where there is poorly controlled use of antimicrobial drugs. Management and containment of this problem requires action in human and animal health and environmental sectors to reduce the number of untreatable bacterial infections that now occur both in and out of hospitals and the high levels of resistance in bacteria in animals, especially in livestock farms and aquaculture. Environmental dimensions are also important given the presence of antimicrobial drugs and resistant organisms in human and animal waste-water. In addition, many of the same principles of managing AMR can be applied to stewardship of treatments for other infectious diseases such as malaria, viruses and fungi.

6.2. Strategic directions

The strategic direction for AMR can be summarised as “use less antimicrobials and use them wisely”.

Human actions in health care, livestock production, environmental health and other related areas can either limit or accelerate the development of drug resistant bacteria. Reductions in AMR depend on improved and controlled use of existing drugs through better practices. Infection prevention through enhanced infection control in health care settings and biosecurity/preventive measures on farms and other places where animals are kept are also core components of the response to AMR.

The overall objective of the Viet Nam antimicrobial action plan to 2020 is to promote prevention of drug resistance so as to ensure effective treatments for humans are available³⁹ - “No action today, no cure tomorrow”.

³⁴ The broad term antimicrobial resistance is used in this document to cover changes in resistance patterns in all classes of micro-organisms to drugs used in treatment and prevention. However, the main focus for the One Health approach is resistance in bacteria.

³⁵ See <http://www.princeton.edu/pei/news/S1473309913703189-main.pdf>

³⁶ Kang C-I, Song J-H. Antimicrobial Resistance in Asia: Current Epidemiology and Clinical Implications. *Infection & Chemotherapy*. 2013; 45(1):22-31. doi:10.3947/ic.2013.45.1.22.

³⁷ Kim SH, et al. Changing Trends in Antimicrobial Resistance and Serotypes of *Streptococcus pneumoniae* Isolates in Asian Countries: an Asian Network for Surveillance of Resistant Pathogens (ANSORP) Study. *Antimicrobial Agents and Chemotherapy*. 2012; 56(3):1418-1426. doi:10.1128/AAC.05658-11.

³⁸ Nguyen et al. Antibiotic use and resistance in emerging economies: a situation analysis for Viet Nam. *BMC Public Health*. 2013 13:1158

³⁹ It is also important to have appropriate drugs available for animals.

6.3. Achievements in establishing One Health approaches in Viet Nam

The major achievements include:

- National, regional and international recognition of the magnitude of the problem and the need to manage and prevent AMR across sectors (MOH, MARD, MOIT, MONRE, WHO, FAO, US-CDC, OUCRU).
- Compilation of initial data on the extent of antimicrobial resistance in the animal and human health sectors and factors likely to be associated with AMR particularly through The Asian Network for Surveillance of Resistant Pathogens (ANSORP).
- Development of a national action plan (Decision No. 2174/QĐ-BYT, dated June 21, 2013).
- Official guidance on the management of the use of antibiotics in hospitals (Decision No. 772/QĐ-BYT dated March 04, 2016 of the Ministry of Health).
- Establishment of an antibiotic stewardship program in 16 hospitals via the Viet Nam Resistance Project (VINARES) that monitors resistance patterns for hospital acquired infections in intensive care units, tracks antibiotic consumption, and institutes microbiological analyses to guide empiric and specific treatment.
- Establishing the National Hospital of Tropical Diseases as the national reference laboratory for AMR and the national reference hospital for antimicrobial stewardship.
- Participation in global and regional networks including the Global Antibiotic Resistance Partnership (GARP) which is supporting the establishment of a national reference laboratory for AMR and the implementation of the national action plan for AMR, and the Tokyo Meeting of Health Ministers on Antimicrobial Resistance (April 2016).

Other activities have been conducted including regional work by FAO supported by USAID⁴⁰ to understand and document AM use and AMR in livestock production industry, enhance awareness, promote AM stewardship and strengthen capacity in surveillance of AMR and residues in livestock. A network of laboratories is being established to provide AMR surveillance data. Studies on AM use have also been conducted by CIRAD. Other activities from the One Health matrix (Appendix 1) include:

- APEIR-AMR, IDRC, 2013-2015;
- Environmental and food reservoirs of AMR organisms, Vllir, 2013-15;
- Molecular epidemiology of AMR Salmonella/Campylobacter, NAFOSTED, 2012-15.

6.4. Work underway

An integrated effort across a wide range of sectors is required to address AMR. In 2013 Viet Nam became the first country in WHO's Western Pacific Region to approve a national action plan to combat Drug Resistance. An aide-memoire signed in June 2015 commits the Ministry of Health, Ministry of Agriculture and Rural Development, Ministry of Trade and Industry and Ministry of Natural Resources and Environment to coordinate and jointly implement the national action plan.

The plan requires the formation of an inter-ministerial steering committee chaired by the Minister of Health with five subcommittees covering infection control; treatment; monitoring and inspection of use of AM in health facilities and communities and in farming; logistics; and education and communication. This committee will be required to coordinate with other related national coordination mechanisms related to One Health and the GHSA.

⁴⁰ Antimicrobial Resistance (AMR) project (OSRO/RAS/502/USA)

Viet Nam's AMR action plan contains 6 sub-objectives described below (Table 6). Provided there is buy-in and support from all involved parties, significant improvements can be made in the way antimicrobial drugs are used within the next 5 years as defined by a number of measurable and meaningful outcomes. Additional information on the extent of the problem is not needed before action is taken - sufficient information is already available to demonstrate there is a problem - although on-going measurement of the extent of the problem should continue as described in sub-objective 2 (AMR patterns in various organisms, and patterns of use in humans and animals).

The first 5 sub-objectives of the AMR action plan are mainly within the remit of the Ministry of Health (MOH), however, key elements of some of these sub-objectives also involve the agriculture sector (for example, surveillance systems on the use of antibiotics and the development of drug resistance). The 6th sub-objective focuses explicitly on antibiotic use in livestock, poultry, aquaculture and cultivation, under the responsibility of MARD.

Table 6. Sub-objectives of the Viet Nam national AMR action plan

Sub-objective	Description
1. Raise awareness of antimicrobial resistance among the community and health workers	This important area requires a good understanding of the drivers of existing behaviours. As has been shown with other One Health issues, raising awareness is important but if it does not result in behavioural change then it will not achieve the desired goal. For example, a number of antibiotics cannot be used legally in livestock in Viet Nam yet their use continues, suggesting that farmers see benefits in using these drugs and few disincentives from doing so. This sub-objective also applies to farmers, veterinarians and veterinary paraprofessionals.
2. Strengthen national surveillance systems on the use of antibiotics and drug resistance	On-going monitoring needs to be funded. Laboratories currently undertaking this work and those planning to undertake this work need to maintain their capacity to perform the necessary testing using appropriate quality management programmes. In the animal health area, capacity is needed to test for AM in feed, wastewater and tissues as well as for determining resistance patterns of key organisms. Diagnostic services assist in determining whether diseases in animals can be controlled by other means such as vaccination. While it is important to continue (and enhance) surveillance, sufficient evidence is already available to recognise that there is an urgent problem requiring immediate action through behaviour change to reduce demand, enforcement mechanisms to limit poor practices, and supply side measures
3. Ensure adequate supplies of quality medicines to meet the needs of people	This applies to both human and animal health. If antimicrobial resistance increases, then it will become more difficult to achieve this goal. It has already been reported that the cost of antimicrobial treatments in hospitals is increasing as more expensive drugs are required to replace those that are no longer effective in treating infections. ⁴¹

⁴¹ Nguyen et al. Antibiotic use and resistance in emerging economies: a situation analysis for Viet Nam. BMC Public Health. 2013 13:1158

4. Promote proper safe use of drugs	All hospitals are expected to have antimicrobial stewardship programs and the proper use of antibiotics in the community is expected to improve. A review of prescribing practices in Viet Nam has led to an urgent call for change. ⁴²
5. Promote infection control	Infection control/prevention in hospitals and on farms are both recognised as important elements for reducing the need for antimicrobial drugs and the spread of drug resistant organisms. While some investment is necessary to ensure infection control/farm biosecurity measures are in place, the main outcome is changes in behaviour (e.g. hand hygiene, following approved procedures, good animal husbandry practices, etc.). Over time, the savings from these measures are expected to offset their costs. Vaccination can also be used to prevent many diseases and reduce the need for antimicrobials, and will be promoted.
6. Promote proper, safe antibiotic use in livestock, poultry, aquaculture and cultivation	<p>Assessments of farming practices in Viet Nam has already shown that much work needs to be done in changing the behaviour of farmers in the way they use antibiotics. These drugs are freely available, and mostly used as empirical treatments without submission of samples for diagnostic tests.</p> <p>In many ways, it will be harder to change patterns of antimicrobial use in animals than in humans. A significant proportion of antimicrobial drugs for humans are used in hospitals where it is (relatively) easier to implement programmes on antimicrobial stewardship. Animals are reared on millions of separate farms and many para-veterinarians rely on antimicrobial drug sales as an important part of their income.</p> <p>During the next 5 years, the use of antibiotics in animals that are critical for treatment of human infections will be assessed. For example, Circular No.06/2016/TT-BNNPTNT dated May 31, 2016 from MARD defines the list of antibiotics that can be used in animal feed for growth promotion and their maximum concentrations. It applies until December 31, 2017. Review at that time provides an opportunity to modify the list of drugs that can be used for this purpose and also allows for consideration of any adverse consequences of proposed changes, such as increased use for therapy or disease control. The overall goal is to ensure proper use of antibiotics in animals and to improve controls on antibiotics that are critical for human use.</p> <p>One of the major drivers of improved use of antimicrobial drugs in aquaculture and strengthened enforcement programs has been the requirements of importing countries, rather than produce for local consumption.</p> <p>Resistance to viral infections has also been reported in some parts of the world as a result of illegal use of antiviral drugs in livestock. This area also needs to be examined in Viet Nam to ensure these drugs are not being used.</p>

Support for work on AMR will be provided during the next 5 years from a number of sources including the government, through the GHSA, and other initiatives including the Global Antibiotic Resistance Partnership (as well as disease-specific initiatives such as for tuberculosis, HIV and malaria that fall outside the scope of this plan). The overall goals are to reduce the quantities of antimicrobials used, establish appropriate systems of antimicrobial stewardship, and limit the use in animals of critically important antimicrobials for humans.

⁴² See [Nguyen et al 2013](#)

Resources are not the major constraint to improve use of antimicrobials. As stated elsewhere, it is possible for measures to tackle AMR to be cost neutral.⁴³ Most of the improvements will come from behavioural and system changes. However these changes need full buy-in to the solutions from the highest level of government, in hospitals, in local clinics, pharmacies and veterinary supply stores as well as from the general public and farmers. The experiences with laws and enforcement of laws on motorcycle helmets in Viet Nam provide lessons for programmes on antimicrobial use.

The problem of antimicrobial use in animals is compounded by an absence of a proper identification system for livestock. If an animal is found in a slaughterhouse to have been treated with an illegal antibiotic (through residue testing) it is not possible to trace this back to the farm of origin. Given the importance of livestock tracing for food safety, systems of animal identification will be assessed and, if feasible, implementation will commence by 2020 (see Section 7.10).

6.5. Alignment with existing policies & strategies

WHO has developed a global action plan for antimicrobial resistance, endorsed at the 2015 World Health Assembly, with five objectives:

1. To improve awareness and understanding of antimicrobial resistance through effective communication, education and training;
2. To strengthen the knowledge and evidence base through surveillance and research;
3. To reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures; to optimise the use of antimicrobial medicines in human and animal health;
4. To develop the economic case for sustainable investment that takes account of the needs of all countries, and
5. To increase investment in new medicines, diagnostic tools, vaccines and other interventions.

The WHO action plan highlights *“the need for an effective “one health” approach involving coordination among numerous international sectors and actors, including human and veterinary medicine, agriculture, finance, environment, and well-informed consumers. The action plan recognises and addresses both the variable resources nations have to combat antimicrobial resistance and the economic factors that discourage the development of replacement products by the pharmaceutical industry.”*

One Health approaches are required because of the need for intersectoral collaboration, because misuse in one sector (e.g. livestock farming) can potentially affect others (e.g. human health) and also because of the considerable behavioural change that will be required to reduce the misuse of these drugs. A One Health approach is needed to protect existing antimicrobials especially given that resistance between bacteria can be transmissible and resistant bacteria in one species can transfer to other species through the environment or food chain. Already the global nature of this problem is evident with certain resistant strains of bacteria being detected in multiple locations around the globe, reviewed in detail elsewhere.

Levels of use of antimicrobials in hospitals are much higher in Viet Nam than in European countries (defined doses per bed day) and resistance in a range of organisms in both animal and human pathogens has already been demonstrated including resistance to third and fourth generation cephalosporins and fluoroquinolones and carbapenem. Recent discoveries of colistin-resistance in carbapenem-resistant enterobacteria in a number of countries mean that suitable drugs are not available for treatment of infections with these organisms.

⁴³ Nguyen et al. Antibiotic use and resistance in emerging economies: a situation analysis for Viet Nam. BMC Public Health. 2013 13:1158

A regional plan⁴⁴ has also been developed that promotes three priority areas:

1. Strengthen development and implementation of comprehensive national plans to contain AMR and raise awareness in multiple sectors.
2. Improve surveillance of AMR and monitoring of antimicrobial use.
3. Strengthen health system capacity to contain AMR.

Under each of these priority areas a number of steps and indicators are provided, with most of the indicators being qualitative.

The Viet Nam national plan contains all of the elements of the global and regional WHO plans. MOH is the lead agency on human health and use of AM in health care settings with a large number of departments responsible for implementing specific components of the national action plan. MARD is the lead agency for use of AM in animal production and aquaculture and horticulture.

6.6. Key factors for success

Behavioural change is key to progress in dealing with AMR. The entire population of Viet Nam is a stakeholder on this issue but special attention needs to focus on those using and prescribing the majority of antimicrobials. This occurs in health care settings and farms. Information is also needed on the quantities and types of antimicrobials being used so that changes in patterns of usage over time can be measured.

6.7. Challenges & constraints

The challenges and constraints are well recognised and have been well described, as the following selected extracts from Nguyen et al 2013 demonstrate.⁴⁵

“Patients, physicians, veterinarians, clinics and hospitals, and retailers – from large pharmacies to local drug sellers – have little motivation to weigh the negative impact of their antibiotic use on others, especially those in the future. Policy solutions must alter incentives for patients, physicians and others in the healthcare system to act in society’s best interests.”

Many of the laws and processes necessary for sound regulation of the quality and use of drugs have been defined but remain inadequately implemented. Enforcement is still weak and has not achieved its intended objective. This will be an area of development in the next 5 years.

“There are many barriers preventing effective enforcement of regulations designed to improve antimicrobial stewardship in developing countries: insufficient funding and lack of expertise, human resources and financial incentives. It is important to foresee possible negative consequences of enforcement: financial losses and reduced healthcare access. Accounting for this will improve policy implementation in these settings. Furthermore, it is important to know where to focus regulatory efforts: a focal point too far downstream may create targets too numerous or dispersed for enforcement to be feasible.”

From a One Health perspective, there is also a challenge in ensuring the full integration of human health, livestock production and environmental health aspects of AMR prevention and control within the overall national approach.

⁴⁴ http://www.wpro.who.int/entity/drug_resistance/documents/action_agenda.pdf?ua=1

⁴⁵ See the Table 2 in [Nguyen et al 2013](#) to have more information on constraints.

6.8. Targets

Activities will be conducted in each of the areas in the national action plan and as a result improvements are expected under each of the six sub-objectives (below) as described in the Summary Plan. A multitude of existing policies and processes provide a ready operational framework for implementation of the national action plan. Indicators for these are being developed.

6 sub-objectives of national action plan	Target
Reduced use of antibiotics in animals including improved controls on antibiotics critical for human use	Assess likely effectiveness and feasibility of bans on the use of medically important antibacterial agents for growth promotion in livestock and drugs critical for human treatment. Where feasible, introduce and enforce bans and require purchase by prescription only
Reduced and improved use of antibiotics in humans	Widespread implementation of antibiotic stewardship programs and behavioural change campaigns for the public
Improved data on antimicrobial use and antimicrobial resistance	Relevant information collected following the GHSA Roadmap
Improved infection control and prevention (IPC) programs in hospitals	Widespread implementation of IPC programs in hospitals
Enhanced laboratory capacity for testing for AMR using quality assured programs	Fund existing and new AMR testing laboratories
Reduced environmental contamination with antibiotics	Reduced use of AM compounds in farms and animals, and improved waste disposal

On the human health side and indicative of the establishment of health care processes for regulating the quality and use of antibiotics, tracking AMR infections and preventing in-hospital infections, the following outcomes are anticipated by 2020:

- Defined measure(s) to track antibiotic consumption and prescribing in tertiary hospitals. For example:
 - A 50% reduction in the number of defined daily doses/100 bed-days will have been achieved from current levels. Estimates in the national action plan suggest that antimicrobial use in Vietnamese hospitals is around five times that of similar sized facilities in Europe.
 - A 75% reduction in inappropriate post-operative antibiotic prophylaxis regimens.
- Defined measure(s) to track the effectiveness of infection control procedures in tertiary hospitals. For example, a 50% percent reduction in hospital-acquired infections in intensive care units with resistant organisms will be recorded as a result of changes in behaviour and improved infection control. (Current estimates suggest that one in four ICU patients are infected with a hospital-acquired infection and the systems for monitoring this have already been established in large hospitals through the VINARES project.)

- Established national laboratory network of 18+ laboratories with ISO 15189 compliance and accreditation for AMR surveillance

Under the six components of the national action plan the following targets have also been set:

Component	Targets
1. Raise awareness	1.1. Compile documents for training 1.2. Develop IEC materials 1.3. Organise communications activities 1.4. Assess knowledge of the community about AMR
2. Surveillance system	2.1. Building appropriate laboratories including reference laboratories for animal health - National Center for Veterinary Hygiene and Inspection – and human health – The National Hospital for Tropical Diseases 2.2. Quality management systems for laboratories (30 + labs) 2.3. Establish surveillance systems 2.4. Curriculum development for tertiary institutes 2.5. Continuing education for clinical microbiology lab staff 2.6. Develop cooperative programs with overseas institutions 2.7. Develop a database of antibiotic use and antibiotic resistance (human and animal)
3. Supply quality drugs	3.1. Update documents listing essential medicines 3.2. Invest in production/supply of quality drugs at reasonable prices 3.3. Implement management systems for ensuring drug quality
4. Safe use of drugs in humans	4.1. Develop documents regulating rational antibiotic treatment 4.2. Conduct training on good prescribing practice and pharmacy practice 4.3. Improve capacity of Council of Drugs and Treatment 4.4. Monitor and supervise safe use of drugs (as per 2.7) 4.5. Develop and use training material on clinical pharmacy practice
5. Strengthen infection control	5.1. Improve documents on infection control 5.2. Provide continuing education on and monitor infection control 5.3. Promote monitoring system for infection control 5.4. Enhance farm biosecurity measures and promote GAHP
6. Safe use of drugs in animals (livestock, poultry, aquaculture)	6.1. Develop manuals on prescribing and use of antibiotics in animals 6.2. Develop a list of permitted antibiotics for animals 6.3. Prescribe and enforce residue limits 6.4. Establish monitoring systems for appropriate use of antibiotics (as per 2.7) 6.5. Enhance control on discharge from farms that will contain AM and resistant bacteria (MONRE)

6.9. Budget

The minimum funds required for work on AMR using One Health approaches over the next 5 years is estimated to be in the order of USD 20 million. Funding is expected to come from government, the GHSA funding envelope, ADB and other partners. Budgets for individual components are being developed under the GHSA Roadmap.

7. One Health approaches for managing other zoonotic diseases



7.1. Background

A wide range of other zoonotic diseases occurs in Viet Nam. *Streptococcus suis*, leptospirosis and anthrax are included in Inter-ministerial Circular 16/2013 (along with avian influenza (H5) and rabies). A One Health perspective can help reduce the burden of illness from these diseases. The main diseases are listed in Table 7.

Table 7. Priority zoonotic diseases as defined by the Government of Viet Nam

Priority zoonosis	Comments
Anthrax	Circular 16 disease Localised outbreaks associated with consumption of animals that died from anthrax
Brucellosis	Need to monitor given high levels in region, expansion of dairy sector and high volume of trade in live cattle with neighbouring countries.
Leptospirosis	Circular 16 disease No evident occupational risk but higher risk in rural communities. High prevalence of exposure in rats in southern Viet Nam.
<i>Streptococcus suis</i>	Circular 16 disease Some disease due to occupational exposure, consumption of raw pork or pig blood, but some with no known exposure to pork ⁴⁶
Other	A range of other zoonotic agents occur or have occurred and could re-emerge. Most are associated with individual cases of disease rather than outbreaks

Streptococcus suis causes meningitis and, occasionally, streptococcal toxic shock in humans. It is carried by many healthy pigs, though can also cause severe disease in pigs including septicaemia, meningitis and endocarditis. Most human cases are associated with butchering of pigs or pig meat and also with consumption of raw or undercooked pork products, including raw pig blood.⁴⁷ A possible association between Porcine Reproductive and Respiratory Syndrome (PRRS) outbreaks in pigs and increased human cases of disease caused by *Streptococcus suis* has been reported in Viet Nam.⁴⁸ This association suggests that control of non-zoonotic epidemic diseases of swine may help to prevent zoonotic diseases. Local research has demonstrated the difficulties in changing attitudes and practices towards consumption of raw pig blood through behavioural change communication and regulation.⁴⁹ Nevertheless, there is a need to continue developing appropriate information for school curricula on the risk of infectious diseases (*Streptococcus suis* and other food-borne pathogens) with consumption of raw pork and pork blood including consumption of products from animals that appear healthy. Vaccines against *Streptococcus suis* are still some years away.

⁴⁶ Nguyen THM et al. *Streptococcus suis* meningitis in adults in Vietnam. *Clinical Infectious Diseases*. 2008; 46(5):659-667

⁴⁷ <http://cid.oxfordjournals.org/content/48/5/617.long>

⁴⁸ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4697300/>

⁴⁹ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4214319/>

Leptospirosis has been examined in a number of studies in Viet Nam^{50, 51} and the region but additional work is required to understand the disease and to determine the extent to which it occurs. It is under-recognised given it is difficult to diagnose both clinically and in the laboratory. Much of the disease appears to be water-borne and linked to heavy rainfall and flooding, but our knowledge about the risks associated with disease is incomplete. Climate change has the potential to increase the range and the risk of leptospirosis in Viet Nam. Livestock, pets and wild animals (especially rats) appear to be the main reservoirs for leptospire but the links between animals and humans is not always direct.

Anthrax has caused 413 human reported cases and three deaths in northern Viet Nam between 2006 and 2011 and occasional outbreaks continue. All cases have been linked to slaughtering/eating dead ruminants.⁵² In areas where the disease is known to occur, vaccination for livestock will be used and combined with communication campaigns about the importance of not consuming dead ruminants.

Other zoonotic diseases also occur in Viet Nam:

- **Japanese encephalitis (JE)** is a locally important cause of encephalitis especially in children and is associated with spillover of virus from either swine or wild birds. It is an epidemic-prone disease that can be controlled through increasing and sustaining vaccine coverage of a locally produced vaccine among eligible children with possible catch up of older age groups depending on the epidemiology of the disease.⁵³ Currently, the national immunisation schedule includes 2 doses of JE vaccine (separated by 2 weeks) when a child is 12 months of age, and a 3rd dose when the child is 2 years old (vaccination of pigs is not recommended because of the difficulties associated with obtaining high level herd immunity given the rapid rate of turnover). Studies will continue to determine the major causes of encephalomyelitis in humans in Viet Nam building on those undertaken in the past. The data from these studies will help to guide JE vaccination strategies, detect any antigenic variants and identify other pathogens.
- **Murine typhus**⁵⁴ occurs as a source of rat-borne disease transmitted by fleas and is controlled through both rodent and flea control. These activities will continue.
- Other zoonotic diseases that cause problems in other parts of Asia - and probably exist in Viet Nam but are rarely diagnosed - include **brucellosis**⁵⁵ and **bovine tuberculosis**. The marked increase in size of the dairy sector could result in an increase in one or both of these diseases, although it is highly likely (based on testing) that imported dairy cattle and their progeny on large farms are free from infection. Nevertheless, there is considerable trade in other cattle in Viet Nam some of which move over long distances from other countries in the region and are only held in Viet Nam temporarily. Large markets provide opportunities for spread of these diseases. Brucellosis has become an important zoonotic disease in China, another country that has rapidly expanded its dairy sector. Plague caused by **Yersinia pestis** has not been diagnosed in Viet Nam for over 10 years but caused epidemics in the past. **Q fever** could occur in areas with high populations of goats.

⁵⁰ <http://www.ncbi.nlm.nih.gov/pubmed/10326104>

<http://www.ncbi.nlm.nih.gov/pubmed/25629781>

⁵¹ <http://www.ncbi.nlm.nih.gov/pubmed/25995736>

⁵² <http://www.ncbi.nlm.nih.gov/pubmed/25778504>

⁵³ Yen NT et al. A model immunization programme to control Japanese encephalitis in Viet Nam. *J Health Popul Nutr.* 2015; 33(1):207-2013

⁵⁴ Hamaguchi S et al. Clinical and Epidemiological Characteristics of Scrub Typhus and Murine Typhus among Hospitalized Patients with Acute Undifferentiated Fever in Northern Vietnam. *Am J Trop Med Hyg.* 2015; 92(5):972-978

⁵⁵ http://www.rr-asia.oie.int/fileadmin/Regional_Representation/Programme/Emerg/2014_Brucellosis_Chiang_Mai/15.Vietnam.pdf

Zika virus, while not strictly within the framework of this plan as discussed in the Introduction, was originally a virus of zoonotic origin. It has emerged as a serious cause of human disease in South and Central America, the Caribbean and French Polynesia, affecting foetal development and associated with Guillian-Barre syndrome in some cases. Zika virus is present in Viet Nam, demonstrating the capacity of local mosquito populations to transmit the virus but the disease associated with local strains is generally mild. Studies will continue to characterise local viruses to define whether there is a local host animal population (See Focus Area 3) and to compare local strains with those from the Americas. Special attention will be paid to the capacity of local strains to cause disease during foetal development. If a strain of virus similar to that found in the Americas is detected in Viet Nam and is transmitting locally this would be handled as an emergency using capacity built for emergency disease management (see Focus Area 2, One Health approaches for managing human disease emergencies of zoonotic origin).

7.2. Strategic directions

Application of One Health approaches for control, prevention and management of existing zoonotic diseases.

7.3. Achievements

The main achievements on these zoonotic diseases include conducting of research (see 7.1) and development of guidance on directions for future work.

7.4. Work underway

Work is expected to be conducted in the following areas for the following priority zoonotic diseases:

Priority zoonosis	Comments
Leptospirosis	Additional research, Public awareness, Interagency coordination/Circular 16 including case investigations
<i>Streptococcus suis</i>	Additional research, Public awareness, Interagency coordination/Circular 16 including case investigations
Anthrax	Vaccination, Public awareness, Interagency coordination/Circular 16 including case investigations
Brucellosis/ tuberculosis	Additional research including risk assessment of imported cattle, Management of major cattle market, Diagnostic tests and reagents (surveillance)
Japanese encephalitis	Human vaccination, Case investigations, Public awareness
Other zoonotic diseases	Public awareness, Emergency contingency for severe disease outbreak

7.5. Alignment with existing policies & strategies

APSED will continue during this period and activities will be aligned with this program. The GHSA has action packages that encompass these diseases including the immunisation action package.

7.6. Key factors for success

The main factors that result in success in managing zoonotic diseases are good surveillance and case

detection systems including laboratories capable of conducting appropriate tests for these diseases. It is critical to involve stakeholders in the development of appropriate disease control strategies. Vaccinations exist for some of these diseases and need to be implemented in accordance with agreed schedules with appropriate properly stored vaccines.

7.7. Challenges and constraints

The major challenges and constraints for control and prevention of these diseases include:

- Under-reporting or under-ascertainment of diseases
- Lack of familiarity with requirements of Circular 16 especially at lower levels
- Resources for One Health approaches to these diseases
- Difficulties in changing behaviours

7.8. Targets

The main targets by as provided in the Summary Plan are listed below.

Description	Target
Anthrax control	Improved public awareness in high risk areas and enhanced vaccination
Reduction in burden of disease due to <i>Streptococcus suis</i>	Behavioural change (where possible) especially consumption of raw pig products
Reduction in burden of disease due to Leptospirosis	Community awareness of the dangers of leptospirosis in periods of heavy rainfall
Enhanced traceability of animals and residue testing	Practical animal identification systems such as pig tattoos linking animals in slaughter houses to individual farms or small scale traders
Risk assessment of food borne illness of animal origin	Conduct a risk assessment to help justify investments in this area
Circular 16 will be fully implemented at all levels with reporting of all cases in the human and animal sector to both MOH and MARD (as well as their local counterparts)	See focus area 1

Over the next 5 years the following targets are also expected to be achieved:

- Additional research to further define the extent of these diseases and to develop appropriate control and preventive measures, building on work already undertaken
- Communications to improve awareness about leptospirosis among the medical profession
- Improved diagnostic capacity for leptospirosis in human and animals
- Continued increase in the coverage of JE vaccine for children eligible under the National Immunisation Schedule with reductions in the number of human cases of Japanese encephalitis

- Risk assessment on brucellosis from trade in ruminants from neighbouring countries

7.9. Budget

The estimated minimum cost for activities on other zoonotic diseases is USD 5 million over the next 5 years. This figure does not cover the cost of treatment of human cases.

7.10. Foodborne diseases

7.10.1. Background

Foodborne diseases resulting from the presence of pathogenic organisms or toxic chemicals in/on food of animal origin are an important cause of morbidity and less commonly mortality in Viet Nam. The range of diseases and agents involved in Viet Nam has been reviewed⁵⁶ and bacterial foodborne diseases were ranked in the top five conditions that should be prioritised for action based on disease severity, outbreak potential and public attention.⁵⁷

Food safety in Viet Nam is recognised, in general, as a major issue by the public and an area in which major actions are expected to be taken in the next 5 years. Both the immediate effects of acute foodborne illness and the long-term effects of consumption of products that contain excess levels of persistent organic pollutants or other chemicals are of concern to the general public. Among the important foodborne bacterial pathogens are non-typhoidal *Salmonella*, *Campylobacter* species, verotoxigenic *Escherichia coli* and *Listeria* species. A range of parasites are also foodborne, including toxoplasma, cysticercosis/taeniasis, trichinellosis and trematodes from fish.

As a rule, reported cases of food poisoning represent only a small proportion of all cases. Contamination can occur anywhere along the chain from farm to consumer and some of the risks are mitigated through processing, including cooking. Fragmentation of the livestock sector into millions of producers with consequent difficulties in identifying individual poultry and pigs inhibit efforts to improve traceability. Nevertheless, aquaculture products destined for export are traceable and demonstrate that viable systems can be developed to improve food safety. Many of the measures implemented to prevent food-borne diseases of animal origin will have significant effects in containing and controlling other diseases. For example, residues of antimicrobial drugs have been implicated in the development of antimicrobial resistance⁵⁸ as well as being potentially harmful to humans exposed to excessive levels. Methods used to test for residues in pigs at slaughter require a tracing system back to the farm of origin. Similar methods are also required for other chemicals such as illegal use of beta-agonists, including salbutamol and clenbuterol.

At present, foodborne diseases are managed through other mechanisms including the **Food Safety Network** to which the One Health Partnership secretariat contributes. Therefore, they are not included as a core element of the 2016 – 2020 zoonotic disease One Health plan and are not dealt with in detail in this document. The One Health Partnership can, however, facilitate inter-ministerial action on foodborne diseases of animal origin and can help prevent duplication of activities in areas such as animal identification systems and the development and application of good animal husbandry practices (GAHP)⁵⁹ which are also needed for the control of other zoonotic diseases. There is a common interest in improving aspects of transport, slaughter, handling and marketing for prevention of emerging infectious diseases and foodborne disease.

⁵⁶ Carrique-Mas JJ et al. A review of food borne bacterial and parasitic zoonoses in Vietnam. *Ecohealth*. 2013; 10(4):465-489

⁵⁷ Trang DT et al. Prioritization of zoonotic diseases of public health significance in Viet Nam. *JIDC*. 2015; 9(12):1315-1322

⁵⁸ Residues probably play a lesser role than resistant organisms on or in food of animal origin.

⁵⁹ <http://www.worldbank.org/en/results/2016/04/14/vietnam-better-food-safety-and-production-efficiency-with-good-animal-husbandry-practices>

The law on Food Safety was passed in 2011 with responsibility for animal products largely delegated to MARD. For MARD, the improvement of disease prevention along the chain from farm to household will continue during the next 5 years with a focus on GAHP and product/animal traceability.

Importing countries (e.g. EU requirements for animal products)⁶⁰ also play a role in driving food safety standards as has been seen with aquaculture products. This can be used as a major driver for improving food quality especially if these same procedures are used for local products. Much of the work on improving food safety requires behavioural change and it is necessary to involve stakeholders in developing appropriate solutions. In addition, major food companies also have quality management systems in place to ensure that products supplied in restaurants and supermarkets do not pose a risk to consumers. This expertise should be utilised.

One Health approaches are gradually being implemented on food safety issues in Viet Nam and elsewhere.

The **Codex Alimentarius Commission**, the body that sets standards for food, embodies the One Health approach. It was established by FAO and WHO to develop an international food code aimed at ensuring safe produce.

7.10.2. Work underway

A number of agencies are involved in prevention and management of foodborne diseases from animal products in Viet Nam. A World Bank project includes a major food safety component (LIFSAP) and has introduced improvements to markets and slaughter points to reduce the risk of foodborne pathogens. This project also supports the introduction of good animal husbandry practices. In January 2016 a meeting was held at the World Bank in Viet Nam to assess the critical gaps and issues on food safety in Viet Nam as the first step towards a formal risk assessment.

FAO and WHO are supporting the GoV in review of the food safety law to assess the implications of the law across multiple sectors; the review will be completed by 2019.

The following extract from a report on a meeting on food safety issues highlights the range of stakeholders involved in food safety.

*“The **Food Safety Working Group (FSWG)** is an initiative to bring key Government Agencies/ Line ministries and development partners (DPs) together for joint policy dialogue and discussions on food safety issues in Viet Nam. It was created at the request of, and convened under the auspices of, the Deputy Prime Minister Vu Duc Dam at a meeting in June 2015 chaired by DPM Dam and benefits from the active participation of Office of Government (the designated focal point of coordination), Ministry of Health (MOH), Ministry of Agriculture and Rural Development (MARD), Ministry of Industry and Trade (MOIT) from the Government side and of the Food and Agriculture Organization (designated focal point among development partners), Asian Development Bank (ADB), Canadian Embassy, JICA, New Zealand Embassy, and the World Bank.”*

Meetings of the FSWG in January and March 2016 included participants from various departments and institutes within MARD including the National Ago-Forestry-Fisheries Quality Assurance Department (NAFIQAD), representatives from FAO, WHO, and the Ministry of Industry and Trade, One Health Partnership, the private sector, ADB, World Bank and various donor countries.

⁶⁰ http://ec.europa.eu/food/fvo/act_getPDF.cfm?PDF_ID=10116

7.10.3. Challenges and constraints

- The biggest constraint is the fragmentation of the livestock sector into millions of small farms, poor traceability and limited capacity for testing.
- Food handling practices from slaughterhouse through markets to final preparation by and for consumer (including the absence of appropriate refrigeration) provide conditions for pathogens to multiply in meat.
- The lack of enforcement results in use of chemicals that should not be employed in food animals.
- Persistent environmental contaminants are present in animal products from certain areas

7.10.4. Targets

As described in the Summary Plan by 2020, it is expected that systems for identification of food animals going to slaughter will have been examined for feasibility, such as a tattoo system for pigs, to allow traceability of pigs and carcasses back to farms or traders.

A risk assessment on food safety will have been completed highlighting areas where improvements to food safety are required and can be made.

Appendix 1: List of selected One Health activities in Viet Nam from 2005-2020 by disease focus

Focus	Period	Donor	Title	Themes
AMR	2013-16	IDRC	Asia Partnership on Emerging Infectious Diseases Research - APEIR-AMR	Ecohealth, research
	2013-15	Vlir	Environmental and food reservoirs of AMR organisms	Training, research
	2012-15	NAFOSTED	Molecular epidemiology of AMR Salmonella / Campylobacter	Laboratory, surveillance, research
Avian influenza	2013-18	MOST	Avian influenza H5N1 vaccine	Vaccine production
	2013-15	USAID	Surveillance for avian influenza	Coordination, research, surveillance, training
	2009-15	France	Research for the Evaluation of AI Surveillance in South East Asia (REVASIA)	Surveillance, research, training, coordination
	2010-14	USAID	Avian influenza H7N9 outbreaks	Biosecurity, training
	2007-14	USAID	Emergency preparedness for highly pathogenic avian influenza	Preparedness, surveillance, response
	2013	FAO, USAID	Address risks of avian influenza	Biosecurity, surveillance
	2008-11	USAID	Asia Partnership on Emerging Infectious Diseases Research - APEIR-CM (Highly pathogenic avian influenza)	Surveillance, control, research
	2009-11	USAID	Gathering Evidence for Transitional Strategy (GETS) - vaccination strategies for HPAI	Response
	2007-11	France	GRIPAVI - epidemiology/ecology of HPAI	Research, training, coordination
	2006-10	Multiple	Joint Vietnam-UN program for HPAI	Coordination, Response, Preparedness, Behaviour change
	2005-09	FHI360	Avian influenza behaviour change communication (AI/BCC)	Behaviour change, Training
	2005-09	USAID	AI/BCC support activity	Behaviour change, Training, Advocacy
Influenza	2012-15	USAID	Surveillance / characterization of influenza viruses posing risks for next pandemic	Surveillance, research, training, coordination
	2012-14	USAID	Emerging Pandemic Threats (EPT+)	Surveillance, coordination
	2009-13	USAID	USAID Avian and Pandemic Influenza Initiative	Surveillance, disease control, preparedness, training, biosecurity
	2007-13	GoV, Japan, WB	Viet Nam Avian and Human Influenza Preparedness Project (VAHIP)	Control, preparedness, training, coordination
	2011-	WB	Viet Nam AI and Human Influenza Control and Preparedness Project (VN-VAHIP)	Control, preparedness, training, coordination
	2005-09	CDC	Viet Nam Influenza Program	Training, surveillance, diagnostics
EIDs	2013-17	EC	Regional capacities for the prevention, control and eradication of highly pathogenic and emerging diseases (HPED)	Coordination, Education and Training, Research
	2010-16	USAID	Asia Partnership on Emerging Infectious Diseases Research (APEIR)	Research, surveillance, Ecohealth, coordination
	2010-16	WHO	Asia-Pacific Strategy for Emerging Diseases (APSED)	Systems
	2013-15	USAID	Strengthening capacity for OH implementation in Viet Nam	Coordination, communications
	2012-	Members, CIRAD	GREASE Research network for emerging epidemic risks	Research, coordination
	2009-11	USAID	7th International Ministerial Conference on Avian and Pandemic Influenza (IMCAPI 2010)	Advocacy, conference, communications
Neglected diseases	2012-14	Japan	Research capacity for neglected diseases	Research, surveillance, diagnosis, laboratory
Non-specific	2012-17	IDRC	Field Building Leadership Initiative	Research, training, Ecohealth
	2011-16	Nagasaki University	Enhance the research capacity on emerging diseases - ERID	Coordination, research
	2010-16	WHO	IHR 2005	Systems

Focus	Period	Donor	Title	Themes
	2013-14	USAID	Applied Veterinary Epidemiology Training (AVET)	Training
	2008-14	CIDA	Food and Agricultural Products Quality Development and Control	Prevention, biosecurity, surveillance, training, research, production
	2010-14	USAID	IDENTIFY	Laboratory capacity
	2010-14	USAID	RESPOND - Viet Nam One Health University Network (VOHUN)	Coordination, Education and Training, Research
	2010-14	WB	Livestock Competitiveness and Food Safety Project (LIFSAP)	Food safety, Biosecurity
	2012-13	USAID	Knowledge management and policy dialogue through the partnership on avian and pandemic influenza (KMP-API)	Coordination, management, policy
	2013	PEPFAR	Global health security capacity	Detection, response, laboratory
	2012-13	IDRC	Animals, water & public health	Ecohealth, research
	2009-13	USAID	Applied Veterinary Epidemiology Training (AVET)	Training
	2008-13	USAID, CDC, WHO	Field Epidemiology Training Program (FETP)	Training, research
	2010-12	IDRC	Building capacity for research and practice in ecosystem approaches (BECA)	Research, Ecohealth, policy
	2011	WHO	Four-way linking project for health risks at human-animal interface	Laboratory, detection, coordination
Rabies	2015-20	ASEAN	ASEAN Rabies	Regional strategy
	2015-17	NAFOSTED	Rabies transmission from neighbouring countries	Surveillance, laboratory, research
	2014-15	AusAID	Institutional and inter-sectoral strengthening for rabies control	Surveillance, control, communications
	2011-15 2016-20	GoV	National Program on rabies prevention & control	Response, behaviour change, coordination
	2009-13	DRAFF	Partnership on global animal health and biosecurity	Prevention, Risk reduction, Communication, Training
<i>Strep. suis</i>	2012-15	Wellcome	OUCRU – <i>Streptococcus suis</i>	Research
Swine diseases	2012-17	ACIAR	Reducing disease risks and improving food safety in smallholder pig value chains (PigRisk)	Production - value chains, Research
	2013-17	NIH, HKU, AIRD	Surveillance on swine emerging diseases (SWEID)	Surveillance, research, training, coordination
	2011-14	USAID	Eco-health assessment on poultry production for the livelihood improvement of small producers (Eco-EID)	Ecohealth, Research, production
	2012-13	ICDR	Hygienic practices of small-scale poultry slaughterhouses	Training, Research, Production - slaughterhouses
Wildlife diseases	2010-14	USAID	PREDICT	Research, Surveillance and laboratory
	2010-14	AusAID, USAID	PREVENT	Detection, Risk reduction, Biosecurity, Training, Research, Behaviour change
Zoonoses	2015-20	CDC, USAID	GHSA Zoonotic disease action package	Surveillance, detection, preparedness, response, training, policy
	2012-17	CDC	Study at human-animal interface for influenza and zoonotic diseases	Surveillance, research
	2013-16	AFD	Impacts of livestock intensification on community health - ECOMORE	Surveillance, detection, preparedness, response, training
	2012-16	Wellcome	Viet Nam Initiative on Zoonotic Infections (VIZIONS)	Research
	2015	USAID, UN joint plan	Circular 16	Response, coordination, surveillance
	2012-14	ICDR	Eco-EID (eco-bio-social approaches to EIDs including vector-borne, zoonoses)	Ecohealth, research
	2008-13	ICDR-EcoZD	EcoZD – leptospirosis	Ecohealth, research

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