MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

MINISTRY OF HEALTH

MINISTRY OF NATURAL RESOURCES AND ENVIRONMEI

MASTER PLAN FOR THE ONE HEALTH PARTNERSHIP FRAMEWORK FOR ZOONOSES, 2021 – 2025 PERIOD

(Promulgated together with Decision No. 1039/QD-BNN-HTQT dated March 21, 2022 of the Ministry of Agriculture and Rural Development)

Ha Noi, March 2022

ACKNOWLEDGEMENT

The Vietnam One Health Partnership (OHP) framework for zoonoses for the period from 2021 to 2025 was signed on March 23, 2021, between three Ministries (Agriculture and Rural Development, Health, and Natural Resources and Environment) and 29 national and international development partners (DPs). The objective of the OHP is to work and act together towards the common goal of minimizing the risk of future pandemics. The partnership framework is the basis for the orientation of the cooperation and setting the priority goals of Vietnam One Health (OH) during the 2021-2025 period, not only for the three ministries and 29 signatory partners but also as a basis for cooperation for any international development partner, national or private, that has a common interest and is willing to work with the Government of Vietnam (GoV) to use the OH approach to minimize zoonotic diseases, ensure a safe interaction among humans, animals, and the environment.

To implement the OHP, the Ministry of Agriculture and Rural Development (MARD), as the chairing Ministry of the partnership framework and with the active support and companionship of the Delegation of the European Union (EU) in Vietnam, has closely worked with the Ministry of Health (MOH), the Ministry of Natural Resources and Environment (MONRE), other relevant Ministries, Agencies, civil society organizations (CSOs), and Development Partners to prepare the Master plan for the OHP framework for zoonosis for the period from 2021 to 2025 (hereinafter referred to as the OHP Master Plan 2021 – 2025). The Plan is considered as a guidebook that provides basic information on human and animal health needs, lessons learned from the National One Health Strategic Plan for Zoonotic Diseases (2016-2020), analyzes gaps in multi-sectoral management, operation, and coordination, and proposes specific activities and programs using the OH approach in fighting zoonosis and limiting the further occurrence of antimicrobial resistance. It also provides scenarios that demonstrate a method for measuring and comparing the burden of zoonotic diseases in humans and animals, identifies priority areas for investment in OH for the period 2021-2025, and describes a strategic orientation for the 5-year life of the OHP. It was agreed that the OHP Master Plan 2021 - 2025 would be able to be updated upon request to adapt to the new situation and based on available resources.

The OHP Master Plan 2021 - 2025 was issued by the MARD according to Decision No. 1039/QD-BNN-HTQT dated March 21, 2022 with the agreement of the MOH as set out in the Official Letter No. 817/BYT-DP dated February 22, 2022 and the MONRE as set out in the Official Letter No. 1274/BTNMT-TCMT dated March 14, 2022.

In line with the OH approach, the OHP Master Plan 2021 - 2025 was developed with consultations and inputs from a wide range of national and international DPs, Ministries, Agencies, institutes, universities, non-governmental organizations (NGOs), associations, CSOs, and private organizations. The OHP Master Plan 2021 - 2025 was then synthesized, reviewed, and adjusted through the collection of official written comments and formal consultation workshop with relevant stakeholders, namely

- The GoV, the MARD, the MOH, and the MONRE were the primary ministries contributing to the development of the OHP Master Plan 2021 - 2025.
- The agencies and units under the MARD contributing to the development of the OHP Master Plan 2021 - 2025 included: the Department of Animal Health (DAH), the Department of Livestock Production (DOLP), the National Agro-Forestry-Fisheries Quality Assurance Department, the Department of Planning, the Department of Finance, the International Cooperation Department (ICD), the Vietnam Administration of Forestry, 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, Coordination Office for National Target Program on New Rural Development, Nghe An Department of Agriculture and Rural Development (DARD), Nghe An Department of Animal Health, Nghe An Department of Forest Protection, and Nghe An Center for Disease Control;
- The agencies and units under the MOH contributing to the development of the OHP Master Plan 2021 - 2025 included: the General Department of Preventive Medicine, the Medical Services Administration, and the National Institute of Hygiene and Epidemiology;
- The agencies and units under the MONRE contributing to the development of the OHP Master Plan 2021 – 2025 included: the Vietnam Environment Administration, Department of Nature Conservation and Biodiversity, Department of Science, Technology and International Cooperation;
- General Department of Market Surveillance, Ministry of Industry and Trade has contributed to the OHP Master Plan 2021 - 2025 development.

International members of the One Health Partnership for Zoonoses and other partners providing contributions to the development of the OHP Master Plan 2021 - 2025 included:

- International Technical Organizations and Programs of the United Nations in Vietnam, including the Food and Agriculture Organization (FAO), the World Health Organization (WHO), and the United Nations Development Program (UNDP), United Nations Office on Drugs and Crime (UNODC), United Nations Environment Program (UNEP);
- Multilateral development partners such as the Delegation of the European Union to Vietnam (EU), Asian Development Bank (ADB), and the World Bank (WB);
- The Embassy of the United States of America in Vietnam and its agencies and centers, including the United States Agency for International Development (USAID), the Centers for Disease Control and Prevention (CDC), the US Defense Threat Reduction Agency (DTRA), Animal and Plant Health Inspection Service – U.S. Department of Agriculture (USDA APHIS);
- The Embassy of France in Vietnam, the Agence Française de Développement, French National Research Institute for Sustainable Development, and Centre de coopération internationale en recherche agronomique pour le développement;
- The Embassy of Germany in Vietnam, the KfW Development Bank, German International Cooperation Agency (GIZ);

- The Embassy of the United Kingdom, Embassy of Denmark, Embassy of the Netherlands, Embassy of Australia, Embassy of New Zealand in Vietnam, and the Danish Veterinary and Food Agency;
- International organizations and research institutes, including World Wildlife Fund (WWF), International Livestock Research Institute (ILRI), Wildlife Conservation Society (WCS), Oxford University Clinical Research Unit (OUCRU), Alliance of Biodiversity International and International Center for Tropical Agriculture (CIAT), FHI 360, PATH Vietnam, Global Health Advocacy Incubator/Campaign for Tobacco-Free Kids (GHAI), the Wildlife Trade Monitoring Network (TRAFFIC), Woolcock Institute of Medical Research;
- Other Vietnamese institutes, organizations, associations, and NGOs providing contributions to the development of the OHP Master Plan 2021 - 2025 included: the Vietnam Veterinary Association, the Vietnam Livestock Association, the Vietnam Red Cross Society, the Vietnam Public Health Association, Research and Training Center for Community Development (RTCCD), Center for Public Health and Ecosystem Research (CENPHER), and members of the Vietnam One Health Network of Universities (VOHUN), People and Nature Reconciliation (PanNature), Vietnam Chamber of Commerce and Industry (VCCI), etc.

Our sincere thanks to Mr. Koen Duchateau - Head of Cooperation Department and Mr. Le Van Thanh, Program Manager of the Delegation of the European Union to Vietnam (EU) for support and accompanying with the OH Secretariat; the Transformation and Change Management Consulting Company (T&C Consulting) for mobilizing and managing the world's leading and experienced experts, including Dr. Eric Neumann, Associate Professor of Medicine and Epidemiology at Massey University (New Zealand) and Affiliate Associate Professor of Veterinary Epidemiology at Iowa State University (USA) and Dr. Vu Cuong, Associate Professor, Doctor of Development Economics, National Economics University (Vietnam).

In addition, the Plan also received professional support from other experts such as Dr. Chu Van Chuong, former Deputy Director of the International Cooperation Department, MARD, and Dr. Pham Duc Phuc, VOHUN Coordinator, Dr. Nguyen Manh Ha, Dr. Giang Minh Tho, LLM Dinh Thi Hoang Nhung, etc... to identify the current situation and actual needs of stakeholders at different levels/organizations to formulate this OHP Master Plan 2021 - 2025.

BỘ NÔNG NGHIỆP VÀ PHÁT TRIỂN NÔNG THÔN	CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc lập - Tự do - Hạnh phúc
Số 1039 /QĐ-BNN-HTQT	*Hà Nội, ngày* 21 *tháng* 3 *năm* 2022

QUYẾT ĐỊNH

Về việc Ban hành Kế hoạch tổng thể thực hiện Khung đối tác Một sức khỏe về phòng chống bệnh dịch từ động vật sang người, giai đoạn 2021-2025

BỘ TRƯỞNG BỘ NÔNG NGHIỆP VÀ PHÁT TRIỂN NÔNG THÔN

Căn cứ Nghị định số 15/2017/NĐ-CP ngày 17/02/2017 của Chính phủ quy định chức năng, nhiệm vụ, quyền hạn và cơ cấu tổ chức của Bộ Nông nghiệp và Phát triển nông thôn;

Căn cứ Nghị định 114/2021/NĐ-CP ngày 16/12/2021 của Chính phủ về quản lý và sử dụng vốn hỗ trợ phát triển chính thức (ODA) và vốn vay ưu đãi của các nhà tài trợ nước ngoài;

Căn cứ Quyết định số 34/2007/QĐ-TTg ngày 12/3/2007 của Thủ tướng Chính phủ về việc ban hành Quy chế thành lập, tổ chức và hoạt động của tổ chức phối hợp liên ngành;

Căn cứ Công văn số 10552/VPCP- QHQT của Văn phòng Chính phủ ngày 16/12/2020 về việc đồng ý thành lập Khung đối tác Một sức khỏe về phòng chống dịch bệnh từ động vật sang người giai đoạn 2021-2025;

Căn cứ Quyết định số 2717/QĐ-TCCB của Bộ Nông nghiệp và Phát triển nông thôn ngày 18/6/2021 về việc thành lập Khung đối tác Một sức khỏe phòng chống dịch bệnh lây truyền từ động vật sang người, giai đoạn 2021-2025;

Căn cứ các Công văn số 817/BYT-DP ngày 22 tháng 02 năm 2022 của Bộ Y tế và số 1274/BTNMT-TCMT ngày 14 tháng 3 năm 2022 của Bộ Tài nguyên và Môi trường về việc đồng thuận ban hành Kế hoạch tổng thể thực hiện Khung đối tác Một sức khỏe giai đoạn 2021-2025;

Xét đề nghị của Vụ trưởng Vụ Hợp tác quốc tế.

QUYẾT ĐỊNH:

Điều 1. Ban hành Kế hoạch tổng thể thực hiện Khung đối tác Một sức khỏe về phòng chống dịch bệnh lây truyền từ động vật sang người giai đoạn 2021-2025 (*Kế hoạch tổng thể đính kèm*).

Điều 2. Tổ chức thực hiện

Bộ Nông nghiệp và Phát triển nông thôn chủ trì phối hợp với Bộ Y tế, Bộ Tài nguyên và Môi trường triển khai thực hiện các nội dung của Kế hoạch tổng thể, cụ thể như sau:

- Giữ vai trò đầu mối quốc gia về hợp tác quốc tế trong lĩnh vực phòng chống bệnh dịch lây truyền từ động vật sang người, hướng dẫn, kiểm tra, đôn đốc việc thực hiện Kế hoạch tổng thể của các Bộ, ngành và địa phương;

- Tổ chức kiểm tra, đánh giá tình hình thực hiện Kế hoạch tổng thể của các đơn vị;

- Phối hợp chặt chẽ với các Bộ, ngành liên quan trong công tác phòng chống dịch bệnh lây truyền từ động vật sang người;

- Trên cơ sở khung của Kế hoạch tổng thể, Bộ Y tế, Bộ Tài nguyên và Môi trường, các ngành và cơ quan liên quan trong lĩnh vực này xây dựng chương trình, kế hoạch hành động cụ thể cho đơn vị mình, phối hợp với Ban thư ký Một sức khỏe để vận động các nguồn lực thực hiện Kế hoạch tổng thể;

- Việc giám sát tiến độ thực hiện Kế hoạch tổng thể được thực hiện thông qua Hội nghị thường niên cấp cao do 03 Bộ đồng chủ trì, có sự tham gia của các Bộ, ngành khác có liên quan và các thành viên của Khung đối tác Một sức khỏe giai đoạn 2021-2025.

Điều 3. Quyết định này có hiệu lực từ ngày ký. Chánh Văn phòng Bộ, Vụ trưởng các Vụ: Hợp tác quốc tế; Tổ chức cán bộ; Tài chính; Kế hoạch; Pháp chế; Khoa học công nghệ và Môi trường; Cục trưởng các Cục: Thú y; Chăn nuôi; Tổng cục trưởng Tổng cục Lâm nghiệp; Các Giám đốc: Cơ quan thẩm quyền quản lý CITES; Trung tâm Khuyến nông quốc gia; Ban thư ký Đối tác Một sức khỏe và Thủ trưởng các đơn vị có liên quan chịu trách nhiệm thi hành quyết định này./.

Nơi nhận:
- Như Điều 3;
- Văn phòng Chính phủ (để b/c);
- Bộ trưởng (để b/c);
- Các Bộ: Y tế; Tài nguyên và MT; Công Thương; Kế hoạch và Đầu tư; Tài chính; Khoa học và Công nghệ;
- Các Viện thuộc Bộ NN và PTNT;
- Các Hiệp hội: Nông dân; Thú y; Chăn nuôi gia cầm; Thức ăn chăn nuôi; Liên hiệp Phụ nữ Việt Nam;
- Ban thư ký Đối tác Một sức khỏe;
- Các đối tác Một sức khỏe;
- Lưu: VT, HTQT(VT.Phượng-30).

KT. BỘ TRƯỞNG
THỨ TRƯỞNG

Phùng Đức Tiến

TRANSLATION VERSION

MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT	**SOCIALIST REPUBLIC OF VIET NAM** **Independence - Freedom – Happiness**
No. 1039 /QĐ-BNN-HTQT	*Ha Noi, March 21, 2022*

DECISION

On issuing the Master Plan for the One Health Partnership Framework for zoonoses, 2021 – 2025 period

MINISTER OF AGRICULTURE AND RURAL DEVELOPMENT

Pursuant to Decree No. 15/2017/ND-CP dated February 17, 2017 of the Government defining the functions, tasks, powers and organizational structure of the Ministry of Agriculture and Rural Development;

Pursuant to Decree No. 114/2021/ND-CP dated December 16, 2021 of the Government on the management and use of Official Development Assistance (ODA) and concessional loans granted by foreign donors;

Pursuant to Decision No. 34/2007/QD-TTg dated March 12, 2007 of the Prime Minister promulgating the Regulation on the establishment, organizational structure and operation of the cross-sectoral cooperating organization;

Pursuant to Official Letter No. 10552/VPCP-QHQT dated December 16, 2020 of the Government Office on the agreement to establish the One Health Partnership Framework on prevention of zoonotic diseases in the 2021-2025 period;

Pursuant to Decision No. 2717/QD-TCCB of the Ministry of Agriculture and Rural Development dated June 18, 2021 on the establishment of the One Health Partnership Framework to prevent zoonotic diseases in the 2021 -2025 period;

Pursuant to the Official Letter No. 817/BYT-DP dated February 22, 2022 of the Ministry of Health and No. 1274/BTNMT-TCMT dated March 14, 2022 of the Ministry of Natural Resources and Environment on the agreement to promulgate the Master Plan for the One Health Partnership Framework for zoonoses, 2021 – 2025 period;

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

DECIDES:

Article 1. To issue the Master Plan for the One Health Partnership Framework for zoonoses, 2021 – 2025 period *(the Master Plan is attached)*.

Article 2. Implementation of the Master Plan:

The Ministry of Agriculture and Rural Development will assume the prime responsibility for and in coordination with the Ministry of Health, Ministry of

Natural Resources and Environment on the implementation of the Master Plan, with the following tasks:

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

- To organize the specific monitoring and assessment of the implementation of the Master 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 Master Plan, the Ministry of Health, Ministry of Natural Resources and relevant agencies working in this area will formulate specific strategies, programs and action plans for their own agencies, and in coordination with the Viet Nam One Health Partnership for Zoonoses Secretariat to mobilize resources for the Master Plan implementation.

- Supervision of the progress in implementing the Master Plan will take place through the annual national One Health Forum co-chaired by the three Ministries with the participation of related ministries, sectors, and signatories to the One Health Partnership Framework in the 2021-2025 period.

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, Legislation, Science, Technology and Environment, Animal Health, Livestock Production Departments; Director-General of the Viet Nam Forest Administration Office; and the Directors of the CITES Management Authority, 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 Government Office (for reporting);
- The Prime Minister (for reporting);
- Ministries: the Ministry of Health, the Ministry of Natural Resources and Environment, the Ministry of Planning and Investment, the Ministry of Finance, the Ministry of Science and Technology;
- Institutes under the Ministry of Agriculture and Rural Development;
- Associations/Unions: the Viet Nam Farmers Union, 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;
- The OHP Partners;
- Archive: Ministry Archive, ICD (V.T. Phuong 30).

ON BEHALF OF THE MINISTER
THE VICE MINISTER

(signed and sealed)

Phung Duc Tien

BỘ Y TẾ	**CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM** **Độc lập – Tự do – Hạnh phúc**
Số: 817 /BYT-DP V/v: ban hành Kế hoạch tổng thể thực hiện Khung đối tác một sức khỏe giai đoạn 2021-2025.	*Hà Nội, ngày 22 tháng 02 năm 2022*

Kính gửi: Bộ Nông nghiệp và Phát triển nông thôn.

Phúc đáp Công văn số 807/BNN-HTQT ngày 10/02/2022 của Bộ Nông nghiệp và Phát triển nông thôn (NN&PTNT) về việc xin ý kiến thông qua dự thảo cuối cùng Kế hoạch tổng thể thực hiện Khung đối tác Một sức khỏe (MSK) giai đoạn 2021-2025, sau khi nghiên cứu dự thảo Kế hoạch, Bộ Y tế có ý kiến như sau:

1. Bộ Y tế nhất trí với nội dung Dự thảo Kế hoạch tổng thể thực hiện Khung đối tác một sức khỏe giai đoạn 2021-2025 do Bộ Nông nghiệp và Phát triển nông thôn phối hợp với các cơ quan thuộc Bộ Y tế, Ban thư ký Đối tác Một sức khỏe (OHP) và các Bộ, ngành liên quan xây dựng.

2. Bộ Y tế nhất trí ủy quyền Bộ Nông nghiệp và Phát triển nông thôn ban hành Kế hoạch tổng thể thực hiện Khung đối tác một sức khỏe giai đoạn 2021-2025.

Bộ Y tế sẽ phối hợp chặt chẽ với Bộ Nông nghiệp và Phát triển nông thôn và các Bộ, ngành liên quan để triển khai các hoạt động phối hợp liên ngành trong khuôn khổ Kế hoạch.

Trên đây là một số ý kiến của Bộ Y tế, kính đề nghị Bộ Nông nghiệp và Phát triển nông thôn tổng hợp và tiến hành các thủ tục theo quy định.

Trân trọng cảm ơn.

Nơi nhận:
- Như trên;
- BT. Nguyễn Thanh Long (để báo cáo);
- Các Đ/c Thứ trưởng;
- Bộ Tài nguyên và Môi trường;
- Lưu: VT, DP.

KT. BỘ TRƯỞNG
THỨ TRƯỞNG

Nguyễn Trường Sơn

TRANSLATION VERSION

MINISTRY OF HEALTH

THE SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom – Happiness

No: 817/BYT - DP
on issuance of the Master Plan for the One Health Partnership Framework for zoonoses (OHP) period 2021-2025

Hanoi, 22nd February 2022

To: The Ministry of Agriculture and Rural Development

In response to the Official Letter No. 807/BNN-HTQT dated February 10, 2022 of the Ministry of Agriculture and Rural Development (MARD) on requesting comments on the final Draft of the Master Plan for the One Health Partnership Framework for zoonoses (OHP) period 2021-2025. After reviewing the Draft, the Ministry of Health has the following remarks:

1. The Ministry of Health agrees on the content of the Draft Master Plan for the One Health Partnership Framework for zoonoses (OHP) period 2021-2025, 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 concords with the Ministry of Agriculture and Rural Development issuing the Master Plan for the One Health Partnership Framework for zoonoses (OHP) period 2021-2025.

The Ministry of Health shall cooperate closely with the Ministry of Agriculture and Rural Development and 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 Agriculture and Rural Development to consolidate and carry out the required procedures according to the regulations.

With gratefulness.

Recipients:
- As mentioned above;
- Minister Nguyen Thanh Long (for reporting)
- Vice Ministers
- Ministry of Natural Resources and Environment
- Keep as archives: VT, DP.

ON BEHALF OF THE MINISTER
THE VICE MINISTER

(signed and sealed)

Nguyen Truong Son

BỘ TÀI NGUYÊN VÀ MÔI TRƯỜNG	CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM **Độc lập - Tự do - Hạnh phúc**
Số: 1274 /BTNMT-TCMT V/v ban hành Kế hoạch tổng thể thực hiện Khung đối tác Một sức khỏe giai đoạn 2021 - 2025	*Hà Nội, ngày 14 tháng 3 năm 2022*

Kính gửi: Bộ Nông nghiệp và Phát triển nông thôn

Phúc đáp Công văn số 807/BNN-HTQT ngày 10 tháng 02 năm 2022 của Bộ Nông nghiệp và Phát triển nông nghiệp về việc ban hành Kế hoạch tổng thể thực hiện Khung đối tác Một sức khỏe giai đoạn 2021 - 2025, Bộ Tài nguyên và Môi trường có ý kiến như sau:

1. Về cơ bản nhất trí với nội dung dự thảo Kế hoạch tổng thể thực hiện Khung đối tác Một sức khỏe giai đoạn 2021 - 2025 (lần 3) do 03 Bộ (Nông nghiệp và Phát triển nông thôn, Tài nguyên và Môi trường, Y tế) chủ trì, phối hợp cùng với các đối tác phát triển trong nước và quốc tế xây dựng.

2. Bộ Tài nguyên và Môi trường nhất trí ủy quyền cho Bộ Nông nghiệp và Phát triển nông thôn ban hành Kế hoạch tổng thể thực hiện Khung đối tác Một sức khỏe giai đoạn 2021 - 2025.

3. Trong thời gian tới, Bộ Tài nguyên và Môi trường sẽ tiếp tục phối hợp chặt chẽ với các Bộ ngành liên quan và các đối tác phát triển trong nước và quốc tế để thúc đẩy, triển khai các hoạt động trong khuôn khổ Kế hoạch tổng thể thực hiện Khung đối tác Một sức khỏe giai đoạn 2021 - 2025.

Trên đây là ý kiến của Bộ Tài nguyên và Môi trường gửi quý Bộ để tổng hợp, thực hiện các thủ tục ban hành Kế hoạch tổng thể nêu trên theo quy định./.

Nơi nhận: - Như trên; - Bộ trưởng Trần Hồng Hà (để báo cáo); - Lưu: VT, TCMT, TL(05).	**KT. BỘ TRƯỞNG** **THỨ TRƯỞNG** **Võ Tuấn Nhân**

TRANSLATION VERSION

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT	**THE SOCIALIST REPUBLIC OF VIETNAM** **Independence – Freedom – Happiness**
No: 1274/BTNMT - TCMT on issuance of the Master Plan for the One Health Partnership Framework for zoonoses (OHP) period 2021-2025	*Hanoi, 14th March 2022*

To: The Ministry of Agriculture and Rural Development

In response to the Official Letter No. 807/BNN-HTQT dated February 10, 2022 of the Ministry of Agriculture and Rural Development (MARD) on requesting comments on the final Draft of the Master Plan for the One Health Partnership Framework for zoonoses (OHP) period 2021-2025. After reviewing the Draft, the Ministry of Natural Resources and Environment has the following remarks:

1. The Ministry of Natural Resources and Environment basically agrees on the content of the Draft Master Plan for the One Health Partnership Framework for zoonoses (OHP) period 2021-2025 (third Draft), which has been taken lead by the three Ministries (Ministry of Agriculture and Rural Development, Ministry of Natural Resources and Environment, Ministry of Health) in cooperation with national and international development partners.

2. The Ministry of Natural Resources and Environment concords with the Ministry of Agriculture and Rural Development issuing the Master Plan for the One Health Partnership Framework for zoonoses (OHP) period 2021-2025.

3. The Ministry of Natural Resources and Environment shall cooperate closely with related ministries and sectors, and national and international development partners to promote and implement activities within the framework of the Plan.

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

Recipients:
- As mentioned above;
- Minister Tran Hong Ha (for reporting)
- Keep as archives: VT, TCMT, TL(05).

ON BEHALF OF THE MINISTER
THE VICE MINISTER

(signed and sealed)

Vo Tuan Nhan

Contents

List of tables

List of figures

Abbreviations

ACPHEED	ASEAN Center for Public Health Emergencies and Emerging Diseases
ADB	Asian Development Bank
AIPED	National Integrated Operational Program on Avian Influenza, Pandemic Preparedness and Emerging Infectious Diseases
ALE	Animal loss equivalent
AMU	Antimicrobial usage
AMR	Antimicrobial resistance
APHIS	Animal and Plant Health Inspection Service
ARES	ASEAN Rabies Elimination Strategy
ASEAN	Association of Southeast Asian Nations
BSWG	Biosecurity Working Group
CCO	Central Coordination Office
CDC	U.S. Centers for Disease Control
CENPHER	Center for Public Health and Ecosystem Research
CIAT	International Center for Tropical Agriculture
CITES	Convention on International trade on endangered species
COVID-19	Coronavirus disease 2019
CSO	Civil Society Organization
DALY	Disability-adjusted life-year
DPs	Development Partners
DTRA	the US Defense Threat Reduction Agency
EID	Emerging Infectious Diseases
EMDE	Emerging markets and developing economies
EOC	Emergency operation center
EU	The Delegation of the European Union to Vietnam
FAO	Food and Agriculture Organization
FHI	Family Health International
GBD	Global Burden of Diseases
GDP	Gross Domestic Product
GHAI	Global Health Advocacy Incubator
GHG	Green House Gas
GHSA	Global Health Security Agenda
GIZ	German International Cooperation Agency
GoV	Government of Vietnam
H5N1	influenza A
HSFAT	Health Security Financing Assessment Tool
ICD	International Cooperation Department
IHR	World Health Regulations
ILRI	International Livestock Research Institute
IMCAPI	International Ministerial Conference on Animal and Pandemic Influenza
IPBES	Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem

	Services
IUCN	International Union for Conservation of Nature
JEE	Joint External Evaluation
KfW	German Development Bank
LFA	Logical Framework Approach
LFM	Logical Framework Matrix
LMIC	Low-middle income countries
M&E	Monitoring and Evaluation
MARD	Ministry of Agriculture and Rural Development
MCTF	Multi-sectoral Coordination Task Force
MOH	Ministry of Health
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry of Science and Technology
NAP	National Action Plan
NGOs	Non-governmental organizations
NIHE	National Institute of Hygiene and Epidemiology
NiV	Nipah virus
NSC	National Steering Committee
NTS	Nontyphoidal Salmonellae
NTP	National Target Program
NRD	New Rural Development
NZD	Neglected Zoonotic Diseases
OH	One Health
OHCN	One Health Communication Network
OHP	Vietnam One Health Partnership Framework for Zoonoses; see "the Framework"
OHSP	One Health Strategic Plan
OIE	World Organization for Animal Health
OUCRU	Oxford University Clinical Research Unit
PAHI	Partnership for Avian and Human Influenza
PREZODE	Preventing Zoonotic Disease Emergence
PVS	Performance of Veterinary Services
QALY	quality-adjusted life years
RTCCD	Research and Training Center for Community Development
SEAOHUN	Southeast Asia One Health University Network
SDG	Sustainable Development Goals
the Framework	See OHP
the OHP Master Plan 2021 - 2025	The Master plan for the OHP framework for zoonoses, 2021 - 2025 period
TRAFFIC	Wildlife Trade Monitoring Network
TWG	Technical Working Groups
UN	United Nations
UNDP	United Nations Development Program

UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UNODC	United Nations Office on Drugs and Crime
US	United States
USAID	United States Agency for International Development
USTH	University of Science and Technology of Hanoi
VCCI	Vietnam Chamber of Commerce and Industry
VOHUN	Vietnam One Health University Network
VUCA	Volatility, Uncertainty, Complexity, and Ambiguity
WB	the World Bank
WCS	Wildlife Conservation Society
WHO	World Health Organization
WWF	World Wildlife Fund
YLD	Years lived with disability
YLL	Years of life lost
zDALY	Modified DALY for zoonotic diseases
ZDAP	Zoonotic Diseases Action Package

Executive summary

A Master plan for the OHP framework for zoonoses, 2021 – 2025 period (OHP Master Plan 2021 - 2025) has been developed to guide implementation of the Vietnam One Health Partnership (OHP) framework for zoonoses for the 2021 to 2025 period that was agreed upon at a signing ceremony among three Ministries and 29 national and international development partners (DPs). This Plan provides important information on the orientations, priorities, needs, and proposals of the stakeholders and suggests a roadmap to realize the goals described under the six focus areas of the OHP.

The overall objective of the OHP is "to minimize the risks of zoonotic pathogens and environmental agents' spillover and antimicrobial resistance by improving multi-sectoral OH collaboration." Six further, more specific objectives are also identified:

1. To strengthen the institutional capacity and human resources; to establish a framework and forum for multi-sectoral dialogue and collaboration for minimizing the spillover risks at human, animal, and ecosystem interfaces.
2. To minimize the risks of emerging and transmitting new zoonotic disease pathogens due to the biological, environmental, and human behavior impacts.
3. To step up the governance and supervision of antibiotic use and to curb antimicrobial resistance.
4. To minimize the human health impacts of some zoonoses (as prioritized in the Joint Circular 16/2013/TTLT-BYT-BNN&PTNT dated 27 May 2013) and other resurging diseases.
5. To enhance the mobilization of resources for recovery, reconstruction, and the management of risks caused by emerging and resurging dangerous diseases.
6. To strengthen the control and management of environmental factors that have human's health impacts.

During May and July 2021, the Delegation of the European Union to Vietnam (EU) funded Technical Assistance team worked closely with the OH Secretariat to conduct consultations with 33 active national and international DPs in Vietnam. Through these consultations, important priorities regarding human and animal health, zoonotic diseases, environmental and climate factors, antimicrobial resistance, and others were identified so that this Plan could represent the broad areas of interest and importance around human, animal, and environmental health.

This Plan sets out an expected 5-year investment framework that links important OH focused ongoing and planned activities that involve public and private stakeholders in Vietnam with a total budget of $129.5 million. This is a large sum of money but reflects the enormity of OH issues facing the country. One only has to look at the havoc caused by the emergence of COVID-19 virus to understand the magnitude of the commitment of human and financial resources that are necessary to avoid or at least minimize the impact of future pandemics.

The proposed investment in OH can be considered a prudent investment given the importance of OH issues facing the country, which include (i) the ongoing burden of zoonotic diseases, (ii) the cost to livestock producers and others from necessary measures to stamp out outbreaks once they occur, (iii) the increasing cost of antimicrobial resistance across all OH domains, and in particular (iv) the devastating cost of pandemics when they occur.

1. Background and introduction

COVID-19 has led to unprecedented adverse health and economic impacts in the Asia and Pacific region and the rest of the world. COVID-19 demonstrated that with trade and travel expanding on a global level, the opportunity for greater disease transmission also increases. By November 2021, over 250 million people had become infected with the virus, with South-East Asia accounting for over 18% of cases – over 5 million people have died from the disease.[1]

The Asian Development Bank's (ADB) latest impact assessment estimated global losses due to COVID-19 to be 5.5% to 8.7% of world Gross Domestic Product (GDP) in 2020, and 3.6% to 6.3% of world GDP in 2021; the corresponding losses for developing Asia amount to 6.0% to 9.5% of regional GDP.[1] Vietnam alone saw a reduction in tourist arrivals of nearly 80% in 2020 due to the pandemic – similar effects limited only to the tourism economic sector across South East Asia are expected to reduce regional GDP by 5.6 to 8.4% in 2021.[2] Identifying the source of the virus and the route of its introduction into the human population, including the possible role of intermediate hosts, highlights the fact that OH is central to our understanding of the origins of the COVID-19 pandemic, but also to our prevention and control of future zoonotic disease emergencies.

OH is an approach to design and implement programs, policies, legislation, and research in which multiple sectors (livestock, aquaculture, wildlife, human health, and environment) communicate and work together to achieve better health outcomes. The areas of work in which a OH approach is particularly relevant include food safety, the control of zoonoses, and combatting antimicrobial resistance (AMR).

Implementation of the OH approach to prevention and control of zoonotic diseases has not taken place in most countries at the scale needed; the COVID-19 pandemic clearly shows this. Eleven high-level panels and commissions have laid out specific recommendations for global pandemic preparedness in 16 reports since 2011. Despite their consistent messages, few of these suggestions have been implemented by countries to the extent that a OH approach can be considered business-as-usual. However, Vietnam's response to COVID-19 has been recognized globally as a good example of how well-organized response efforts can be effective even under difficult circumstances. Many lessons have been learned from Vietnam's COVID-19 control program which should help the country to respond even better in the future. Lessons learned include:[3]

1. Investment in a public health infrastructure (e.g., emergency operations centers and surveillance systems) enables countries to have a head start in managing human health crises effectively. Vietnam learned lessons from SARS and avian influenza and applied them to COVID-19.
2. Early action, ranging from border closures and masks to testing and lockdowns, can curb community spread before it gets out of control.
3. Thorough contact tracing can help facilitate a targeted containment strategy.
4. Quarantines based on possible exposure, rather than symptoms only, can reduce asymptomatic and pre-symptomatic transmission. Specifically, the mandatory testing and quarantining of international travelers appears to be an effective policy.

[1] WHO Coronavirus (COVID-19) Dashboard. Retrieved from https://covid19.who.int, accessed November 15, 2021.

5. Clear communication is crucial. A clear, consistent, and serious narrative is important throughout a crisis.

6. A strong whole-of-society approach engages multisectoral stakeholders in decision-making processes and encourages cohesive participation in appropriate measures.

Vietnam and the rest of the world are likely to continue to face challenges from new and re-emerging infectious diseases (EIDs) in humans, livestock, and wild animals, particularly at the human-animal-ecosystem interface. If left unaddressed, these health threats will have substantial, rapid, cross-border, and extremely far-reaching consequences for human health, livelihoods, and economic development. Intensive global efforts in response to specific EID outbreaks, together with a growing global understanding of wider risks based on ongoing research and technical and policy exchanges, have led to a consensus on the need for a strong OH approach at global, regional, and national levels.

2. Situation analysis

2.1. Why One Health?

In a frequently recited research paper published in 2005, around 1,407 human pathogen species were identified of which 816 (58%) are known to be zoonotic. One-hundred seventy-seven of these are considered emerging or reemerging pathogens of which 130 (73%) are known to be zoonotic, suggesting that zoonotic pathogens are disproportionately likely to be associated with emerging and reemerging infectious diseases.[4] The US-based Centers for Disease Control (CDC) noted that approximately 75 percent of EIDs found in humans are zoonoses – initially transmitted from animals to humans. In addition to COVID-19, other examples include Ebola virus which originally came from bats, HIV which was likely transmitted to humans from primates, and influenza A (H5N1) which is normally found in birds and waterfowl.

Human factors are important drivers for the emergence of zoonotic diseases and their related health threats at the human-animal-environment interface: Increasing human demand for animal protein, unsustainable agricultural intensification, increased use and exploitation of wildlife and its illegal trafficking, unsustainable utilization of natural resources accelerated by urbanization, land-use change, extractive industries, increased travel and transportation, changes in food supply, and climate change.[5] ***Figure 1*** below illustrates the dramatic level of interactivity between the various drivers that encourage the emergence of zoonotic diseases and emphasizes the need for multisectoral and multidisciplinary collaboration.

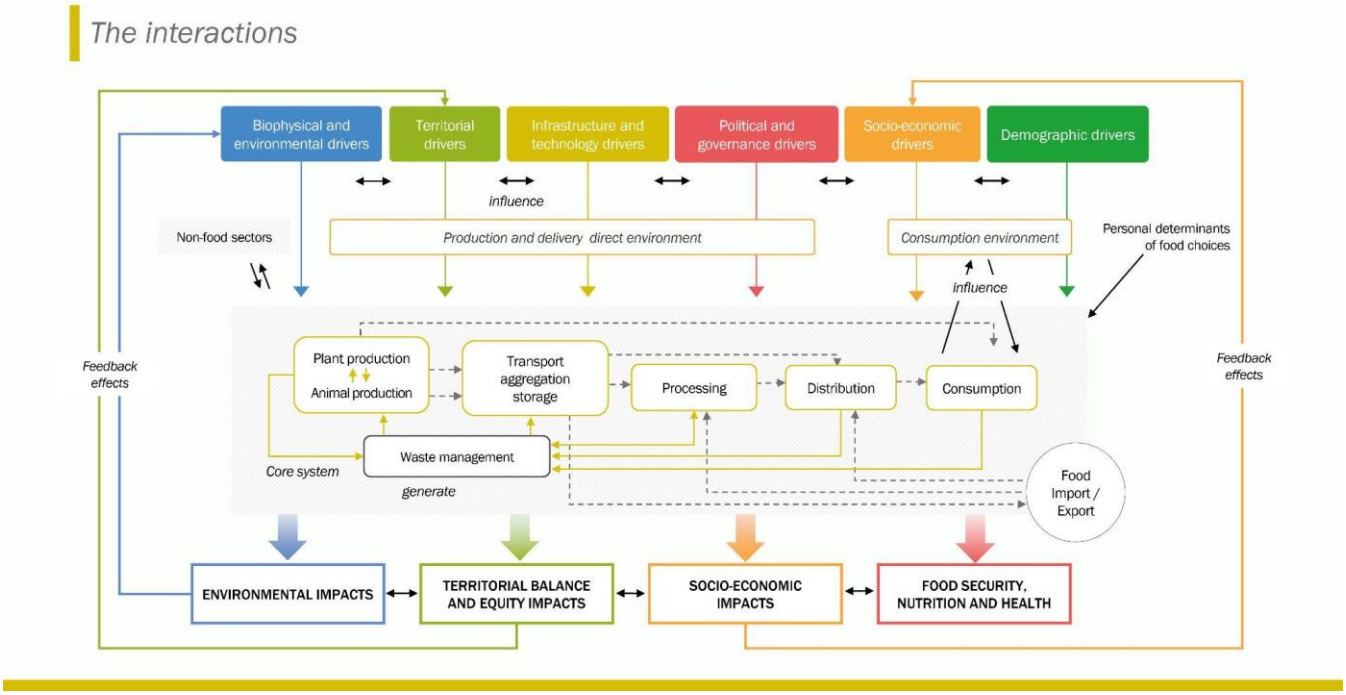


Figure 1. Interactivity between the various drivers that encourage emergence of zoonotic diseases and which emphasize the need for multisectoral and multidisciplinary collaboration (from Tefft, J. and David-Benz, H. "Catalyzing the sustainable and inclusive transformation of food systems. From Assessment to Policy and Investment", June 10, 2021).

Health issues at the human-animal-environment interface cannot be effectively addressed by one sector alone. Collaboration across all sectors and disciplines responsible for health is required to address zoonotic diseases and other shared health threats at the human-animal-environment interface. OH is a collaborative, multidisciplinary, and multisectoral approach that can address urgent, ongoing, or potential health threats at the human-animal-environment interface at subnational, national, regional, and global levels. This approach includes ensuring balance and equity among all the relevant sectors and disciplines.

Multisectoral means that more than one sector is working together (e.g., on a joint program or response to an event). Multidisciplinary means that multiple disciplines are working together (i.e., in a single ministry or research institute employing physicians, nurses, veterinarians, epidemiologists, laboratory scientists, basic scientists, and/or other health professions).

A OH approach always involves multisectoral collaboration but the term multisectoral does not always mean that all relevant sectors, including the human health, animal health, and environment sectors, are engaged and work together effectively. Taking a OH approach means that all relevant sectors and disciplines are engaged.

Most countries have mechanisms in place for administrative and technical collaboration among the animal health, human health, environment, and other relevant sectors and disciplines. However, these mechanisms are often inadequate, not fit for purpose, or not designed with a OH approach in mind.[6]

In zoonotic disease events and human health emergencies, lack of joint preparation and established mechanisms for collaboration can result in confusion and delayed responses which can lead to poorer health outcomes. The lack of coordinated planning, information sharing, assessment, and control activities across all relevant sectors can obstruct and complicate the implementation of effective disease control programs.

2.2. Benefits of the One Health approach

Various benefits can be attributed to a OH approach. Most benefits are a result of more effective disease control and/or biosecurity measures (often related to infectious disease) and improvements in both animal and human health, and well-being. Benefits can be measured economically but also as improvements in societal outcomes or social well-being.[6, 7]

1. Early detection of threats and timely, effective, or rapid responses such as preventing, detecting, and combating future pandemics, and understanding how to respond to pathogen emergence and re-emergence in a proportionate and timely manner. Such benefits are mostly an intermediary benefit, with an expectation that early detection leads to a rapid and effective response and therefore smaller outbreaks with smaller outbreak costs.
2. Improved effective disease control and/or biosecurity measures (often related to infectious disease) such as an improved understanding of the virulence mechanism, disease pathogenesis and disease epidemiology or an improved management or control of diseases in animals and/or humans. While these benefits are largely intermediary ones, it is expected they will help to reduce mortality or morbidity and yield higher productivity.
3. Economic benefit/increase in economic efficiency such as cost savings through sharing resources or economic growth due to the absence of diseases such as COVID-19. A few studies report a demonstrated increase in economic efficiency due to a OH approach. One study estimated efficiency gains at a global level of between US$184 million and US$506 million per year, or 10% to 16% if cooperation is established between the sectors through a OH approach.[8] The World Economic Forum COVID-19 Action Platform recently put the cost of fighting COVID-19 at 500 times as much as pandemic prevention measures.[9] A World Bank (WB) estimate projected that globally, roughly US$3.4 billion per year is needed to build and operate systems for effective zoonotic disease prevention and control in low and middle-income countries through OH systems.[10]
4. Improvement in human or animal health or well-being such as a reduction of disease risk for humans and/or animals, and/or improved human health globally. These are the most direct benefits of a OH approach but are often also difficult to measure in economic terms.
5. Effective action against the rise of AMR will mitigate against its negative impact on healthcare costs and contribute to a more productive and healthy population.
6. All sectors have the information they need and therefore decisions are based on accurate and shared assessments of the situation; decision-makers in all sectors are accountable to each other.
7. Technical, human, and financial resources are effectively used and equitably shared, gaps in infrastructure, capacity and information are identified and filled, and advocacy for funds, policies, and programs is more effective.

In addition to the specific benefits of a OH approach, it remains equally important to tackle the anthropogenic drivers of zoonoses emergence. There are important OH benefits that will arise from addressing drivers such as agricultural intensification or illegal trafficking of wildlife. Addressing such issues is naturally very complex and requires resilient agroecological food systems that rely on natural synergies and harness biological diversity for food production while protecting important wildlife habitats. Investments in local supply

chains, including strengthening local abilities to meet food safety regulations, are also part of the necessary transformation to sustainable food systems. Lastly, a farm-to-fork approach must be taken with regards to reducing risk from zoonotic diseases along the entire consumptive chain, from production to processing, and transport to consumption of food.[5]

2.3. Vietnam's commitment to international and regional agreements

Vietnam's commitment to international and regional agreements is reflected by its signing of regional OH agreements such as the Partnership for Avian and Human Influenza (PAHI) which was established in 2006 and included 26 national and international signatories. This framework aimed to support the coordination of national and international efforts related to Vietnam's National Integrated Operational Program on Avian and Human Influenza (also called the "Green Book" 2006-2010) and which was eventually extended for another five-year-period as the "National Integrated Operational Program on Avian Influenza, Pandemic Preparedness and Emerging Infectious Diseases (AIPED) 2011-2015."

Following PAHI and AIPED, the Government Office announced the Prime Minister's in principle agreement that converted PAHI into the first OHP for prevention of the transmission of infectious diseases from animals to humans. The first OHP in Vietnam was established in March 2016 and included the support of 27 national and international members. The OHP committed the GoV to improving Vietnam's capacity to prevent, detect and respond to existing and emerging zoonotic disease risks in people and animals. The implementation of this commitment was described in the National One Health Strategic Plan (OHSP) for Zoonotic Diseases 2016-2020.

According to a report by the OHP Secretariat, 51 key programs and projects were implemented[2]. These key program/project responses were multi-sectoral and multi-disciplinary and included assistance from United Nations (UN) agencies, the WB, the United States, the EU, ADB, and other key bilateral and multilateral partners. Many of the signatories to the OHP have implemented OH projects and programs in Vietnam. Several technical working groups were established, such as the Biosecurity Working Group (BSWG), One Health Communication Network (OHCN), Vietnam One Health University Network (VOHUN), and others.

During this period, Vietnam also demonstrated their commitment to adopt the OH approach by agreeing to resolutions made at national and regional meetings including:

1. The Hanoi Declaration adopted at the International Ministerial Conference on Animal and Pandemic Influenza (IMCAPI 2010), affirming the need for a long-term multi-stakeholder partnership mechanism between national and international partners and stakeholders to support cooperation and collaboration on addressing OH challenges.
2. The Joint Declaration at the 4th Ministerial Conference on the Global Health Security Agenda (GHSA) October 2017 in Uganda, affirming the continuation of activities to promote global health security using a OH approach, while providing support to expand the GHSA Program, 2020- 2024.
3. The Joint Declaration of the 14th Association of Southeast Asian Nations (ASEAN) Health Ministers Meeting in Siem Reap, Cambodia, August 2019, reaffirming the ASEAN

[2] Summary report on the performance of OHP and the implementation of the OH strategy 2016-2020

leaders' declaration on the prevention of AMR, and wish to improve ASEAN strategic framework for combining AMR through a OH approach (2019- 2030).

On September 1st, 2021, Vietnam signed the declaration of intent in support of the Preventing Zoonotic Disease Emergence (PREZODE) international initiative in coherence with the creation of the One-Health High-Level Expert Panel announced on 12 November 2020 at the Paris Peace Forum and with the recommendations of the report on biodiversity and pandemics by the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services IPBES (2020) and the UN agenda on biodiversity, Vietnam confirmed its willingness to work together for the prevention of zoonotic disease emergence by signing the declaration.

Vietnam is a member of the Convention on International Trade on Endangered Species of wild fauna and flora (CITES) which aim to regulate and control of the trade on wildlife and wild plant which also help to reduce impact to human to natural environment then eventually control the zoonotic risk from cross border wildlife trade.

OH stakeholders that were consulted as part of development of this OHP Master Plan 2021 - 2025 suggested that a more comprehensive communication program be implemented to provide visibility to stakeholders about progress on Plan activities. Further, such a communication program would facilitate the involvement of civil society organizations (CSOs) interested in OH, help to mobilize resources of non-governmental organizations (NGOs) when investing in OH projects, help to clearly identify the OH focal point for the GoV, and engage private sector stakeholders. This same communication platform could help to build and distribute a narrative that ties the OHP to Vietnam's commitments to the UN 2030 Sustainable Development Agenda and other international or regional OH initiatives. *Annex 1 describes Vietnam' commitments to the UN 2030 Sustainable Development Agenda*.

Vietnam has increased its role in managing OH commitments and engagement including its proposal to host the ASEAN Center for Public Health Emergencies and Emerging Diseases (ACPHEED), an initiative which is intended to enhance integrated and sustained ASEAN preparedness, response, and resilience to human health emergencies, particularly on emerging and re-emerging infectious diseases. The country also continues to act on its pledge to the GHSA as one of the lead countries for implementation of the Zoonotic Diseases Action Packages (ZDAP) through activities implemented at MARD, MOH, the OHP Secretariat, VOHUN, and international agencies working in Vietnam. Vietnam has made important contributions to GHSA related meetings and workshops by presenting information on implementation of ZDAP and CDC Action Packages[3] in Vietnam, GHSA projects and partners working in the country, and how GHSA and OH activities are coordinated in Vietnam.

In December 2018, Vietnam held an ASEAN-Tripartite Rabies Meeting "Towards Rabies Elimination in the ASEAN Region" which included participation of more than 100 representatives from ASEAN Member States, the Food and Agriculture Organization of the United Nations (FAO), the World Organization for Animal Health (OIE), the World Health Organization (WHO), donor agencies, and other OH partners. Vietnam is recognized as a

[3] Global Health Security Agenda: Action Packages. Retrieved from https://www.cdc.gov/globalhealth/healthprotection/ghs/pdf/ghsa-action-packages_24-september-2014.pdf, accessed November 22, 2021.

leading country in rabies prevention and control and has been the ASEAN regional focal point in the development of the ASEAN Rabies Elimination Strategy.

Vietnam has undertaken OH capacity assessments through implementation of the Health Security Financing Assessment Tool (HSFAT), Performance of Veterinary Services (PVS), and Joint External Evaluation (JEE). These efforts demonstrate Vietnam is seriously committed meeting its obligations to international and regional agreements related to OH.

To make progress on the six focus areas described in the OHP 2021-2025, Vietnam must review, then revise and update where required, its legal framework that will facilitate full adoption of the principles of OH. This will allow the country to honor its commitments to the international agreements described above as well as enable effective implementation of the OHP 2021-2025 within the country.

2.4. Gap analysis of the current One Health situation in Vietnam

The performance of the OHSP 2016-20 has recently been reviewed which provides some insight into gaps as they relate to infrastructure, capacity, and use of the OH approach in Vietnam's efforts to manage zoonotic diseases, AMR, and emerging issues. It should be noted of course that the detection of COVID-19 in the country in January of 2020 was disruptive to many aspects of government performance and to the life and well-being of the country's citizens. However, as is noted in the Plan, COVID-19 has exposed weaknesses in OH capacity in many countries around the world.

Findings from the OHSP 2016-20 combined with feedback from OH stakeholders undertaken as part of the development of the 2021-25 Plan, are presented below in the form of a "Strengths, Weakness, Opportunities, and Threats" analysis (or SWOT analysis).

Strengths

1. Basic legal arrangement for implementation of a OH approach in the government sector is in place (Law on Veterinary Medicine, Law on Livestock Production, the Law on Prevention and Control of Infectious Diseases, the Law on the Environment, the Law on Medical Examination and Treatment, among others) though more comprehensive arrangements need to be continually improved upon.
2. The control program for COVID-19 in Vietnam was recognized as amongst the best in the world. The National Steering Committee and Provincial Steering Committees for COVID-19 Control were established. An effective national emergency operations center (EOC) network was established at central and regional levels with full equipment and trained personnel that ensured effective performance.
3. GoV commitment towards sustainable and inclusive development and a OH approach is evidenced by state budget financing for sustaining the OHP Secretariat.
4. Higher strategic priorities for green growth, climate change adaptation and GHG emission reduction, and inclusive development via various target programs including National Target Program (NTP) on Comprehensive Poverty Reduction, New Rural Development (NRD), implementation of updated NDC, Socio-Economic Development in Mountainous and Ethnically Diverse Areas in 2021-2030.
5. Human health and veterinary laboratories saw improved capacity and capability. ISO certification and/or WHO accreditation has been achieved in some areas.
6. Improvements in multisectoral coordination, especially between the health and agriculture sectors, related to prevention and control of high-pathogenicity avian influenza

outbreaks. No human cases of the disease occurred during the outbreaks and bird outbreaks were promptly resolved.

7. Important milestones related to control of dog-associated rabies were achieved including increased rates of vaccination and development of a National Action Plan (NAP) on rabies control and elimination.

Weaknesses

1. Government sector capacity to support a multi-sectoral OH approach in dealing with zoonotic issues in the context of COVID-19. The OH approach is not yet institutionalized in the public sector nor been adopted as business-as-usual. Constraints remain that make it difficult for individuals or agencies to work easily between Ministries.

2. Poor multi-sectoral operational culture in the government system occurs both at the level of inter-ministerial (horizontal) work and intergovernmental (vertical) work.

3. Low government ownership of the OH approach. A more comprehensive legal structure is required to facilitate and reward cross-sectoral OH approach.

4. Lack of concrete guidance to develop policy frameworks that show how contextual and upstream changes can produce favorable behavioral outcomes with the development of interventions at a multi-dimensional and intersectoral level.

5. Lack of technical guidance for application of a OH approach in specific sectors and/or localities.

6. Though some individuals are well-versed in OH methods, there is generally a low awareness amongst most workers regarding what constitutes a OH approach, when it is required, and why it should be used. This is particularly evident in lower levels of government and in front-line workers.

7. Insufficient legal structure, lack of coordination in implementing regulations, and lack of technical capacity to enable data collection, storage, and sharing particularly about food safety, zoonotic disease and AMR. There is no consensus on techniques for data implementation, storage and analysis at relevant agencies.

8. Lack of incentives for the private sector to engage in OH initiatives with the public sector or with donors/NGOs.

Opportunities

1. Vietnam has clear commitments to Sustainable Development Goals (SDGs) (Annex 1) and other international agreements that are relevant to OH issues. Strategy and funding should be identified to ensure Vietnam meets or exceeds its obligations.

2. A number of regional OH initiatives are operating throughout South and Southeast Asia. While Vietnam is specifically involved in, or targeted as a beneficiary in some of these, there is an opportunity to secure more value from these initiatives if there were more visibility about them, perhaps via the OHP Secretariat.

3. Improved biosecurity (between farms, within farms) would allow for Vietnam's competitive poultry and pork industries to achieve higher productivity, leading to increased prosperity to all people (more and cheaper food) and producers (higher sales and export opportunities).

4. Sector restructuring agenda, especially in agriculture and rural development, towards a more productive, market-linked, and internationally integrated sector for sustainable development.

5. DPs' interests and initiatives in adopting a multidisciplinary approach in dealing with root causes of zoonosis.

6. More funding modalities opened for private sector engagement.

7. In line with JEE recommendations, emergency response capacities in the animal health sector should be strengthened.

8. Strong encouragement and commitment from international DPs and donors, especially identifying the relation between wildlife trafficking and zoonotic pathogen risk.

9. Some strategic partners of the OH have actively deployed programs in the region that emphasize the importance of OH. Vietnam should coordinate with these ongoing efforts.

10. Existing activities in food safety (United Nations Forum on Sustainability Standards, the Vietnam Standing Steering Committee on Food Safety, ILRI national food safety working group, and many other donor-led initiatives) should be included fully in activities to be coordinated under the OHP to ensure Vietnam meets in obligations to provide a safe food supply domestically and to be in a favorable position for exporting food products.

Threats

1. The VUCA world (Volatility, Uncertainty, Complexity, and Ambiguity): high threat of new zoonotic diseases.

2. High risk of AMR due to unregulated and proliferating use of antibiotics in the human health and agriculture sectors.

3. More intensive and extensive growth of agriculture, deforestation, urbanization, and other productive activities have reduced living spaces for wildlife.

4. Capturing, trading, and illegally transporting wild animals increases the risk of transmission of dangerous infectious diseases to humans and domestic animals.

5. Though high-level legal regulations exist, there remains too much improper trade and use of antimicrobial drugs in humans, livestock, and poultry creating a substantial risk of increasing problems due to AMR.

6. Risk from cross-border and cross-continent wildlife trafficking, migratory species, and a poorly regulated wildlife farming industry.

7. Lack of trust and bottom-up approaches between stakeholders in the value chain and authorities creates a difficult environment for promoting behavioral change.

8. Weak connections between human health and agriculture sectors on one hand and environmental protection on the other hand, which may lead to inadequate emphasis on impact of climate change on human and animal health.

9. By not including it as a key OH focus area in the current OHP, food safety appears to have been deemphasized relative to other OH issues. Therefore, there is a risk that this important OH area will not be given the attention and funding necessary to meet expectations of international organizations and donors that are heavily involved in this area.

From the SWOT analysis, additional key issues are identified that need to be critically addressed through activities proposed in the OHP Master Plan 2021 - 2025:

1. The OH partnership should be extended to engage more visible and active participation of environment and climate change activities, including the risk of diseases moving into new areas, interaction of intensifying disasters and disease risks, increased vulnerability due to livelihoods impacts, and increased pressure on habitats and water.

2. Strengthening the legal framework to facilitate multidisciplinary and multisectoral coordination is crucial to being able to fully operationalize the OHP Master Plan 2021 - 2025.

3. Vietnam’s high commitment to, and active participation in, related international protocols, together with its rich experiences in dealing with diseases and pandemic, should be deeply explored to help effective implementation of the OHP Master Plan 2021 - 2025.

2.5. Establishment of the 2021-2025 OHP

On March 23, 2021, a ceremony was organized with 31 partners to sign the new OHP Framework. The OHP *(Annex 2)* provides an implementation path for planning and coordinating all OH activities in the country that contribute to the six focus areas listed in the OHP Framework. The Plan advocates for, coordinates resources, and serves as a collaboration hub for organizing and implementing OH activities.

During the period 2016-2020 when the first OHP was established and with the active engagement of 27 government partners (MARD, MONRE, MOH, others), UN agencies, the WB, ADB, US Embassy, Embassy of France, USAID, and other domestic and international partners, the first OHP facilitated a number of prominent OH-related activities:

The first OHP created an important platform that facilitated multi-sectoral coordination and has helped to connect, promote, and enhance coordination among related units within the framework of OH in Vietnam.

Contributions were made to Government agencies to complete, submit, and enact related laws and regulations such as those described in sections above.

Cooperation and support for OH initiatives were provided for Vietnamese partners (MOH and MARD) to improve capacity for epidemic prevention and control, and to minimize epidemic outbreak risks in a systematic manner for specific diseases such as SARS, H5N1, H1N1, H5N6, and others.

A system of preventive measures was improved by increasing capacities in various ways:

1. Multi-sectoral coordination.
2. Development, review, update, and regular exercise of influenza pandemic response action plans.
3. Training and human resources development.
4. Investment in equipment, together with Government agencies, to achieve laboratory compliance with international standards and ISO 15189 (66 laboratories now eligible to perform COVID-19 testing and three laboratories for rabies testing). Laboratories that meet international standards and ISO 17025 are qualified to perform food safety testing and antimicrobial resistance monitoring.
5. Support across the health sector to establish, provide equipment, and train human resources for operation of five EOCs.
6. Establishment of the VOHUN.
7. Development of communication messages and implementation of risk communication activities.

Regular and periodic surveillance was carried out for high risk and endemic diseases and avian influenza viruses (H5N1, H5N6, H1N1) at poultry farms, markets, and slaughterhouses. As a result, in the past five years, small outbreaks among poultry were successfully controlled without extensive spread and no human cases were recorded. To date, no H7N9 viruses have been detected in Vietnam, unlike the situation in some neighboring countries.

Cooperation and participation have been organized for effectively implementing the NAP on Antimicrobial Resistance for 2021-20304. Similarly, the NAP on Antimicrobial Resistance for the agricultural sector for 2021-2025 has also been actioned.

Active surveillance was coordinated for specific zoonotic diseases among farmed wildlife and other natural species (bat droppings).

Information systems and information sharing mechanisms have been gradually improved to support timely reporting to relevant local agencies and WHO, OIE, and FAO.

8. Support and cooperation were provided to assist international conferences and workshops such as: the 3rd Coordination Conference on ZDAP; An international conference on new emerging infectious diseases in Asia- Pacific region; the ASEAN Tripartite Conference on Rabies Control and the ASEAN Rabies Elimination Strategy (ARES); participation and contribution to the GHSA Summit, etc.

In addition, during the COVID-19 pandemic, OHP partners including WHO, CDC, and others cooperated with Vietnam to improve capacities in three essential areas:

1. Establish surveillance networks to rapidly contain the outbreak, preventing uncontained spread of the virus.
2. Provision of equipment, devices, and analytical tests to the EOCs at central and local levels.
3. Improved human resource capacity in frontline healthcare workers by training and assistance with identification and tracing of at-risk people.

3. Strategic orientation

3.1. Vision for 2025 and beyond

In August 2021, the Minister of MARD delivered an important speech at a national forum on "**Connecting Agricultural Production and Consumption**". In his remarks, the Minister made references to the importance of OH when he stated, "connecting agricultural products is connecting people". In the speech, he emphasized the importance of Vietnam adopting the idea of "green agriculture" whereby the industry synchronously applies processes and technologies to rationally and efficiently use and conserve natural resources.

In December 2021, the Minister of MARD chaired the International Support Group (ISG) Plenary Meeting 2021, the annual high-level dialogue entitled "**Green Partnership for New Agriculture**". Green agriculture aspires to create new value for agricultural outputs while simultaneously meeting the need to minimize production costs, social costs, and environmental costs. A philosophy that promotes environmentally friendly and resilient food systems requires effective linkages between and integration of agriculture, health, and the environment; these means migration from a single-sector development mindset to one that seeks inter-sectoral integrated development. Food safety is a key area of OH research and practice in Vietnam as it represents major concerns of the public and the GoV and therefore

[4] At the time this OHSP was written, the implementation strategy for the NAP is in the final stages of completion by MOH for submission to the Prime Minister.

the GoV has several programs to control foodborne diseases.[11] For example, the SafePORK project (2017–2022) is developing market-based approaches to improve hygienic practices at slaughterhouses and wet markets and WHO is working with national organizations to strengthen lab-based surveillance systems for important foodborne pathogens including *E. coli*, *Salmonella spp*., and *Shigella*.

This transformation Green Partnership should not be limited to the private sector but also demands integration in the public sector whereby local administrative boundaries should give way to inter-regional and inter-provincial development whenever possible. Principles of a green agriculture sector include:

1. Protecting the environment, ecological systems, reasonable use of natural resources, and conserving biodiversity.
2. Considering solutions that are responsive to the problems of climate change.
3. Focusing on training farmers with emphasis on having a positive attitude, encouraging self-reliance, networking, and cooperation. This includes supporting farmers' access to knowledge, technology, information related to the market, food safety and hygiene, and sustainable development.
4. Providing community-based tourism visitors with experiences of local life, in which local communities are directly involved in tourism activities and receive socio-economic benefits from these activities, and are responsible for conserving natural resources, environment and local culture.

The GoV efforts such as those demonstrated by MARD above show that the OH approach is well recognized, and efforts are being made to mainstream its' use in the government sector. These ongoing efforts are part of a comprehensive and integrated approach, based on effective public and private partnerships, to minimize the risk of zoonotic pathogens' and environment agents' spill over, and to reduce the occurrence of antimicrobial resistance in Vietnam. Successful implementation of the OHP Master Plan 2021 - 2025 will increase the government's preparedness for full integration of OH approach in fulfilling Vietnam's international commitments to inclusive and sustainable development agenda towards 2030.

3.2. The alignment of main One Health objectives with UN's Sustainable Development Goals (SDGs)

Aligning the objectives proposed in the 2021-25 OHP framework with existing international and regional frameworks can help to promote the success and sustainability of a national OH approach for management of key human and animal health issues. Most countries work within one or more frameworks that require coordination across sectors and disciplines. Examples of these frameworks include:

1. International Health Regulations (2005) [12]
2. OIE standards [13]
3. Global Health Security Agenda [14]
4. Codex Alimentarius [15]
5. Global Action Plan on Antimicrobial Resistance [16]
6. International Food Safety Authorities Network (INFOSAN) [17]

All of these frameworks seek to align themselves with the UN's SDGs [18] as donor organizations tend to model their most substantial, longer-term investments with one or more of the Goals. The 2030 Agenda for Sustainable Development aims to eradicate poverty and

achieve sustainable development. These goals take an integrated approach, stress equity and sustainability, and are relevant to all countries. At national, regional, and global levels, indicators for measuring progress towards achieving the SDGs have become a priority for national governments.

Taking a multisectoral, the OH approach for zoonotic disease control that addresses the interconnectedness of health and its social and economic determinants aligns with the SDG framework. Health is a critical consideration in achieving the 17 goals and taking a OH approach in health activities will support making progress in achieving the SDGs, see *Annex 1*.[6]

The language used in the 2021-2025 OHP Framework shows that Vietnam is aware of these existing regional and global OH initiatives and is actively seeking to align proposed activities of the GoV and partners with them. This alignment will reduce the chance of duplicating research or actions being done by others, contribute to positive regional and global health outcomes rather than only Vietnam benefiting, and increases the likelihood of successful outcomes by taking advantage of expertise available through the regional and global initiatives.

3.2.1. Emerging/re-emerging diseases

In addition to problems related to existing zoonotic diseases, EIDs are of increasing concern to the global community because of their epidemic and endemic potential and their wide-ranging socioeconomic impacts. Some of the most recent examples of EIDs include COVID-19 globally, Nipah virus in South Asia, and high-pathogenicity avian influenzas (such as the pandemic occurrence of H5N8 strains currently circulating in commercial poultry and waterfowl). Other EIDs will emerge in the future unexpectedly and may disperse rapidly and widely due to several interrelated factors and global trends. These include:

1. Dramatic increase in human population (particularly in Asia, Africa, and Latin America).
2. Strong economic growth in some Asian countries, accompanied by rapid urbanization and greater demand for food, particularly of animal origin.
3. Persistent increases in poverty with a concomitant reliance on smallholder livestock and poultry production, often near population centers. Lack of good biosecurity in these farming systems and market chains is a major factor in the emergence and spread of infectious diseases due to contamination of drinking water and peri-urban community members coming into direct contact with these animals and their effluent.
4. Increasing human population has resulted in encroachment of commercial and non-commercial livestock production into nature areas, putting these farmed animals into more frequent contact with wildlife. Additionally, this encroachment leads to displacement of wildlife (notably bats and rodents) into the human community.
5. Demand by humans for ‘bush meat’.
6. Climate change, particularly global warming, has changed ecosystems in many regions and has extended the distribution of vectors which transmit diseases, increased the frequency and scale of natural disasters, and significantly altered spatial and temporal rainfall patterns.
7. An increase in illegal wildlife trafficking concurrent with loss of biodiversity. The destruction of forests and their replacement by monocultures is leading to increased incursions of wild animals into living areas.

3.2.2. Antimicrobial resistance

Antibiotic resistance develops when bacteria adapt and grow in the presence of the irrational use of antibiotics. The development of resistance is linked to how often antibiotics are used. Drug-resistant bacteria can circulate in populations of human beings and animals, through food, water and the environment, and transmission is influenced by trade, travel and both human and animal migration.[16] Antimicrobial resistance is a broad term and encompasses not only resistance to drugs for treating bacterial infections, but also infections caused by other microbes including parasites (e.g. malaria), viruses (e.g. HIV), and fungi (e.g. Candida).[5]

The emergence and spread of AMR bacteria are influenced by antimicrobial use in humans, livestock animals and aquatic animals. Inappropriate use, including misuse and overuse of antimicrobials in humans, food animals and crop production accelerate the rate at which AMR is occurring.[19] In some countries, antibiotics are widely used in healthy food-producing animals for non-therapeutic purposes such as to improve feed efficiency or rate of weight gain. This practice favors the emergence and spread of resistant bacteria in food animals and in human populations. Resistant microorganisms carried by food-producing animals can spread to humans through consumption of contaminated food, direct contact with animals, or through the environment (e.g., in contaminated water). For most human cases of AMR bacterial infections, the extent to which the resistance was initially generated or acquired from food-animal populations, humans, or the environment is unknown.

Antimicrobial resistance threatens the very core of modern medicine and the sustainability of an effective, global human health response to the enduring threat from infectious diseases. Effective antimicrobial drugs are prerequisites for both preventive and curative measures, protecting patients from potentially fatal diseases and ensuring that complex procedures such as surgery and chemotherapy, can be provided at low risk. Yet, systematic misuse and overuse of these drugs in human medicine and food production have put every nation at risk. Few replacement products are in the pipeline. Without harmonized and immediate action on a global scale, the world is heading towards a post-antibiotic era in which common infections could once again kill.

For farmers, animal husbandry, and the food industry, the loss of effective antimicrobial agents to treat sick animals' damages food production and family livelihoods.

Today, there is considerable awareness of the need for action to combat antimicrobial resistance. Support is multisectoral, and there is increasing collaboration among the relevant sectors, in particular, human health, animal health, and agriculture. The Global Action Plan on Antimicrobial Resistance [16] highlights this issue and provides an international framework for collaboration amongst the "Tripartite" organizations that represent these sectors (FAO, WHO, and OIE) though each continues to maintain their own strategies for investing in AMR control and surveillance.[20, 21] In addition, the EU has developed a strategy that aligns broadly with principles identified in the Global Action Plan.[22] The Global Action Plan outlines five objectives for managing AMR:

---

[5] http://www.emro.who.int/health-topics/drug-resistance/what-is-the-difference-between-antibiotic-and-antimicrobial-resistance.html

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.
4. To optimize the use of antimicrobial medicines in human and animal health.
5. To develop the economic case for sustainable investment that takes account of the needs of all countries and to increase investment in new medicines, diagnostic tools, vaccines, and other interventions.

To understand the complexity of AMR epidemiology and to help policy makers develop appropriate risk mitigation measures, AMR surveillance systems must involve various government authorities working at different scales, as well as private actors, and allow for the monitoring of antibiotic resistance and consumption in the human, animal, and environmental sectors. Steps should be taken to develop new collaborative practices, accepted and applied by all actors, and to improve mutual understanding and trust between actors, in order to provide a more appropriate operational framework.

3.2.3. Zoonotic diseases

Zoonotic diseases, or zoonoses, are diseases shared between animals (including livestock, wildlife, and pets) and people. They can pose serious risks to both animal and human health and may have far-reaching impacts on economies and livelihoods. Zoonotic diseases are commonly spread at the human-animal-environment interface – where people and animals interact with each other in their shared environment. Zoonotic diseases can be foodborne, waterborne, vector-borne, transmitted through direct contact with animals, or transmitted indirectly by fomites or environmental contamination.[6]

While the list of potentially zoonotic agents is very long, many international organizations have focused on a smaller handful of agents that have posed a persistent threat to human and animal health for hundreds of years and remain significant burdens even today. These diseases are sometimes referred to as neglected zoonotic diseases (NZDs).[23] The WHO developed a list of seven of the most important NZDs in 2005 and the list remains accurate today.[24]

1. Anthrax
2. Bovine tuberculosis
3. Brucellosis
4. Cysticercosis
5. Hydatid disease
6. Rabies
7. African trypanosomiasis

Neglected infectious diseases such as brucellosis and anthrax, can be seen both as an outcome and determinant of poverty.[23] Socioeconomic factors ranging from occupation, educational access and attainment, income, access to food and water resources, and housing quality or mobility - may contribute significantly to the exposure, susceptibility, health, and productivity burden of societies.

These factors often intersect closely with animal and environmental exposures. For example, livestock-dependent populations, comprising over one billion people globally, have elevated direct exposure risks to livestock-transmitted zoonoses. However, in addition to

direct health burden, they may also suffer from the impacts of zoonotic (and non-zoonotic) outbreaks on livelihoods and economic solvency, and in cases of subsistence farming, nutrition security.

Livestock diseases may also reduce livestock productivity and therefore challenge sustainability of smallholder livestock raising and contribute to environmental degradation through unnecessary greenhouse gas emissions, and feed, water, and antimicrobial resource use. Further costs of NZDs are related to their non-health impacts including interruptions in education, decreased worker productivity, decline in tourism, and societal stigma. The cost of treatment for an infectious disease may constitute a large portion, or be in excess of, annual wages for the poor and have the potential to be catastrophic financial event for an individual or household and potentially leading to treatment delays that later inhibit treatment efficacy.

In Vietnam, it should be recognized that several other pathogens could be added to the WHO list of important zoonotic agents including avian influenza, *Streptococcus suis* infection, pandemic influenza, foodborne bacterial diseases, and leptospirosis.[25]

It shouldn't be forgotten that zoonotic diseases do not only affect people. Many of them, including those listed above, are significant animal pathogens in their own right. Due to the multiple functions fulfilled by livestock in rural societies (as sources of food, income, and social status), all animal diseases ultimately have an impact on humans. Controlling most animal diseases, including those that are not able to cause disease in humans (e.g., the current outbreak of African swine fever in Vietnam) can benefit from control programs that take an integrated, OH approach.

3.2.4. Food safety

Many, if not most, of all important zoonoses relate in some way to animals in the food production chain.[26] Therefore, it follows that food is an important vehicle for many, but not all, of these zoonotic pathogens. Past outbreaks of food-borne diseases have largely been viewed only through the lens of public health; yet food-borne illnesses are closely associated with the link between human and animal populations, and with the surrounding environment.

The causes of food-related zoonoses can be separated into three major classes: Parasites, bacteria, and viruses. Parasites often have only a limited animal host range but nonetheless, can contribute significantly to an individual human disease burden. Viruses, by contrast, have been the cause of major, well-published global outbreaks (e.g., SARS, and avian- and swine-influenza) capable of efficiently being transmitted amongst people under unique circumstances. Bacterial zoonoses on the other hand, frequently produce sporadic, but very widespread disease cases which tend to be less likely to occur as epidemics, but create a major, persistent disease burden in all countries of the world (e.g., Salmonella and Campylobacter).

Although a number of very important zoonoses are related to, and in some cases are directly transmitted to people from wildlife, the vast majority of zoonotic foodborne disease cases in the world actually relate to animals bred for food purposes. Such zoonotic pathogens include bacteria, such as *Brucella*, *Salmonella*, *Campylobacter*, verotoxigenic *E. coli*, and *Leptospira*, parasites such as *Taenia*, *Echinococcus*, and *Trichinella*, and viruses such as influenza A and Rift Valley Fever virus.

To prevent foodborne diseases and promote food safety and food security effectively, therefore requires a OH approach.[27] In 2015, the United Nations General Assembly agreed

upon 17 global Sustainable Development Goals, the first of which was: “End poverty in all its forms everywhere” and the second to “End hunger, achieve food security and improved nutrition, and promote sustainable agriculture”.

Food safety is a global priority and most believe that every person in the world has the right to have access to safe and nutritious food. This notion has resulted in constant increases in the amount of food imports into nearly all countries of the world to meet the increasing demands of growing populations.

Food is prone to various safety issues if it is not produced or handled in a safe manner. Increasing international trade of food makes it easy for contaminated food from one country to cause an outbreak of foodborne illness in another country. Challenges to food safety include contamination with microbial pathogens, chemical pollutants, heavy metals, food additives, pesticide residues and drug residues.

However, steps related to food processing or preparation introduce additional food safety risks related to a lack of personal or poor environmental hygiene. Food contamination is very common and can be due to human activity or natural phenomena. The illegal and uncontrolled use of pesticides, veterinary drugs and chemical preservatives increases the risk of food contamination in agricultural production. Contamination with heavy metals, such as cadmium, lead and mercury, occurs mainly through environmental pollution. In slaughterhouses, meat can become contaminated with pathogens due to co-mingling of animals before slaughter or meat after slaughter.

Local outbreaks of disease can turn into international emergencies due to the speed and geographical range of product distribution. Therefore, a sound food supply should be established through effective production processes, supply chains, and markets.

Food safety and food security are interrelated concepts with a profound impact on the quality of human life and require a OH approach to be effective in protecting the well-being of people, animals, plants, and our shared environment. The EU has recently adopted a new strategy, namely “Farm to Fork”, aiming to make food systems fair, healthy, and environmentally friendly. In line with such strategy, the EU intends to contribute to the global transition to sustainable agri-food systems by promoting new technologies and scientific discoveries, bringing new opportunities for operators in the food value chain, and increasing public awareness and demand for sustainable food.

Improving food safety is an essential element of improving food security, which exists when populations have access to sufficient and healthy food. Farmers, livestock keepers, processors and vendors must be diligent as they are the ones who are primarily responsible for any deficiency. Government agencies must enforce and update laws beneficial to public health. In addition, government agencies must educate the public about steps to prevent foodborne diseases and the general public, must adhere to the safety rules. A single person or organization cannot address food safety challenges alone.

3.2.5. Human-animal-ecology interface

“Ecosystem” refers to the combined physical and biological components of an environment, with a dynamic complex of plant, animal, and microorganism communities and their nonliving environment interacting as a functional unit. These organisms form complex sets of interrelationships in our planet and disruptions to this ecosystem can have an adverse impact on our health in various ways through complex pathways.[28]

With a OH approach, the public health and animal sectors need to be better coordinated with the environmental sector; authors have noted the environmental sector tends to be neglected in the OH triad (human – animal - environment).[29]. One recent report from Vietnam indicated that a limiting factor for this is the scarce research dedicated to environmental health and forestry protection in the country [11] and that a key means to address this challenge was through a more significant role for MONRE in the OHP 2021-2025.

Human health and diseases are determined by many complex factors. Health threats from the human-animal-ecosystems interface, through emergence and reemergence of zoonotic diseases impose a continuously increasing risk to human health from pathogens transmitted through contact with animals, food, water, and contaminated environments. It is important to remember however, that the rise of emerging infectious diseases threatens not only humans, but also the fauna and flora that make up the critically needed biodiversity that supports the living infrastructure of our world, in which human health and animal health are intimately connected. Food, farming, and the environment serve as key connecting points to the challenges in this domain.[28]

Environmental hazards can occur in the form of biological, chemical, physical, psychological and sociological, or site and location hazards. All of these hazards can also be affected by the changes or disturbances to biodiversity and its subsequent ecosystem services, and therefore be harmful to human health. The Millennium Ecosystem Assessment report detailed how ecosystem health contributes to human well-being through sustainable ecosystem services and conditions for human health.[30] Changes or disturbances to biodiversity and to ecosystem services are, in turn, affecting the ecosystem functions in provisioning, regulating, and supporting dimensions to all life on earth, including humans and animals (***Figure 2*** and ***Figure 3***).

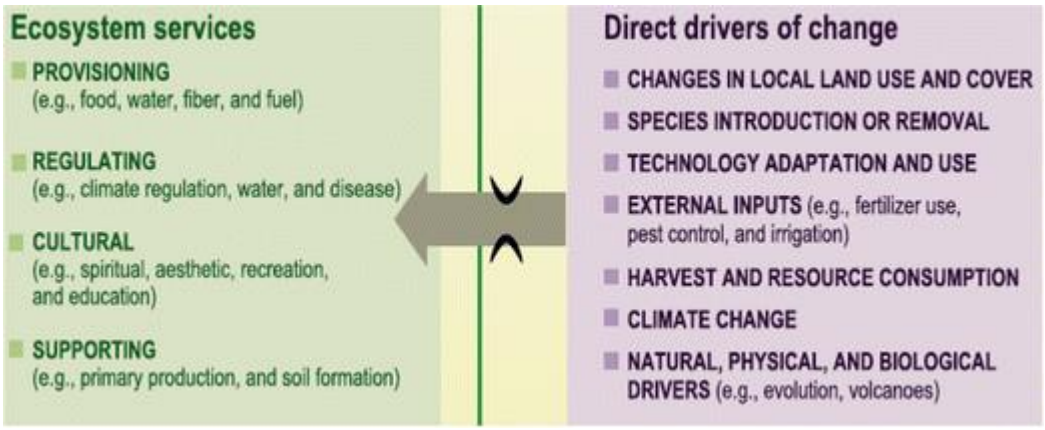


Figure 2. Direct drivers of change that have adverse effects on ecosystem services.[30]

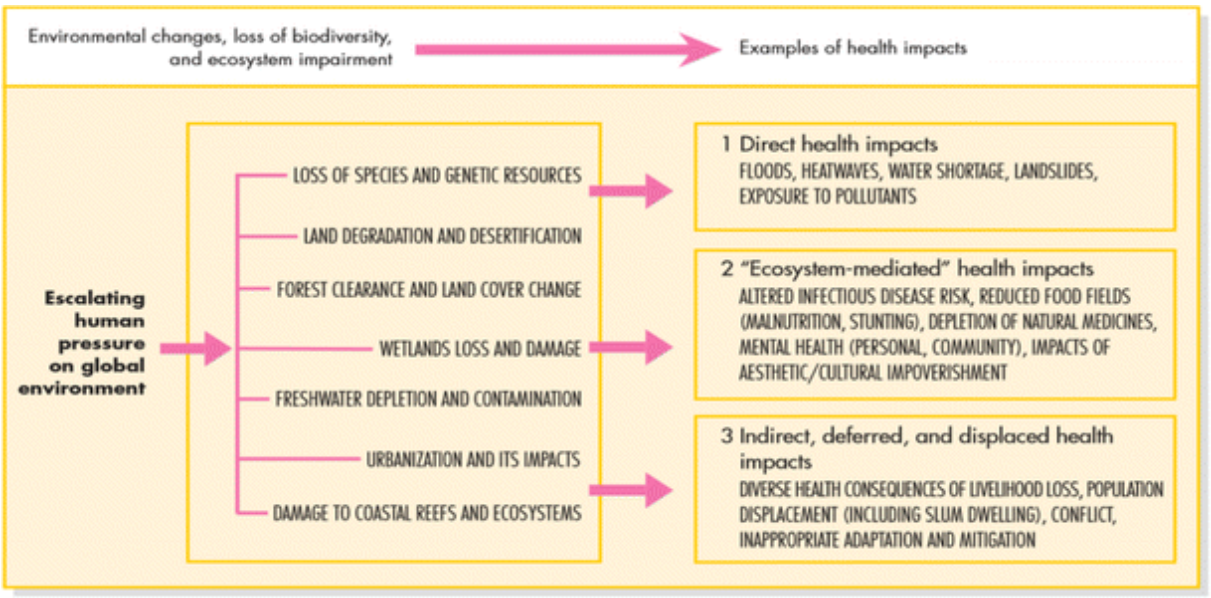


Figure 3. Examples of health impacts from ecosystem disturbances related to environmental changes, loss of biodiversity and ecosystem impairment.[28]

Ecological changes are a major predisposing factor for the rising threat of zoonoses. There are numerous examples of emerging and reemerging infectious diseases that are linked, in part, to the ecology of vector habitats, climatic changes, disruptive patterns of land use, changes to the hydrological environment, as resultant effects of these disturbances on rodent ecology. In addition, human-induced disturbances to our environments and food systems, such as air pollutions, water pollutions, misuse of antibiotics and growth hormones, over-fishing, abuse of chemical usages, food fraud and overlook of food animals and poultry welfares, all have the potential to contribute considerable additional risk to human and animal health.

4. Delivering outcomes of the One Health Partnership 2021-2025

The current COVID-19 pandemic has spread to every corner of the globe, affecting nearly everyone and creating a substantial burden to physical and mental health because of clinical disease and death. Some might say the pandemic has "swept away the fruits of humanity accumulated over many years, claiming the lives of many and threatening the lives of millions." According to a recent WB Report,[31] the global economy will shrink seriously with per capita income in emerging market and developing economies [32] (EMDEs) including Vietnam expected to decrease by 4.9% in 2021 with a further 3.6% decrease in 2022. By the end of 2021, it is expected that about 100 million people across EMDEs will have fallen back into extreme poverty, increasing the risk of social instability. More than 40% of production and business industries of countries are directly affected by epidemic blockade measures".[6]

It is time for human beings to more seriously consider the importance of the human-animal-ecosystem interface when attempting to lower the risk of new, re-emerging, and recurring infectious diseases occurring in humans, livestock, and wildlife. As COVID-19 has

[6] Summary report on performance by the Vietnam One Health Partnership for zoonoses (OHP) and implementation of Vietnam One Health Strategic Plan for zoonotic diseases (OHSP) 2016- 2020.

shown, these diseases can have substantial, rapid, cross-border, and far-reaching consequences that have a direct effect on human health, livelihoods, economic development, as well as other aspects of our social life.

4.1. Relevant legal framework and regulations

The current legal framework and regulations relevant to OH and the OHP help Vietnam to implement its commitments to regional and international OH initiatives to which they are a signatory. Vietnam has deployed a variety of legal frameworks and regulations; the key ones are listed in the Framework are described below:

1. The Joint Circular No. 16/2013/TTLT-BYT-BNN-PTNT dated May 27, 2013, issued by the MOH and MARD guiding joint activities for prevention and control of animal disease. However, this Circular lacks direct involvement of environment and health officials (MONRE, etc.) as a mean of officially involving MONRE in inter-ministerial efforts.
2. The Official Letter No. 6334/VPCP-HTQT dated August 12, 2015 from the Government Office announced the Prime Minister's in-principal agreement on converting PAHI into the first OHP for prevention of transmission of infectious diseases from animals to humans.
3. The OHP Framework, signed on March 1, 2016 between MARD, MONRE, and MOH secures the involvement of many domestic and international partners.
4. The OHSP 2016-2020, approved by MARD, following the Decision No. 5273/QD-BNN-HTQT dated December 19, 2016.
5. Directive of Deputy Prime Minister Vu Duc Dam in the Official Letter No. 10552/VPCP- QHQT dated December 16, 2020 whereby the Government Office approved the revised 6. OHP Framework for 2021-2025.

Decision No. 2717/QD-BNN-TCCB dated June 18, 2021 on the establishment of the Partnership Framework of Vietnam OHP for zoonoses in the period of 2021- ***(****attached Appendix 3).*

Towards the end of the life of the 2016-2020 OHP, some regulations were promulgated to improve activities in relation to OHP's implementation, especially for some specific actions urgently needed in response to infectious diseases such as COVID-19:

1. The MOH promulgated annual Plans on Prevention and Control of Infectious Diseases. These Plans are the foundation for Department of Health at provincial levels to approve and invest fees for active control and prevention of infectious diseases.
2. The Prime Minister issued Decision No. 170/QD-TTg on January 30, 2020 establishing the National Steering Committee for the Prevention and Control of Respiratory Infections caused by new strains of coronavirus and to guide the Committee's working regime. The Steering Committee, composed of leaders of ministries and agencies and headed by the Deputy Prime Minister, has made timely decisions to help manage the dangers caused by the epidemic but with regard to the need to have a balanced approach that would minimize negative effects on the country's economy and people's livelihoods.
3. On July 23, 2020 the Prime Minister promulgated Directive 29/CT-TTg on an urgent basis to stop the import of wild animals (alive or dead), eggs, larvae, or parts and derivatives of wild animals. This was done in an effort to control zoonotic disease risks related to wildlife trafficking. Relevant Ministries and sectors were also assigned the task of improving communication networks to provide education about wild animals' management and to complete a review of the legal system, sanctions, and penalties for violations to related laws.

4. On February 6, 2021, the MOH also promulgated Decision 1070/QD-BYT for the Plan on Prevention and Control of Infectious Diseases for implementing specific action plans at the Department of Health around prevention and control of infectious diseases. This directed for the participation in a joint assessment of the key health capacity for Vietnam under the World Health Regulations (IHR 2005) and allowing for the development and issuing of an Action Plan for IHR implementation.

While the first OHP laid down the foundation for better application of a multi-sectoral approach to deal with zoonotic disease risks, many of the original human and animal health issues that prompted development of the first OHP remain and the need for a OH approach is as important as ever. Successful management of challenges such as COVID-19 will require multidisciplinary coordination through a OH approach and thus maintaining and expanding the OHP is very necessary. The coordination for OH approach's application is a key element for the successful control and prevention of dangerous diseases such as COVID-19. The OHP framework describes mechanisms and a pathway that can help to mobilize and coordinate resources, improve knowledge, and learn from shared experiences. These are all useful tools necessary for overcoming COVID-19 and other future pandemic agents, managing risk factors that encourage development of zoonotic disease outbreaks, and for encouraging good behaviors that will help to minimize transmission of pathogens between people, livestock, poultry, and wildlife.

To ease the implementation of Vietnam's commitments to international agreement that promote OH (such as SDG, GHSA, ZDAP, IHR, etc.) and achieve better health and prosperity for its people, Vietnam should review its relevant legal structures and revise those that constrain institutional adoption of OH approaches to solving human and animal health problems. In addition, Vietnam is facing major issues like loss of biodiversity, climate change, rising sea levels, and encroachment of humans into forest and wildlife areas that have the potential to significantly hamper existing initiatives to improve the well-being of the country's people. Given these wide-ranging issues, Vietnam must ensure that it has a comprehensive legal framework which can allow for effective mobilization of resources to manage all OH issues in an integrated manner. Importantly, all these efforts need to be accompanied by public messaging that can increase the people's awareness of OH issues and how their personal actions can affect good outcomes.

From a legal standpoint, these key problems require important action. Inter-ministerial or cross-sectoral actions for management of OH problems need to be conducted under appropriate laws and regulations. In particular, for the coordination among MARD, MOH and MONRE in prevention and control of infectious diseases from animals to human beings, the issues should be covered such as:

1. Surveillance of zoonotic diseases.
2. Investigation and handling of outbreaks of diseases transmitted from animals to humans and vice-versa.
3. Communication on prevention and control of zoonotic diseases.
4. Training and scientific research on prevention and control of zoonotic diseases.
5. Change people's behavior through training and communication activities that increase people's awareness of OH and behaviors that contribute to zoonotic disease.
6. Ensure the role of the OHP Secretariat is recognized and resourced as a management unit for coordinating OH activities in Vietnam.
7. Ensure the participation of the MONRE.

The current legal system of Vietnam has numerous regulations related to OH. However, these regulations are scattered under different laws and guidance documents making it difficult to clearly understand how each should work. There should be a mechanism to provide clear guidance about how OH actions should be coordinated through all of the related inter-ministerial and cross-sectoral mechanisms described in the OHP.

Vietnam cannot simply rely on its high-level commitments to international agreements that promote the principles of OH (such as SDG, GHSA, ZDAP, IHR, etc.) to achieve better health and prosperity for its people. As it currently exists, Vietnam does not have a comprehensive official legal framework that can effectively institutionalize principles of OH in the public sector. Current regulations, laws, decrees, and circulars tend to rely on uncoordinated efforts that do not reward Inter-ministerial or cross-sectoral actions for management of OH problems. This issue is particularly important when OH problems are affected significantly by major issues like loss of biodiversity, climate change, rising sea levels, and encroachment of humans into forest and wildlife areas. Therefore, it seems necessary to have a specific regulation that will compel relevant ministries such as MARD, MOH, and MONRE to work jointly under a unique and effective working management regime so that good progress can be made on implementation of activities that will deliver on Vietnam's promise to make improvements in six OH focus areas as outlined in the OHP Master Plan 2021-2025.

However, when reviewing the current and latest legal frameworks of Vietnam, many stakeholders that were consulted in preparing this Plan noted that Vietnam's incomplete legal framework lacks clear direction or suggestion of an appropriate mechanism for ministries to institutionalize use of a OH approach when dealing with zoonotic disease problems.

A good example of the overlapping regulations (and therefore overlapping Ministerial obligations) that complicate efficient work on OH issues is related to wildlife. Vietnam became an official member of CITES in 1994. Since then, the Convention's provisions have been step-by-step incorporated into the country's legal framework and in general terms, the management authority for this Convention resides within MARD as described in Decree No.06/2019/ND-CP on Management of Endangered, Precious and Rare Species of Forest Fauna and Flora and Observation of CITES dated January 22, 2019. However, multiple laws including the Law on Organization of Government dated June 19, 2015, the Law on Forestry No. 16/2017/QH14 dated November 15, 2017, and the Law on Fisheries No. 18/2017/QH14 dated November 21, 2017 all outline additional regulations and responsibilities that affect how compliance with CITES will be managed. Further, the Ministry of Finance (provides information and statistical data on specimens of CITES-listed endangered species), customs authorities (control of export, import, re-export and introduction from the sea of CITES specimens), provincial authorities (regulation of breeding, rearing, and artificial production facilities of CITES species), and many other agencies (public security forces, border defense, tax agencies, market management authorities, veterinary authorities, animal quarantine and plant quarantine agencies, environment protection agencies, and others) all have roles in regulating wildlife trade in Vietnam and these agencies must work in a coordinated way to be effective. This is particularly important as CITES is primarily focused on species preservation and conservation, with outcomes related to reducing the opportunity for zoonotic disease emergence being of secondary concern.

New and more comprehensive legislation would signal the imperative for ministries to adopt OH approach in implementing intersectoral activities under the OHP Master Plan 2021 - 2025. It will be important to formulate OH-focused regulations that can support the implementation of activities under each of the six focus areas described in the OHP Framework. Specific examples were raised by stakeholders:

1. Support of a multi-sectoral simulation exercise to strengthen OH institutional capacity and human resource, focusing on an outbreak of a transmission of a zoonotic agent from wildlife to livestock (but that could then be further transmitted to people).

2. The NAP for AMR needs to be updated, including development of a situation analysis that looks at cross-sectoral risks and aims to optimize OH institutional capacity and human resources through staff or laboratory consolidation when possible.

3. Review, identify and prioritize zoonotic disease pathogens (and environmental risk factors) with the aim of improving interagency coordination and response.

4. Undertake political mapping to establish feasible and science-based advocacy for support of the Global Health Advocacy Incubator (GHAI) partnership with Wildlife Conservation Society which is pursuing improvement to the legal enforcement mechanisms around wildlife trafficking. This partnership will accelerate the adoption and enforcement of laws and policies to end the commercial trade and consumption of wild birds and mammals.

5. Develop and finalize policies and laws on CITES implementation in Vietnam. Strengthen the capacity of the CITES Management Authority of Vietnam and relevant agencies to effectively enforce the provisions of Vietnamese and CITES laws on management of exploitation, rearing, planting, processing, trading, transporting and preventing illegal trade in wild animals and plants.

6. Review the Prime Minister Directive No. 29/CT-TTg to ensure it is effective in delivering on its mandate to control and conserve endangered wildlife. Similarly, Directive No. 28/CT-TTg should also be reviewed to evaluate its effectiveness in preventing and combating wildlife poaching and trafficking. Field surveys of wildlife farming facility operators and wildlife importers/exporters should be completed to get their feedback on the effectiveness (or not) of these Directives, and to identify gaps and recommendations for their revision. Technical and stakeholder consultation workshops may also be conducted as part of this assessment.

7. Development of a NAP for the management of wildlife captive breeding and farming to prevent illegal wildlife trade and reduce risk of zoonotic diseases.

8. Formulate and promulgate legal documents that describe wildlife management actions that may be associated with zoonotic disease risks (owning, storing, transporting, advertising, trading, and consuming wildlife) and stipulate possible sanctions when permitted activities are violated; these documents should also include a list of wildlife species that pose the highest risk to human health.

9. Re-evaluate regulations related to detection and control of high-pathogenicity avian influenza to deal with current prevalence of the disease (and transmission to humans) in affected provinces.

10. Activate and strengthen activities to respond to climate change in the OHP Master Plan 2021 - 2025.

11. Adjust the Circular 16/2013/TTLT-BYT-BNN&PTNT to include the involvement of MONRE for the management and coordination with MOH and MARD.

The OHP Master Plan 2021 - 2025 is an important guiding document for partners and stakeholders interested in OH in Vietnam, which also aims to propose activities, efforts, projects and initiatives that will deliver a more comprehensive legal framework for OH activity implementation.

4.2. Methodology used in developing the OHP Master Plan 2021 - 2025

The work undertaken to develop this Master Plan was initiated by consultation with the OHP Secretariat and the EU Delegation (provided funding for Plan development). The purpose of this consultation was to review the Terms of Reference for the work, to confirm

agreement on the plan of work, and identify a preliminary list of key OH stakeholders to be consulted with during the process of creating the Plan.

With assistance of the OHP Secretariat, stakeholders were contacted, and consultation meeting times established; COVID restrictions meant that many of the consultations were conducted through online videoconferencing. All consultation meetings were attended by at least two of the key experts in the consulting team (usually more than two), a representative from the OHP Secretariat, and as many staff or representatives from the stakeholder organization that they felt were necessary to achieve the objectives of the meeting.

To ensure maximum value was gained from stakeholder consultations, two standardized data capture forms were developed and sent to the stakeholder ahead of time: A questionnaire describing key topics to be discussed and a spreadsheet template for the stakeholder to record specific OH projects or activities that were on-going, planned, or aspirational during the 5-year time horizon of the new Plan. Use of the standardized data capture forms aided the project team in avoiding bias and minimized the opportunity for introduction of less relevant topics into the discussion. Use of the standardized forms also facilitated extraction of main points from each consultation and combination of all feedback into a more usable form.

Consultations usually lasted from one to two hours each and when conducted online, were recorded. Each consultation meeting was initiated with a 10-minute briefing on the terms of reference, key activities planned for the project, and a timetable of the key activities. A list of consultations that were conducted is shown in *Annex 4*.

4.3. Governance of the Plan

This Plan is designed to provide a roadmap that shows how a OH approach can be put into practice in Vietnam. It describes numerous current and proposed programs that stakeholders are and will be implementing according to allocated resources. Activities and programs proposed by stakeholders are based on their sector's aspirations and priorities and should reflect closely the focus areas described in the Framework. Stakeholders should communicate frequently with the Secretariat about their activities/programs to ensure that are correctly summarized then included in the year-end report.

For the proposed activities/programs that are designed in direct response to an identified OH need but do not have a committed funding source (or other constraint) that allows them to be implemented, the stakeholders should work with the OHP Secretariat to identify solutions to the constraint(s) so that implementation can begin.

If there are adequate resources behind the activities that are implemented under the Plan, the health and livelihood of Vietnam will be improved, particularly around issues of food safety, control of zoonoses, and combating antimicrobial resistance. The Plan plays a very important role in clearly describing how a OH approach can be institutionalized in the Vietnam government sector, but also as a public-private partnership.

The OHP brings together OH stakeholders, including Vietnam government agencies, international organizations, NGOs and the private sector, under the direction of the GoV. To support the Steering Committee, several structures have been established including the OHP Secretariat, the Multi-sectoral Coordination Task Force (MCTF), the OHP Forum, Technical Working Groups (TWGs), and short-term expert teams (as might be required). The OHP is led by a Steering Committee, co-chaired by Vice-Ministers of the three flagship Ministries: MARD, MOH, and MONRE. Progress on outcomes identified in the OHP should be assessed

through annual joint reports made by these three Ministries in coordination with the Prime Minister and Deputy Prime Ministers and provided to the Steering Committee.

Implementation of the Plan should be monitored, reviewed, and reported on during annual assembly meetings and posted on the OHP website by the OHP Secretariat. Especially, through the periodic meeting mechanism, stakeholders can update and report on activities at TWGs to present difficulties, share results, achievements, lessons learned and replication in the OHP framework. This arrangement also creates an opportunity to strengthen the coordination network, engage new emerging partners interested in the OHP, and exchange ideas that may serve to diversify OHP operations.

The information exchange must be implemented through two methods (1) urgent information exchange mechanism for urgent circumstances and (2) frequent information exchange. The information exchange mechanism can be implemented in written documents. In case of urgent circumstances, the information exchange mechanism can be implemented directly by phone, fax, and email within 24 hours since the urgent circumstances arise.

The information exchange mechanism can be assigned for a focal unit to supervise information exchange at central and local levels through the Secretariat's coordination.

The Secretariat with the connection with OH stakeholders including GoV agencies, international organizations, NGOs and the private sector under the GoV shall recruit supervision technical staffs working under TWGs and short-term expert teams (as might be required) to represent the GoV and local leaders, representatives of related authorities to investigate urgent circumstances then consult for the related authorities by a written report within 24 hours.

Then they can make a communication campaign for the action with the outcomes identifies in the OHP. They can make annual report on activities at TWGs to strengthen the coordination network, make advantages of new sectors and partners in the OHP for a diversified OHP operations.

4.3.1. Role of the private sector in One Health

OH repeatedly emphasizes a need for multi-sector collaboration. For many, this means collaboration across industry sectors such as health, agriculture, environment, and wildlife. However, in the context of OH, cross-sectoral also includes collaboration between the public (GoV) and private sectors, as well as collaboration with donor agencies.

Many projects, over many years, have launched initiatives and built tools that are deployed to assess, prioritize, document, and address OH needs and gaps in Vietnam and elsewhere. While many of these achieve their intended outcomes in the short-term (during the life of the project), too few are able to successfully induce long-term changes in behavior that persist much beyond the end of the project. Almost all OH projects intend to induce long-term change and in fact, post-project "hand-off" planning is a requirement of nearly all donor led projects. So, if sustainability is a goal of these projects, why do they so often fail? The answers are not always clear, but way to improve sustainability is by early engagement with the profit-driven, private sector.

Many of the upstream drivers of zoonotic diseases and other OH risks occur outside of the health sector (e.g., extractive industries, livestock production, urbanization, conflict) and are multifactorial.[1] Understanding and addressing them requires greater attention to

prevention and detection of threats, ideally before they cause disease events. Effectively addressing these drivers brings in a wider range of potential partners, including the private sector, in a whole of government, whole of society approach to combine resources and solutions for global and local public health. OH should be good for business!

The private sector and civil society also have important incentives and roles in strengthening health security to avoid workforce and other societal disruptions at local and international levels. Their meaningful engagement in health security can be better cultivated and harnessed. For example, employers can disseminate information to employees and contribute to disease reporting networks and take a leadership role in implementing risk reduction actions (e.g., vaccination, biosecurity, etc.).

The role of private sector (and other) stakeholders in successful implementation of OH projects related to AMR was investigated in Vietnam.[2] While the international community strongly advocates the implementation of multi-sectoral surveillance policies for an effective approach to antibiotic resistance, awareness of each sector's inherent biases and drivers is important in their successful engagement.

In this paper, private sector stakeholders (both in human and animal activities) clearly understood the health threat and the stakes at play regarding AMR and demonstrated their interest in joining an effort to combat the problem. To defend their commercial interests, some were already engaged in a process of public-private partnership with the authorities and antibiotic users to search for alternatives and to promote changing practices. However, they perceived challenges in implementing the national strategy in Vietnam, such as a lack of appropriate legal instruments and regulations, conflicts of interest, under-staffed inspection bodies, etc. They were vocal about the heavy administrative Vietnamese procedures and the lack of consultation when establishing new regulations.

However, private sector stakeholder seemed in many respects to be ahead of the other stakeholders in terms of implementing the AMR risk reduction measures being proposed. Some were already computing data on antibiotic importation, production and sales which are partially reported to the relevant authorities (especially to the customs), on a regular basis or by specific request. Clearly, in many areas the private sector stakeholders were in a position to lead the discussion about AMR control, rather than need to be told what to do. In this study, most of the private sector stakeholders were very willing to actively collaborate with the GoV and end-users and it seemed that other stakeholders involved in the national strategy valued their experience, the quality of their data, and their capacity to assist in field projects.

The authors noted that bringing key private sector stakeholders to into OH initiatives, such as AMR reduction, was challenging in the Vietnamese context. To lever and promote successful inter-sectoral collaboration, a participatory "learning by doing" process was suggested that could frame and mentor stakeholders through the identification of appropriate levels of collaboration, depending on the need of a particular project. Private sector involvement can start with simple forms of engagement including participation in awareness raising campaigns, development of show cases by leading investors, working with commune authorities in pursuing New Rural Development objectives, and getting socially recognized as OH oriented pioneers by professional associations. Vietnam Chamber of Commerce and Industry (VCCI) should take a bridging role to facilitate collaboration between the government sector and private sector.

4.4. Specified focus areas in the OH Plan 2021-2025

As presented in the above sections, there is a singular overall objective desired by the signatories of the OHP Framework: **"To minimize the risk that zoonotic pathogens and environmental agents will cross species barriers, and to reduce the occurrence of antimicrobial resistance in human and animal pathogens, by improving multi-sectoral OH collaboration in Vietnam."**

Six focus areas were specified in the 2021-2025 OHP framework and these have been re-phrased below in a form that describes desirable changes of stakeholders, as a basis to mobilize support in terms of resources and knowledge when possible.

Table 1 presents how the six focus areas are translated into specific outputs. More specific explanations of relevant activities to achieve expected outputs are presented in separate subsections.

Table 1. Relationship mapping between OHP Framework 2021-25 focus areas and expected outcomes through institutionalization of One Health approach in Vietnam.

No.	Focus area	Focus area objective	Expected output
1	**INSTITUTIONALIZE ONE HEALTH**	Act on institutional commitments to use a OH approach for the prevention and management of zoonotic diseases through establishment of a framework for multi-sectoral collaboration, improved capabilities and increased capacity of relevant human resources, and better communication between relevant ministries and their provincial/local branches	1.1. The OH technical and/or policy dialogue are improved. 1.2. The OH Communication mechanism is strengthened and expanded. 1.3. The OHP Secretariat is fully functional. 1.4. Institutional framework that governs multi-sectoral and multi-disciplinary cooperation for OH activities is strengthened. 1.5. Stakeholders at all levels are capacitated with improved OH knowledge, skills and instruments. 1.6. International cooperation on OH is improved.
2	**MANAGE RISK FACTORS FOR EMERGENCE**	Reduce the risk of zoonotic pathogens emerging and being further transmitted in new animal or human hosts that are caused by human behaviors affecting disease ecology	2.1. A comprehensive legal framework is established to regulate trade, capture, consumption, and farming of wildlife. 2.2. Active and passive surveillance for important zoonotic pathogens in humans and animals is implemented, including development of information systems that allow data-sharing, signal detection, and automated reporting.

No.	Focus area	Focus area objective	Expected output
			2.3. A three-level (policy, technical, and public) program of education about OH and zoonotic disease prevention, actionable within a person's area of influence, is developed and implemented across the whole-of-country.
3	**REDUCE OCCURRENCE OF AMR**	Improve regulation and compliance with best practices for antibiotic use across all sectors to reduce the occurrence of resistance to medically important (human and veterinary) antimicrobial drugs	3.1. Regulatory framework for manufacture, importation, and distribution of antimicrobials in all sectors is reviewed and improvements implemented where required; compliance with regulations is actively monitored. 3.2. Best practice guidelines (and training) for judicious use of antimicrobial in all sectors are developed; training materials related to these guidelines are distributed to end-users. 3.3. Commitment to NAPs for reducing antimicrobial usage (AMU) and AMR in all sectors, including AMR surveillance and information sharing, is fulfilled (strategy currently being prepared by MOH). 3.4. Public and political awareness of AMR impacts, AMU, and AMC best practices is strengthened.
4	**REDUCE IMPACT OF TRADITIONAL ZOONOSES**	Reduce the human health impacts of influenza A H5N1, rabies, swine streptococcus disease, anthrax, and leptospirosis (as prioritized in the Joint Circular 16/2013/TTLT-BYT-BNN&PTNT, dated 27 May 2013), and other important zoonotic diseases	4.1. Efforts to increase awareness of common zoonoses and to encourage avoidance of behaviors that are likely to result in exposure to zoonotic pathogens, amongst the public, are emphasized through public education campaigns. 4.2. Diagnostic and therapeutic guidelines for traditional zoonotic pathogens, consistent with "WHO Recommended Strategies for the Prevention and Control of Communicable Diseases, 2001" are uniformly applied.
5	**INCREASED EFFECTIVENESS OF RESPONSE TO OUTBREAKS**	Increase the effectiveness (speed, capacity, and capability) of managed responses to outbreaks of emerging zoonotic diseases	5.1. Enough people will be recruited for work as front-line animal and human health workers to meet basic health needs of all people, and farmed animals, poultry, and fish; these workers are trained in principles of OH to effectively prevent, recognize, and manage zoonotic and emerging diseases.

No.	Focus area	Focus area objective	Expected output
			5.2. Formal study and reporting of lessons learned from the COVID-19 experience are urgently completed to develop robust plans for future pandemic management (including planning for surge capacity, development of robust supply chains, stockpiling of critical assets, and other areas). 5.3. Participation in formal regional actions (biosecurity, biosafety, border protection, supply chain management, etc.) is designed to help ensure strong regional and national economies in the face of outbreaks of transboundary human and animal disease.
6	**MINIMIZE HUMAN IMPACT ON THE ENVIRONMENT**	Reduce human activities (or behaviors) that impact the natural environment in a manner that contributes to an increased risk of zoonotic disease emergence or frequency in humans and animals	6.1. Funding and an implementation plan are established to improve the level of public sanitation (water and sewage), particularly in areas with high levels of peri-urban livestock, milk, or poultry production. 6.2. Commitments to fulfill Vietnam's contribution to SDGs and international biodiversity, climate change and environment protection efforts (CBD, UNFCCC) are realized, through comprehensive, determined adoption of appropriate forest, biodiversity, environment protection regulation and sustainable development strategy. 6.3. Natural resources including water, forest, and wildlife are used responsibly to ensure environmental risk factors for zoonotic disease occurrence, emergence, and cross-species transmission are reduced whenever possible.

4.4.1. Institutionalize One Health

Specific objective (outcome)

Act on institutional commitments to use a OH approach for the prevention and management of zoonotic diseases through establishment of a framework for multi-sectoral collaboration, improved capabilities and increased capacity of relevant human resources, and better communication between relevant ministries and their provincial/local branches.

Expected outputs

1.1. The OH technical and/or policy dialogue are improved.
1.2. The OH Communication mechanism is strengthened and expanded.
1.3. The OHP Secretariat is fully functional.
1.4. Institutional framework that governs multi-sectoral and multi-disciplinary cooperation for OH activities is strengthened.
1.5. Stakeholders at all levels are capacitated with improved OH knowledge, skills and instruments.
1.6. International cooperation on OH is improved.

Implementation actions to achieve the desired outcomes are shown in **Table 2**.

Table 2. Indicative tasks, responsibility, and timeline related to achieving the objective of "Institutionalize OH".

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
Output 1.1: The OH technical and/or policy dialogue is improved.							
1.1.1.	Establish Technical working group and Policy Research Group to share information and data related to the research topic at the written request of the relevant agencies and notify the research results on zoonotic diseases to relevant agencies upon official approval.	Secretariat	Secretariat, Policy Research Group	Leading agencies for each TWG	2021-22 Completed in 2022		
1.1.2.	Convene quarterly meetings of the TWGs and/or Technical and Policy Research Groups.	Secretariat	Secretariat, Policy Research Group	Leading agencies for each TWG	Ongoing	Ongoing	Ongoing
1.1.3	Convene the OHP Forum at least once a year to discuss OH policy and make decisions on strategies or planned activities for the next year.	Secretariat	Secretariat, Policy Research Group	Leading agencies for each TWG	Ongoing	Ongoing	Ongoing
1.1.4	Conduct a OH risk-based policy and legal review for policy and legal reform to monitor, manage, and respond to risks of zoonotic disease.	Secretariat	MARD, MOH, MONRE	Secretariat and interested partners	Annual	Annual	Annual
1.1.5	Review the existing regulations and practices to improve inter-agency cooperation and reduce the impact and risk of zoonotic pathogens.	Secretariat	MARD, MOH, MONRE	Secretariat and interested partners	Annual	Annual	Annual

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
Output 1.2: The OH Communication mechanism is strengthened and expanded.							
1.2.1	Develop and implement a communication strategy.	National Agriculture Extension Center (NAEC)	Secretariat, OHCN, and VOHUN	TAJ Media	Adopted in Q2, 2022	Ongoing	Ongoing
1.2.2	Revitalize the OH website and develop a process for routine updating.	Secretariat	Secretariat	EU	Q4, 2021	Ongoing	Ongoing
1.2.3	Pilot OH Communication activities in selected provinces.	OHCN	NSC, Secretariat, relevant ministerial dept. and provinces.		Q2, 2022	Ongoing	Ongoing
Output 1.3: The OHP Secretariat is fully functional.							
1.3.1	Mobilize government resources to support additional administrative and communication staff in the OHP Secretariat.	Secretariat	ICD/MARD	Planning & Finance Department	Started in Q2, 2022	Ongoing	Ongoing
1.3.2	Mobilize external support for technical specialists to build the capacity of the OHP Secretariat.	Secretariat	ICD/MARD	All other stakeholders	Started in Q2, 2022	Ongoing	Ongoing
1.3.3	Improve OHP Secretariat office procedures, workflow, and reporting arrangements.	Secretariat, MOH	Secretariat		Started in Q2, 2022	Ongoing	Ongoing
1.3.4	Assist OHP Secretariat in mapping OH projects and programs in a manner that supports M&E.	Secretariat	ICD/MARD	Planning & Finance Department	Started in Q2, 2022	Ongoing	Ongoing
1.3.5	Engage with private sector stakeholders to raise their awareness and application of OH in Vietnam.	Secretariat	ICD/MARD	VCCI and all other stakeholders	Started in Q2, 2022	Ongoing	Ongoing
Output 1.4: Institutional framework that governs multi-sectoral and multi-disciplinary cooperation for OH activities is strengthened.							
1.4.1	Approve then operationalize the OHP Master Plan 2021 - 2025.	Secretariat	NSC, MARD, MOH, MONRE	EU	The OHP Master Plan 2021 - 2025 is	Operationalized	Operationalized

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
					approved in Q4, 2021 or Q1,2022		
1.4.2	Review then upgrade into higher legal status, if necessary, key legal documents relevant to multi-sectoral OH coordination around zoonotic disease, AMR, wildlife, environment, and food safety.	MOH, MARD, MONRE	MOH, MARD, MONRE, MOST	CITES, NGOs (e.g., RTCCD, FHI 360), and interested DPs	Q1, 2022	Ongoing	Ongoing
1.4.3	Conduct baseline studies on the current significance of priority zoonoses, the environment, and AMR risks so that institutional constraints to effective inter-sectoral coordination are identified.	MONRE, MARD-DAH	MARD, MOH, MONRE	TBD	Q4/2021-Q4/2022 (Completed in 2022)		
1.4.4	Integrate a OH approach into the roll-out of the NTP on New Rural Development (NRD).	CCO of the NTP on NRD	CCO of the NTP on NRD and its local offices	TBD	Started in 2022	Ongoing	Ongoing
1.4.5	Improve the capacity of the Central Coordination Office (CCO) on use of the OH approach, including advocacy event(s) for adoption of the OH approach by relevant Provincial Authorities.	CCO	CCO	TBD	Started in 2022	Ongoing	Ongoing
Output 1.5: Stakeholders at all levels are capacitated with improved OH knowledge, skills and instruments.							
1.5.1	Strengthen knowledge and research capacity by improving leadership and science management skills, conducting a national symposium on AMR, and developing school-based education materials on food safety and sustainable agricultural production.	MARD	Secretariat, VOHUN	Australian Embassy, ACIAR, academics, FHI 360	Q1, 2022	Ongoing	Ongoing
1.5.2	Introduce then maintain innovative methods and tools for improved decision making on disease prevention and control.	MARD	MARD, MOH	Australia Embassy (SPARK), Doherty Institute	Completed in 2022		
1.5.3	Engage CSOs in OH planning, implementation, M&E, and policy advocacy.	NRTCC	Secretariat, MARD, MOH,	CIRAD, NRTCC and other NGOs	Started in Q1, 2022	Ongoing	Ongoing

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
			MONRE				
1.5.4	Use the OH approach as an integral part of conducting a multi-sectoral simulation exercise aimed at improving Vietnam's preparedness for detecting and responding to a zoonotic disease or AMR emergency.	FAO	Dept. of Animal Health (MARD)	FAO, CIRAD, DRISA International Joint Laboratory (IRD) NIHE	Started in 2021	Ongoing	Ongoing
Output 1.6: International cooperation on OH is improved.							
1.6.1	Enhance Vietnamese students' training in application of the OH approach by encouraging participation in the Southeast Asia OH University Network (SEAOHUN).	MOET	MOET	ILRI, SEAOHUN	Ongoing	Ongoing	Ongoing
1.6.2	Advocate for improved application of a OH approach within ASEAN through promotion of online fellowships and networking actions.	MOH	MARD, MOH	CIRAD, ASEAN, Australia Embassy (OH Training and Capacity Building Investment)	Started in 2021	Ongoing	Completed in 2024
1.6.3	Establish a regional partnership instrument on antimicrobial resistance in Asia.	MOH	MOH, MARD, MONRE	EC, WHO, FAO, OIE, and other partners.	Started in 2022	Ongoing	Ongoing
1.6.4	Study processes that lead to zoonotic pandemics and share the results with regional decision-makers.	MOH	Secretariat, MARD, MOH, MONRE	French Embassy, CIRAD, FSPI (OH SEA project)	Complete d in 2022	Ongoing	Completed in 2024
1.6.5	Conduct joint research activities with regional network members using the GREASE platform to facilitate training and communications.	MOH	Secretariat, MARD, MOH, MONRE	CIRAD in coordination with NIVR and VNUA, IRD (DRISA International Joint Laboratory), PREZODE initiative	Ongoing	Ongoing	Ongoing
1.6.6	Establish an interdisciplinary OH poultry hub to address needs related to the rising demand for poultry	MARD	MARD	CIRAD in coordination with	Ongoing	Ongoing	Ongoing

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
	meat and eggs in Vietnam and the region.			NIVR, VNUA, DAH, NIAS, NIHE, UK Aid			

4.4.2. Manage risk factors for emergence

Specific objective (outcome)

Reduce the risk of zoonotic pathogens emerging and being further transmitted in new animal or human hosts that are caused by human behaviors affecting disease ecology.

Expected outputs

2.1. A comprehensive legal framework is established to regulate trade, capture, consumption, and farming of wildlife.

2.2. Active and passive surveillance for important zoonotic pathogens in humans and animals is implemented, including development of information systems that allow data-sharing, signal detection, and automated reporting.

2.3. A three-level (policy, technical, and public) program about OH and zoonotic disease prevention, actionable within a person's area of influence, is developed and implemented across the whole-of-country.

Implementation actions to achieve the desired outcomes are shown in **Table 3**.

Table 3. Indicative tasks, responsibility, and timeline related to achieving the objective of "Manage risk factors for emergence".

	Task	Proposed agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
Output 2.1: A comprehensive legal framework is established to regulate trade, capture, consumption, and farming of wildlife.							
2.1.1	Review existing regulations that govern human behaviors known to increase risk of zoonotic wildlife pathogen spread and emergence.	MOH	MARD, MOH, MONRE	OHS with the support from national and international partners and donors (such as	On-going	Completed	

	Task	Proposed agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
				USAID, GIZ, EU, embassies), and private sector.			
2.1.2	Build capacity in science-based policy advocacy to establish a multi-sectoral OH approach for wildlife conservation.	MOH	MOH	Donor such as USAID, GIZ, EU, embassies and INGO such as Wildlife Conservation Society with support of GHAI	Started in Q4, 2021, completed in 2022		
2.1.3	Develop Standard Operating Procedures that will reduce the risk of zoonotic pathogen transmission associated with wildlife farming and trade.	MARD	MARD, MOH, MONRE	OHS, with intentional donor (such as USAID, GIZ, EU, embassies), and partner such as FAO, WCS, and National partners	On-going	Completed	
Output 2.2:	**Active and passive surveillance for important zoonotic pathogens in humans and animals is implemented, including development of information systems that allow data-sharing, signal detection, and automated reporting.**						
2.2.1	Establish and operationalize a national zoonotic disease surveillance database to support management of risk factors.	MARD	MARD, MOH, MONRE	OHS and international partner ((such as USAID, GIZ, EU, embassies), and partners in the private sector	Started in 2022	On-going	On-going
2.2.2	Strengthen the capacity of testing and diagnosing diseases for livestock and aquaculture by regularly updating new test methods and adding specialized equipment with high sensitivity and accuracy.	MOH	MARD, MOH, MONRE,	Australia Embassy, USAID, GIZ, OHS, and other national	Started in 2022	On-going	On-going

	Task	Proposed agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
				partners			
2.2.3	Develop a database of wildlife, livestock, poultry, and duck farms (location, farm type, size, etc.) to support zoonotic disease surveillance programs and traceability.	MARD/ ILRI	MARD, MONRE	OHS, with intentional donor and partners such as USAID, FAO, ILRI, Embassies and PREZODE	Started in 2022	On-going	Completed
Output 2.3: A three-level (policy, technical, and public) program about OH and zoonotic disease prevention, actionable within a person's area of influence, is developed and implemented across the whole-of-country.							
2.3.1	Develop an on-going process to create and routinely update risk assessments for zoonotic pathogens; this process should be managed through a multi-sectoral steering committee.	MOH	MARD, MOH, MONRE	OHS and other partners	Started in 2022	On-going	On-going
2.3.2	Build value chain models for livestock industries that reward behaviors that can reduce the risk of emergence and spread of zoonotic and emerging pathogens.	MARD	MARD and MOH	OHS, with intentional partner Australia embassy, and work under PREZODE platform		Started in 2023	Completed in 2025

4.4.3. Reduce occurrence of AMR

Specific objective (outcome)

Improve regulation and compliance with best practices for antibiotic use across all sectors to reduce the occurrence of resistance to medically important (human and veterinary) antimicrobial drugs.

Expected outputs

3.1. Regulatory framework for manufacture, importation, and distribution of antimicrobials in all sectors is reviewed and improvements implemented where required; compliance with regulations is actively monitored.

3.2. Best practice guidelines (and training) for judicious use of antimicrobial in all sectors is developed; training materials related to these guidelines is distributed to end-users.

3.3. Commitment to National Action Plans for reducing antimicrobial usage (AMU) and AMR in all sectors, including AMR surveillance and information sharing, is fulfilled.

3.4. Public and political awareness of AMR impacts, AMU, and AMC best practices is strengthened.

Implementation actions to achieve the desired outcomes are shown in **Table 4**.

Table 4. Indicative tasks, responsibility, and timeline related to achieving the objective of "Reduce occurrence of AMR".

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
Output 3.1: Regulatory framework for manufacture, importation, and distribution of antimicrobials in all sectors is reviewed and improvements implemented where required; compliance with regulations is actively monitored.							
3.1.1	Conduct a national symposium on AMR and AMU for government and non-government organizations.	MARD	MOH, MARD, MONRE	FHI 360, WHO, FAO, CIRAD, IRD (DRISA International Joint Laboratory), USTH (University of Science and Technology of Hanoi)	Started in 2022	Ongoing	Ongoing
3.1.2	Improve functioning of the Cross-Sectoral Steering Committee (NSC) and put into effect a mechanism to enable sharing of AMR and AMU surveillance information.	MARD	MOH, MARD, MONRE	FHI 360, WHO, FAO and other partners.	Started in 2022	Ongoing	Ongoing
3.1.3	Review regulations relevant to antimicrobial resistance and antibiotic usage, particularly as they relate to data sharing among agencies, and research institutions.	MOH	MOH, MARD, MONRE	FHI360, WHO, FAO, CIRAD, IRD (DRISA International Joint Laboratory), and USTH (University of Science and	Started in 2022	Ongoing	Ongoing

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
				Technology of Hanoi).			
3.1.4	Strengthen the capacity of focal agencies to manage drugs used in human and animals	MARD	MARD	FHI 360 and other partners.	Started in 2022	Ongoing	Ongoing
Output 3.2: Best practice guidelines (and training) for judicious use of antimicrobial in all sectors is developed; training materials related to these guidelines is distributed to end-users.							
3.2.1	Develop and implement best practice guidance in antimicrobial stewardship for livestock animals, aquatic animals, and humans that are consistent with international standards.	MOH	MOH, MARD	FAO, WHO and interested partners.	Started in 2022	Ongoing	Ongoing
3.2.2	Implement mechanisms to monitor, reward, and enforce compliance with antimicrobial best practice standards in humans, livestock animals and aquatic animals.	MOH	MOH, MARD	Interested partners.	Started in 2022	Ongoing	Ongoing
3.2.3	Support the implementation of the national prescription circulars for antimicrobial use in humans, aquatic animals and livestock animals.	MARD	MARD, MOH	FAO, WHO, and interested partners.	Started in 2022	Ongoing	Ongoing
3.2.4	Reduce the use of antimicrobials and banned substances in farms raising livestock animals and aquatic animals for food.	MARD	local authorities.	Interested partners.	Started in 2022	Ongoing	Ongoing
3.2.5	Research and pilot methods that can identify and then reduce transmission of AMR between animals, ecosystems and humans.	MOH	MONRE, MOH, MARD	WHO, FAO, academic institutions, universities, private sector, IRD, USTH, and interested partners.	Started in 2022	Ongoing	Ongoing
3.2.6	Determine interventions to reduce the prevalence of AMR in poultry farms in Vietnam.	MARD	MARD	ILRI, NIVR, CIRAD, and interested partners.	Started in 2022	Ongoing	Ongoing

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
Output 3.3: Commitment to National Action Plans for reducing antimicrobial usage (AMU) and AMR in all sectors, including AMR surveillance and information sharing, is fulfilled.							
3.3.1	Integrate AMR and AMU surveillance outputs from humans, aquatic animals and livestock animals with research initiatives to support NSC efforts to improve AMR policy and develop an AMR management program.	MARD	MOH, MARD, MONRE	FHI 360 and interested partners.	Started in 2022	Ongoing	Ongoing
3.3.2	Implement National AMR Strategy 2021-2030 and develop the five-year NAPs of Agriculture and Health sectors 2021-2025.	MOH	MOH, MARD	WHO, FAO and interested partners.	Completed in 2021		
3.3.3	Collect data and report on antimicrobial consumption at national and hospital levels.	MOH	MOH	WHO and interested partners.	Started in 2022	Ongoing	Ongoing
3.3.4	Collect data and report on antimicrobial consumption in livestock animals and aquatic animals.	FAO	MARD	FAO and other partners. Support from CIRAD	Started in 2022	Ongoing	Ongoing
3.3.5	Develop a harmonized national AMR surveillance and reporting program for humans and animals, including data sharing agreements.	MOH	MOH, MARD	FHI360, FAO, WHO, IRD, USTH, and CIRAD (GREASE)	Started in 2021	Ongoing	Ongoing
3.3.6	Support laboratories participating in the national surveillance program on antimicrobials (including agricultural and health sectors) to develop methods of microbial isolation and antibiogram testing for internationally recognized quality certification.	MARD	MARD, MOH	FHI360 and interested partners.	Started in 2021	Ongoing	Ongoing
3.3.7	Improve the national monitoring program of antimicrobial residues in animal and fisheries products.	MARD	MARD	Interested partners.	Started in 2022	Ongoing	Ongoing
Output 3.4: Public and political awareness of AMR impacts, AMU, and AMC best practices is strengthened.							
3.4.1	Establish annual public awareness campaigns about AMU and AMR using national and regional TV	MARD	MARD, MOH,	FAO, WHO, and other	Started in 2022	Ongoing	Ongoing

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
	channels and popular social media platforms, with emphasis during World Antibiotic Awareness Week.		MONRE	partners			
3.4.2	Develop training and communication packages on AMU and AMR, emphasizing new and different AMR messages that better resonate with society.	MOH	MARD, MOH, MONRE, NAEC, and local government	WHO, FAO, academia, schools, private sector, IRD, USTH, and other partners.	Started in 2022	Ongoing	Ongoing
3.4.3	Promote alternatives to routine antibiotic use such as traditional herbal remedies that also have an ecological health purpose.	MARD	MARD	RTCCD, CIRAD and other partners.	Started in 2022	Ongoing	Ongoing
3.4.4	Enhance export potential of livestock and aquatic products through rational antimicrobial use and better control of veterinary antibiotic distribution.	MARD	MARD	CIRAD and interested partners.	Started in 2021	Ongoing	Ongoing
3.4.5	Conduct an on-farm intervention trial that will lead to a reduction in antimicrobial usage in fattening pigs (Safe Pork Project).	MARD	MARD	Australia Embassy, ACIAR, ILRI, VNUA, HUPH, NIAS	Started in 2022	Ongoing	Ongoing
3.4.6	Identify interventions to reduce the prevalence of AMR in livestock, poultry and aquaculture farms in Vietnam.	MARD	MARD	ILRI, NIVR, CIRAD and interested partners.	Started in 2021	Ongoing	Ongoing
3.4.7	Conduct on-farm intervention trial to reduce antimicrobial usage in fattening pigs (Safe Pork Project).	MARD	MARD	Australia Embassy, ACIAR, ILRI, VNUA, HUPH, NIAS	Started in 2022	Ongoing	Ongoing

4.4.4. Reduce impact of traditional zoonoses

Specific objective (outcome) Reduce the human health impacts of influenza A H5N1, rabies, swine streptococcus disease, anthrax, and leptospirosis (as prioritized in the Joint Circular 16/2013/TTLT-BYT-BNN&PTNT, dated 27 May 2013), and other important zoonotic diseases.

Expected outputs

4.1. Monitor and communicate to increase awareness of common zoonoses and to encourage avoidance of behaviors that are likely to result in exposure to zoonotic pathogens, amongst the public, are emphasized through public education campaigns.

4.2. Diagnostic and therapeutic guidelines for traditional zoonotic pathogens, consistent with "WHO Recommended Strategies for the Prevention and Control of Communicable Diseases, 2001" are uniformly applied.

Implementation actions to achieve the desired outcomes are shown in **Table 5**.

Table 5. Indicative tasks, responsibility, and timeline related to achieving the objective of "Reduce impact of traditional zoonoses".

	Task	Proposed agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
Output 4.1:	**Monitor and communicate to increase awareness of common zoonoses and to encourage avoidance of behaviors that are likely to result in exposure to zoonotic pathogens, amongst the public, are emphasized through public education campaigns.**						
4.1.1.	Establish technical and communication team to develop a training framework on the prevention and control of zoonotic diseases; and coordinate in organizing training activities according to the approved plan	MOH, MONRE, MARD	MOH, MONRE, MARD	Interested partners	Start	Push up	Completion
4.1.2	Implement the public education campaign on the management of zoonoses.	MARD	MARD, MOH, MONRE	OHS, other national and international partners and donors, and private sector	Start	Push up	Completion
Output 4.2:	**Diagnostic and therapeutic guidelines for traditional zoonotic pathogens, consistent with "WHO Recommended Strategies for the Prevention and Control of Communicable Diseases, 2001" are uniformly applied.**						
4.2.1.	Review and revise generally accepted treatment and diagnostic guidelines for key zoonotic diseases to ensure they are suitable for use in Vietnam.	MOH	MOH	WHO, and other interested partners	Start	Push up	Completion

	Task	Proposed agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
4.2.2.	Establish a working group to develop new treatment and diagnostic guidelines for zoonotic diseases of importance to Vietnam but that haven't already been created by other organizations or countries.	MOH	MOH	WHO, and other interested partners	Start	Push up	Completion

4.4.5. Increased effectiveness of response to outbreaks

Specific objective (outcome)
Increase the effectiveness (speed, capacity, and capability) of managed responses to outbreaks of emerging zoonotic diseases.

Expected outputs
5.1. Enough people will be recruited for work as front-line animal and human health workers to meet basic health needs of all people, and farmed animals, poultry, and fish; these workers are trained in principles of OH to effectively prevent, recognize, and manage zoonotic and emerging diseases.
5.2. Formal study and reporting of lessons learned from the COVID-19 experience are urgently completed to develop robust plans for future pandemic management (including planning for surge capacity, development of robust supply chains, stockpiling of critical assets, and other areas).
5.3. Participation in formal regional actions (biosecurity, biosafety, border protection, supply chain management, etc.) designed to help ensure strong regional and national economies in the face of outbreaks of transboundary human and animal disease.

Implementation actions to achieve the desired outcomes are shown in **Table 6**.

Table 6. Indicative tasks, responsibility, and timeline related to achieving the objective of "Increased effectiveness of response to outbreaks".

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
Output 5.1:	**Enough people will be recruited for work as front-line animal and human health workers to meet basic health needs of all people, and farmed animals, poultry, and fish; these workers are trained in principles of OH to effectively prevent, recognize, and manage zoonotic**						

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
	and emerging diseases.						
5.1.1	Undertake a needs assessment to determine overall required capacity for front-line animal and human health workers.	MOH, MARD	MOH, MARD	Interested partners	Start	Ongoing	Completed
5.1.2	Train then use of the OH approach among front-line animal and human health workers to improve Vietnam's ability to prevent, detect, and response to zoonoses; coordination with related efforts already being done in this area (e.g., National Rabies Control Program, World Antimicrobial Awareness Week campaign, and acting on recommendations from OIE's Performance of Veterinary Services program).	MOH	MARD, MOH	WHO, FAO, NIHE	Started in 2021	Ongoing	Completed in 2024
Output 5.2:	**Formal study and reporting of lessons learned from the COVID-19 experience are urgently completed to develop robust plans for future pandemic management (including planning for surge capacity, development of robust supply chains, stockpiling of critical assets, and other areas).**						
5.2.1	Conduct quantitative and qualitative study of Vietnam's preparedness for and response to COVID-19.	MOH	MOH	Interested partners	Start	Ongoing	Completed
5.2.2	Revise existing COVID-19 (and related) regulations and operational processes based on findings from study described above.	MOH	MOH	Interested partners	Start	Ongoing	Completed
Output 5.3:	**Participation in formal regional actions (biosecurity, biosafety, border protection, supply chain management, etc.) designed to help ensure strong regional and national economies in the face of outbreaks of transboundary human and animal disease.**						
5.3.1	Harmonize border procedures (with relevant countries) to improve protection against uncontrolled spread of human and animal diseases while simultaneously minimizing associated hardships on people and the economy.	Customs Office	Customs Office MOH, MARD	Interested partners	Start	Ongoing	Completed
5.3.2	Develop sustainable levels of OH research funding that provides sufficient capacity at national and regional levels to deal with locally important OH issues.	MARD	MARD, MOH, MONRE	VOHUN	Start	Ongoing	Completed
5.3.3	Build resilient animal and human health care systems that can cope with shocks caused by significant outbreaks, incursions, or emergences of zoonotic diseases, or by environmental crises.	MOH	MOH, MARD	Interested partners	Start	Ongoing	Completed

4.4.6. Minimize human impact on the environment

Specific objective (outcome)

Reduce human activities (or behaviors) that impact the natural environment in a manner that contributes to an increased risk of zoonotic disease emergence or frequency in humans and animals.

Expected outputs

6.1. Funding and an implementation plan are established to improve the level of public sanitation (water and sewage), particularly in areas with high levels of peri-urban livestock, milk, or poultry production.

6.2. Commitments to fulfill Vietnam's contribution to SDGs and international biodiversity, climate change and environment protection efforts (CBD, UNFCCC) are realized, through comprehensive, determined adoption of appropriate forest, biodiversity, environment protection regulation and sustainable development strategy

6.3. Natural resources including water, forest, and wildlife are used responsibly to ensure environmental risk factors for zoonotic disease occurrence, emergence, and cross-species transmission are reduced whenever possible.

Implementation actions to achieve the desired outcomes are shown in **Table 7**.

Table 7. Indicative tasks, responsibility, and timeline related to achieving the objective of "Minimize human impact on the environment".

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
Output 6.1: Funding and an implementation plan are established to improve the level of public sanitation (water and sewage), particularly in areas with high levels of peri-urban livestock, milk, or poultry production.							
6.1.1	Conduct a risk-based policy and legal review to reduce risks of zoonotic disease that are associated with livestock and harvested wildlife supply chains.	MARD	MOH, MARD, MONRE	OHS and other national and international partners such as USAID, FAO, GIZ	Started in 2022	On-going	Completed
6.1.2	Research then pilot methodology that can identify routes of pathogen transmission at the human-animal-environment interface.	MONRE	MONRE, MOH, MARD	OHS, and other partners such as FAO, GIZ and private sector	Started in 2022	On-going	Completed
6.1.3	Research and monitor climate change induced	MONRE	MOH,	OHS, and other	Started in	On-going	On-going

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
	emergence or transmission of zoonotic pathogens at the human-animal-environment interface.		MONRE, MARD	international and national partners such as UNDP and PREZODE	2022		
Output 6.2:	**Commitments to fulfill Vietnam's contribution to SDGs and international biodiversity, climate change and environment protection efforts (CBD, UNFCCC) are realized, through comprehensive, determined adoption of appropriate forest, biodiversity, environment protection regulation and sustainable development strategy.**						
6.2.1	Implement a program to monitor agricultural activities and farmers' behaviors that are known to be harmful or present a high-risk of harm to the environment and biodiversity.	MONRE	MOH, MARD, MONRE,	OHS, national and international DPs such as FAO and UN's entities	Started in 2022	On-going	Completed
6.2.2	Implement programs with stakeholders that will reduce the frequency or significance of agricultural activities (or farmers' behaviors) that have a negative impact on the environment and biodiversity.	OHS	OHS, MOH, MONRE, MARD,	National training institutions and other DPs	Started in 2022	On-going	On-going
Output 6.3:	**Natural resources including water, forest, and wildlife are used responsibly to ensure environmental risk factors for zoonotic disease occurrence, emergence, and cross-species transmission are reduced whenever possible.**						
6.3.1	Monitor and identify environmental factors that encourage emergence or spread of human disease.	MONRE	MONRE, MOH, MARD	OHS and international partners such as UNDP, GIZ	Start in 2022	On-going	On-going
6.3.2	Use ICT to build sustainable value chains that will improve human health by rewarding good behaviors at the human-animal-environmental interface.	MOH	MONRE, MOH, MARD	OHS, and national and international partners	Start in 2022	On-going	Completed
6.3.3	Reduce demand for trade in wildlife and bush meat to minimize the effect of wildlife harvest on the environment and risk of disease transmission.	MARD	MONRE, MOH, MARD	International partners such as USAID, FAO, GIZ, WCS, and ILRI	Start in 2022	On-going	On-going
6.3.4	Undertake a needs assessment to identify the most significant environmental issues that contribute to emerging, health-related issues to guide further	MONRE	MOH, MARD, MOST	Vietnamese Research institutions and	Start in 2022	Completed	

	Task	Proposed Agency	Responsibility		Implementation Timeline		
			GOV	Others	2021-22	2023	2024-25
	intervention.			NGO and international partners such as USAID, FAO, UNEP, AFD			

4.5. Suggested projects to address multiple focus areas of the OHP Master Plan 2021 - 2025

While indicative tasks to address different outputs of each focus area are proposed in Section 6.4 above, the need for interventions that can introduce an integrated and holistic OH approach in different sectors and focus areas should be considered as well. A tentative list of such interventions is shown in **Table 8**.

Table 8. List of recommended interventions that cut across multiple OHP focus areas.

No.	Name of proposed project	Justifications	Brief descriptions of the project (main goals, objectives)	Possible Key Agencies involved	Linked to Output(s)
1	Develop a national control and management system for zoonoses with emphasis on livestock movement tracking, epidemic, food safety, illegal trade, and animal welfare.	The system should be developed based on advanced technologies including blockchain, IoT, Big Data, Cloud Computing, Artificial Intelligence, etc. A Track & Trace system of this type shall ensure data security and privacy, be able to exchange data with existing governments and entrepreneurs' systems in order to help trace and manage: ● Identification, movement, trade, and consumption across the entire wildlife supply chain; ● Information retrieval from the animal supply chain (livestock and wildlife) that monitors zoonotic diseases that can be transmitted between humans and animals; ● Farm animal transport, slaughter, distribution, and consumption to ensure food safety and animal welfare; ● National programs able to define quality systems, including provision of training, and communication/ awareness raising activities for	To develop a digital system for controlling and tracing animal trade and zoonoses for: ● Wildlife conservation; ● Combating illegal wildlife trade; ● Quick responses to zoonotic pathogens; ● Managing use of vaccination and antibiotics for animals; ● Securing food safety for humans; ● Management of antibiotic use; ● Managing animal welfare; ● Managing compliance with regulations and compulsory practices, accreditation, and certifications; ● Raising awareness for communities, livestock households, and farms.	MARD: Department of Livestock Production, General Department of Forestry (Forest Protection Department and CITES), Department of Animal Health.	2.1, 2.2, 3.2, 3.3, 6.1, 6.3

No.	Name of proposed project	Justifications	Brief descriptions of the project (main goals, objectives)	Possible Key Agencies involved	Linked to Output(s)
		government officials, businesses, and community.			
2	Monitoring of zoonotic diseases, AMR, and food safety	● Implement programs for monitoring occurrence of zoonotic diseases, AMR, and food safety pathogens; ● Provide data and encourage scientific approach to capacity building and improved public policy.	Develop national disease monitoring programs: ● Zoonotic diseases; ● AMR; ● Food safety.	MOH, MARD, MONRE	2.2, 3.3
3	Assessing Vietnam's ability to respond to the risk of zoonotic infections and pandemics	Use information gained from previous epidemics (such as avian influenza and COVID-19) to better cope with future outbreaks.	● Conduct descriptive studies to identify mechanisms and effective policies and estimate human and resource costs associated with previous epidemics; ● Undertake scenario analysis to find optimum combination of control activities to protect human health while maintaining economic development and social stability.	MARD, MOH, MOST, MONRE	1.2, 2.3, 5.2
4	Sustainable livestock development	Integrated farming practices are aimed to find an optimum balance between animal health, human health, and environmental health. The successful adoption of this new approach can be developed in pilot areas that can then be scaled up nationwide after successful implementation models have been developed. Integrated farming practices will help private livestock farms in Vietnam become more sustainable.	To entice households and farms to adopt integrated livestock farming practices which can help to ensure principles of biosecurity and food safety are being reliably applied throughout all stages of the livestock value chain, from farm inputs through to farming practices, slaughter, and consumption.	MARD: Department of Livestock Management, Animal Health Department Selected provinces Farming households and firms.	1.4, 1.5, 1.6, 2.2,3.2, 5.3
5	Development of “eco-communities” as a new standard	The NTP on NRD is a far-reaching program of the GoV that aims to promote inclusive and sustainable development of,	Use a OH approach to develop assessment criteria for new rural communes aligned with objectives of the NTP on NRD.	NTP CCO and its subordinates in provinces, pilot	1.1, 1.4, 2.3, 3.4

No.	Name of proposed project	Justifications	Brief descriptions of the project (main goals, objectives)	Possible Key Agencies involved	Linked to Output(s)
	model for improved quality of life in rural communes	and living standards in, rural communes. This objective is an important vehicle for the GoV to make progress on its plan to reduce poverty. Currently, the Program is developing criteria for assessment and accreditation of communes that meet the Program's standards for sustainable development. If the OH approach is integrated into some assessment criteria for the next generation of the NTP, it will force potential candidate communes to make coordinated activities that ensure improvement in animal, human, and environmental health.	To achieve the goal, capacity building and technical support of the NTP CCO is required. Criteria and guidebooks need to be developed, along with resourcing to train local authorities on how to implement blueprint models. Once the OH approach is introduced in the NTP, it can be mainstreamed into the government system with nationwide spillover effects.	provinces and its registered advanced new rural communes	
6	Revision of laws on environmental protection, medical examination and treatment, veterinary medicine, and prevention and control of infectious diseases	The current laws lack a strong legal framework that can oversee all issues related to use of a OH approach for effective control of infectious diseases including but not limited to: ● Enhancing institutional capacity and human resources; ● Minimizing the risks of emerging and transmitting new zoonotic disease pathogens; ● Improving governance and supervision of antibiotic use; ● Minimizing the human health impacts of priority zoonoses; ● Enhancing mobilization of resources for recovery, reconstruction and the management of emerging disease risks;	To develop a more comprehensive legal framework that will: ● Improve sustainable development with coordination of economic growth and environment protection with coordinating networking and supervision mechanism from all sectors; ● Increase the responding capabilities with disasters caused from emerging and transmitting new zoonotic; ● Develop solutions for environment health and suitable use of antibiotic use through making guidance for controlled lists of diseases and medicines, vaccines and chemicals, and related licenses; ● Build focal points units for effective application of legal enforcement; ● Promulgate specific obligations of related subjects to ensure legal implementation;	MARD as a focal coordination unit and related State Authority, as well as related sectors	1.1, 1.4, 2.1, 6.1

No.	Name of proposed project	Justifications	Brief descriptions of the project (main goals, objectives)	Possible Key Agencies involved	Linked to Output(s)
		● Improving management of environmental factors related to animal and human health; ● Improve the legal framework for OHP' implementation, governance, and accountability. Ensure OH legal framework is widely communicated in a convenient format.	● Build compliance mechanism for regulations' violations; ● Increase power for State Authority in communication and training activities.		
7	Capacity building program for livestock husbandry and health expertise, including veterinarians, extension officers, livestock and poultry farmers and health professionals, with emphasis on teaching the OH approach to control of zoonotic diseases (field based OH training program as part of continuing professional development).	Epidemiological competencies are essential to detect emerging infectious and to contain their spread. Epidemiology training programs have been developed and implemented for human health workers and animal health workers in separate courses previously in Vietnam. However, significant gaps exist in epidemiological capacity remain in the country. Based on discussions with partners and findings from national and international reviews, there are some key gaps hindering the development of epidemiology capacity for local human health and animal health workers in Vietnam. These are: ● Variable quality and standards of epidemiology training programs; ● Lack of suitable learning materials case studies for imparting applied competencies; ● Lack of training opportunities for local facilitators and mentors; ● Use of archaic pedagogical methods in	Development of field based OH modules and case studies on topics such as outbreak investigation and response, surveillance and data analysis, risk assessment, and disease diagnosis. This includes development of improved learning materials and suitable case studies, and coordination between experts across the animal-human-environment sectors.	VOHUN as a focal coordination unit and associated with Administration of Science, Technology and training, GDPM/MOH; & DAH/MARD.	1.5, 1.6, 2.1, 3.4, 5.1, 5.3

No.	Name of proposed project	Justifications	Brief descriptions of the project (main goals, objectives)	Possible Key Agencies involved	Linked to Output(s)
		teaching trainees; ● Limited capacity to work at the animal-human-environmental interface. This project aims to develop sustainable field based OH training programs to create these competencies in human health and animal health workers in Vietnam.			
8	Strengthening and securing the role of the OHP Secretariat.	The OHP Secretariat is expected to manage substantial coordination and communication activities to better support the Steering Committee. However, even though MARD has committed to provide budget to maintain routine operation of the Secretariat, most of the Secretariat staff are ICD-officers who work on a part-time basis for the OHP Secretariat. Thus, to professionalize the Secretariat, it should be better staffed with technical and professional experts and provided with sufficient budget to facilitate all activities for which is responsible under this Plan.	OHP Secretariat organization will be strengthened and more staffed for better functionality. To meet this objective, key activities should be implemented: ● Additional technical and communication experts to be staffed in the Secretariat; ● The Secretariat Office's mandate, working flow, M&E system, and reporting regime is established, strengthened, and/or restructured to facilitate its functionality; ● Communication strategy is developed for the Secretariat during OHP Master Plan 2021 - 2025 implementation.	OHP Secretariat, ICD.	1.1, 1.2, 1.3
9	Communication campaign and training about OH approach with involvement of mass media communications.	Communication campaign and training is a basic element required to increase a sustainable OH Plan implementation. Communications should be done in cooperation with: ● Vietnam Television; ● Communication campaign and	Key activities should be implemented: ● Build a OH data system that can be shared among related sectors and authorities; ● Share communication campaign and training documents among related sectors and authorities;	OHP Secretariat and related sectors.	1.2, 1.3, 1.6, 3.2, 3.4, 4.1

No.	Name of proposed project	Justifications	Brief descriptions of the project (main goals, objectives)	Possible Key Agencies involved	Linked to Output(s)
		training programs held by State Authorities at central and local levels; ● Communication campaign and training programs hosted by any private or public OH stakeholder.	● Build networks with suitable human resources that can participate as active mentors for such communication campaign and training.		
10	Building a mechanism that can urgently respond to OH crises or disasters.	The OHP Secretariat should be assigned an additional function related to development of this urgent response unit. Outcomes should include: ● Improving the role of OHP Secretariat; ● Hiring more technical advisers for OHP Secretariat; ● Restructuring OHP Secretariat including recruitment of more human resources from MOH, MONRE, MARD, and specialists from related OH sectors (including both public and private sectors).	Key activities should be implemented: ● Build regulations for a renewal OHP Secretariat with involvement of MOH, MONRE, MARD and specialists of related sectors and stakeholders as well as private sectors; ● Have working mechanism with favorable benefits for human resources of an opened OHP Secretariat such as suitable salary, working equipment, private office; ● Hiring more technical workers and specialists with professional knowledge and experiences to support the new function of OHP Secretariat as an urgent response mechanism to events and disasters in relation to OH.	MOH, MONRE, MARD and specialists of related sectors and stakeholders as well as private sectors.	1.1 1.3, 1.4, 1.5, 5.1, 5.2, 5.3
11	Improving regulatory framework for OH implementation mechanism in government.	In the current situation, there is not an official mechanism to operationalize Vietnam's OH commitment related to ● Coordinating all stakeholders and Vietnam State authority in OH's implementation; ● Supervising OH's commitments of Vietnam; ● Application of a OH approach for Vietnam's effective implementation; ● Organizing communication and	It is necessary to build regulations for OH implementation mechanism with the following objectives ● Establishment for an official mechanism to operate OH's commitment of Vietnam; ● Creation of a unique network for OH's implementation in Vietnam; ● Ensuring the coordination and support as well as cooperation between stakeholders, State authorities, and related sectors for OH's effective	MARD, MONRE, MOH OHP Secretariat Management Board and related sectors.	1.1, 1.2, 1.4, 2.3

No.	Name of proposed project	Justifications	Brief descriptions of the project (main goals, objectives)	Possible Key Agencies involved	Linked to Output(s)
		training networks for OH's implementation in Vietnam.	implementation and supervision.		
12	Digital pandemic management	● Build capacity for evidence-based, early detection and pandemic management systems through creation of interoperable and connected digital data systems in Vietnam. ● Use National Digital Transformation Program as a means of improving multi-sectoral and multi-disciplinary data sharing.	Improved capacity in these areas will: ● Support the ongoing need for response to the COVID-19 pandemic; ● Improve preparedness and therefore reduce impact of future pandemics.	Financial contributions from EU and other OHP implementation partners; MOH General Department of Preventive Medicine.	1.1, 1.4, 2.1, 2.2, 3.1, 3.3, 6.3

4.6. Budgeting for One Health

Creating a budget to accompany this Plan has been a challenge related to three issues:

Inability to separate on-going OH-related business-as-usual actions within public sector from "OH project" activities.

Many agencies within Vietnam ministries are engaged in OH activities as a core function of their service commitment to the Vietnam people. These range from food safety inspection to animal husbandry services, and to public sanitation and water services, and everything in between.

During consultation with these stakeholders, it was common for individuals to indicate they understood the concept of OH but less frequent for them to think they were already contributing to OH. The functions and tasks of a number of government agencies, when reviewed, are more or less related to the objectives and functions of the OH, which are only known by consultation. Therefore, the line between a OH activity and a non-OH activity in ministries such as MARD was often blurry. Some might suggest maintenance of a safe food supply is a OH activity, though others consider certification of a food quality assurance program as a task under OH framework.

Thus, budgeting in the GoV is complicated and currently there is no flexible system that allows one to systematically classify government financial allocations, investments, or activities as a OH activity.

Sparse OH project budget data from stakeholders from private, public, and donor sectors.

Efforts were made during and as a follow-up to stakeholder consultations to develop an inventory of existing, planned, and aspirational OH projects.

Often, donor agencies were able to provide high-quality information about operational aspects of a particular OH project in which they were involved. However, major donors with which we consulted often managed large projects of which only a limited number of tasks might contribute to a OH outcome and therefore were challenging to incorporate into the OHP Master Plan 2021 - 2025 budget.

Currently, there seems to be a global trend for aid projects to be constructed as regional, multi-donor initiatives. With this structure, it is difficult for people external to the project (like the authors of this Plan) to be able to understand operational actions in the plan at sufficient level of detail to be able to accurately account for OH expenditures that could be specifically attributed to Vietnam. Often large projects of this nature contract third parties to conduct work under the main project, and for these contractors to be implementing the work in several countries simultaneously. Thus, the actual (or planned) expenditures for "OH in Vietnam" is very difficult to track.

OH needs were discussed at length during stakeholder consultations. Unfortunately, during these discussions, needs could only rarely be transformed from a qualitative notion (i.e., "very important") to something more quantifiable (X number of affected persons/regions/etc. presenting with a need, each requiring Y amount of investment).

Difficulty ascertaining project activities and therefore budget, for future periods beyond the current year.

Stakeholders were almost uniformly unable to project OH expenditures in Vietnam beyond the current year.

Donors may resist disclosing or committing to longer term financial commitments because: They may be dependent on other sources for the financing they are using to conduct projects, funding priorities can change dramatically from year-to-year particularly in times of global stress such as the COVID-19 pandemic, relationships or availability between the donor agency and the personal and/or contractors doing the work may change from year-to-year, key contractors/implementers may dramatically change focus based on competing interests, availability, or uncertainties, and finally the GoV itself may change its interests or priorities from one year to the next.

Indicative or suggested financial needs for various aspects of OH were described in the 2016-2020 OHSP but little information was available that provided a justification for the stated amounts or to understand on what basis the estimates were made. Further, monitoring and evaluation around the 2016-2020 Plan apparently did not include any tracking against the budgeting amounts. This limited any potential to understand if the estimated amounts were appropriate and therefore provide guidance as to whether the allocations against various needs should be decreased, increased, or remain static in the 2021-2025. As described above, there was also no distinction in the 2016-20 Plan that discriminated OH business-as-usual expenses versus discrete, one-off OH projects.

4.6.1. Proposed budget allocations to meet Vietnam's One Health requirements

Based on the specified focus areas stated in the OHP, an investment framework has been developed to assist the GoV plan future expenditures on OH activities (***Table 9)***. In addition, the investment recommendations have been broken down to reflect a proposed cost-sharing arrangement that can provide guidance to donor agencies that have interest in participating in OH activities in Vietnam and the region (***Table 10***).

The investment framework presented only reflects specific activities that emphasize implementation of the OHP Master Plan 2021 - 2025 and do not including government expenditures such as "food safety inspections" and others that could be considered a business-as-usual OH activity. For the sake of this Plan, these types of public sector activities are considered business-as-usual as they have been done in the past, and would continue to be done in the future, even in the absence of an OHP.

To develop the investment framework, the Vietnam OHSP (2016-2020) was studied carefully, and the investment required to conduct activities under each of the seven OH focus areas in that plan were extracted. In the Technical Annex to the plan, additional costing details that described more specific outcomes expected from these investments were presented. These allocations appeared to be rounded to the nearest US$100,000 and the authors provided some guidance as to whether the funding for a particular allocation should be a responsibility of donors, or a responsibility of the GoV, or be funded jointly. Unfortunately, no details as to the budgeting method were provided but we assume, similar to the current situation for the 2021-2025 Plan, that insufficient detail were available at the time to make precise estimates around anticipated spending (e.g., projects that are planned or desirable, but yet to be matched with available public, private, or donor-provided funding) for the five-year period ahead.

Faced with similar challenges, this Plan used the budget allocations from the 2016-2020 plan as the basis to form the proposed investment framework for the 2021-2025 plan. Briefly, the budget amounts were extracted from the previous plan and these totals were inflated into 2021 equivalents based on published annual inflation rates for Vietnam.[7] These inflated totals were then associated with their respective OH focus area and desired outcomes in a spreadsheet. Finally, a modelling exercise was undertaken to map, whenever possible, similar outcomes between the 2016-2021 OHSP and the OHP Master Plan 2021 - 2025. Based on feedback from stakeholder consultations that were undertaken, and emphasis provided in the OHP framework, the mapping was then extended to accommodate new desired outcomes. Allocations were then looked at in their entirety, and each was reduced or increased in turn to achieve a balanced approach to OH funding that is consistent with the previous plan and therefore ease its adoption by the GoV.

Table 9. Proposed investment framework for OH expenditure in Vietnam between 2021 and 2025. Amounts are represented in USD equivalents.

OHP Focus Areas	Output No.	Outputs	Total Investment (USD)	Percent of Total (%)
Focus area 1: INSTITUTIONALIZE ONE HEALTH	1.1	Improve OH policy dialogue	2,600,000	2.01
	1.2	OH communication plan	2,900,000	2.24
	1.3	OHP Secretariat support	4,200,000	3.24
	1.4	Building a OH institutional framework	2,900,000	2.24
	1.5	OHP stakeholder engagement	4,800,000	3.71
	1.6	International and regional cooperation	7,500,000	5.79
Subtotal			**24,900,000**	**19.23**
Focus area 2: MANAGE RISK FACTORS FOR EMERGENCE	2.1	Improved wildlife trade regulations	4,500,000	3.47
	2.2	Surveillance for zoonotic diseases	15,400,000	11.89
	2.3	Zoonotic disease communications	2,800,000	2.16
Subtotal			**22,700,000**	**17.53**
Focus area 3: REDUCE OCCURRENCE OF AMR	3.1	Regulation of antimicrobials	4,400,000	3.40
	3.2	Antimicrobial best practices	6,600,000	5.10
	3.3	Implementation NAP for AMR	10,000,000	7.72
	3.4	AMR public messaging	5,500,000	4.25
Subtotal			**26,500,000**	**20.46**
Focus area 4: REDUCE IMPACT OF TRADITIONAL ZOONOSES	4.1	Avoiding behaviors that cause zoonoses	23,800,000	18.38
	4.2	Application of diagnostic and therapeutic guidelines	3,200,000	2.47
Subtotal			**27,000,000**	**20.85**

[7] Data from https://www.worlddata.info/asia/vietnam/inflation-rates.php. Accessed October 8, 2021.

OHP Focus Areas	Output No.	Outputs	Total Investment (USD)	Percent of Total (%)
Focus area 5: INCREASED EFFECTIVENESS OF RESPONSE TO OUTBREAKS	5.1	OH capacity building at the front-line	3,800,000	2.93
	5.2	Lessons learned from COVID	2,000,000	1.54
	5.3	Regional resilience against pandemics	10,000,000	7.72
Subtotal			**15,800,000**	**12.20**
Focus area 6: MINIMIZE HUMAN IMPACT ON THE ENVIRONMENT	6.1	Improving public sanitation and water	6,000,000	4.63
	6.2	Action on climate change	3,000,000	2.32
	6.3	Protecting natural resources	3,600,000	2.78
Subtotal			**12,600,000**	**9.73**
Grand Total			**129,500,000**	**100.00**

Table 10. Proposed government-led and donor-led investments in the Vietnam 2021-20215 One Health Plan. Amounts are represented in USD equivalents.

Focus areas	GoV Investment (USD)	GoV (%)	Donor Investment (USD)	Donor (%)	Total Investment (USD)
Focus area 1: INSTITUTIONALIZE ONE HEALTH	15,000,000	60.2	9,900,000	39.8	24,900,000
Focus area 2: MANAGE RISK FACTORS FOR EMERGENCE	9,940,000	43.8	12,760,000	56.2	22,700,000
Focus area 3: REDUCE OCCURRENCE OF AMR	15,505,000	58.5	10,995,000	41.5	26,500,000
Focus area 4: REDUCE IMPACT OF TRADITIONAL ZOONOSES	5,880,000	21.8	21,120,000	78.2	27,000,000
Focus area 5: INCREASED EFFECTIVENESS OF RESPONSE TO OUTBREAKS	9,350,000	59.2	6,450,000	40.8	15,800,000
Focus area 6: MINIMIZE HUMAN IMPACT ON THE ENVIRONMENT	4,680,000	37.1	7,920,000	62.9	12,600,000
Grand Total	**60,355,000**	**46.6**	**69,145,000**	**53.4**	**129,500,000**

4.6.2. How One Health needs access resources in Vietnam

In addition, as an alternative to presenting OH investment needs as a monetary measure, two processes are available to help donors (***Figure 4)*** and beneficiaries (***Figure 5)*** work efficiently with agency managers, ministry officials, and other stakeholders to plan and implement OH projects in Vietnam. Underpinning both processes in the important and key facilitating role of the OHP Secretariat.

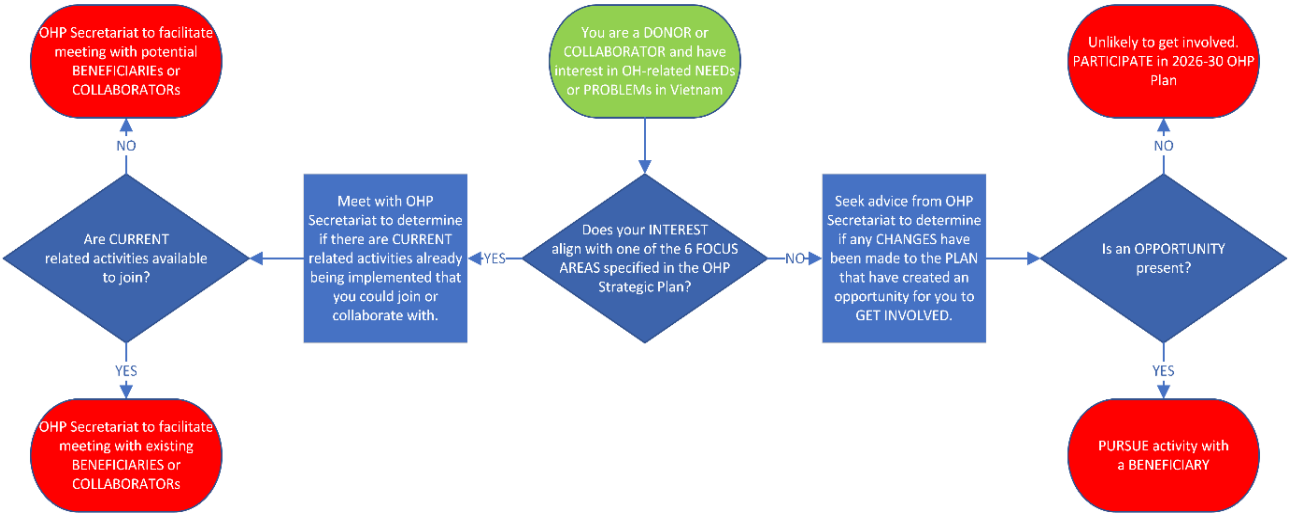


Figure 4. Donor-driven roadmap for implementing OH projects in Vietnam.

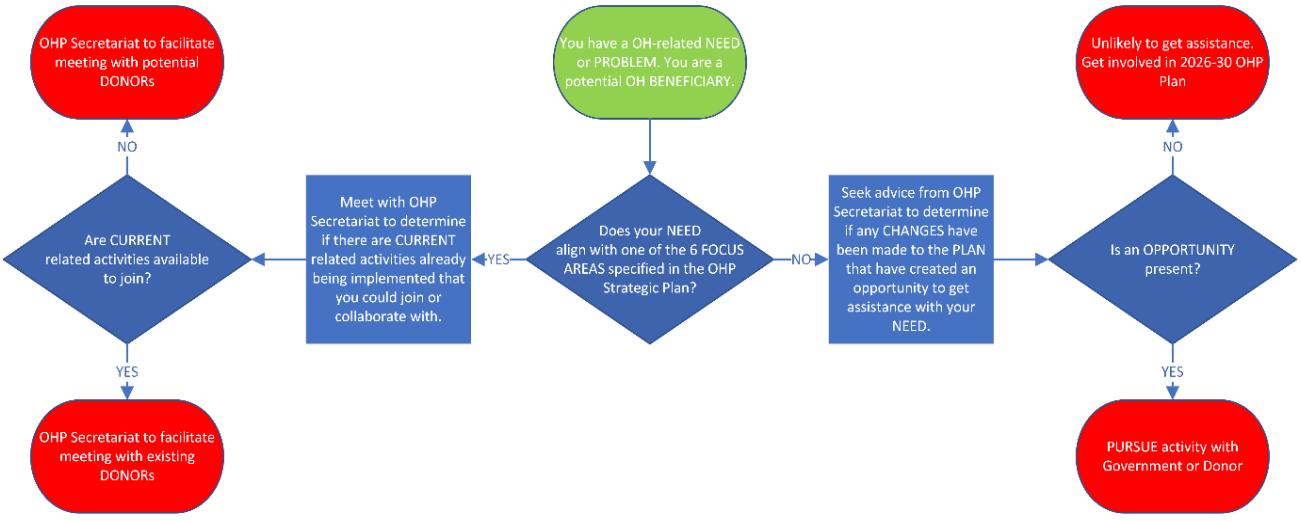


Figure 5. Beneficiary-driven roadmap for implementing OH projects in Vietnam.

5. Risk scenarios and budgeting

Different from the first OHSP 2016-2021, this current OHP Master Plan 2021 - 2025 investigates how unanticipated human or animal health events occurring in Vietnam might affect implementation of the Plan, or how the GoV may wish to consider institutionalizing the OH approach within affected ministries.

The approach selected for this investigation and described below is formed around developing an economic framework that can be used by the GoV and other OH stakeholders

for allocating human and financial resources in the prevention and control of various types of zoonotic disease outbreaks.

5.1. The economic burden of disease

5.1.1. Human diseases

Economic evidence can be used to prioritize many kinds of resource allocation decisions, including in the health sector. However, it remains controversial to assign financial costs to diseases that cause disability or death in people. The controversy is rooted in people's notions about morality of assigning financial value to a person's life or livelihood, further complicated by the substantially different cost of living in different countries around the world. To improve comparability across research data, epidemiological studies, and disease burdens in different countries, generic measures of health outcomes, such as quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs) are commonly used.

Although the intended use of QALYs or DALYs is similar, the theoretical and technical underpinnings of the two metrics differ.[33] The concept of the QALY was developed in the 1960s and combines information about "years lived" and the associated utility values of those years, ranging from 0 (dead) to 1 (perfect health). Utility estimates represent the perspective of an individual's values or preferences, based on the central tenet that individuals are the best judges of their own welfare, and improved societal welfare as the ultimate goal is based on the sum of these individual utilities. The primary application of QALYs has been to compare the benefits and risks of medical interventions.

In contrast, the DALY was developed in the 1990s by the Global Burden of Diseases, Injuries, and Risk Factors (GBD) initiative to assess burden of disease at a population level, to understand leading causes of health loss worldwide, and to compare population health across geographic settings.[34] DALYs reflect the sum of years of life lost (YLLs) due to premature mortality and years lived with disability (YLDs). The disability weights used for DALYs are inverse to that of utility weights (when calculating QALYs), with "0" referring to no disability and "1" representing the dead state. Disability weights are defined not based on surveys of individuals but based on expert opinion, as in the view of researchers that developed DALYs a single set of weights anchored to specific diseases (or clinical presentation) better facilitated cultural and geographical comparisons than did some form of self-assessment. The DALY, a measure of disease burden that captures both reductions in life expectancy and quality of life due to disability, has been increasingly used in economic evaluations, particularly studies for the low-middle income countries (LMICs).

Cost-per-disability-adjusted life-year averted (DALY) studies have become a commonly used measure in the current practice of cost-effectiveness analysis for interventions that affect quality as well as length of life. While the QALY-based measure has been recommended by many health technology assessment agencies in high-income countries, the DALY-based measure is generally preferred in low- and middle-income countries.[35, 36] Freely and publicly available disability weights, which are required for DALY calculations, further ease their credible adoption in health care economic debates. DALYs have been adopted by the WHO to quantify the global burden of disease [37] and the global burden of foodborne diseases.[38]

5.1.2. Livestock and poultry diseases

As described above, an understanding of the economic and social impacts of diseases is central to the decision-making process for disease control. In contrast to the situation in human health, animal disease impacts are widely reported using economic models based on monetary costs. Therefore, animal losses can be estimated based on the sum of lost value due to animal death (lost sales), costs associated with disease control (treatments, vaccinations, etc.), reduced efficiency of production (e.g., more feed required to produce saleable meat, eggs, or milk), and reduced value of livestock or livestock products ("defective" product for which the market creates a financial penalty for the seller). Cost-of-disease calculations are relatively easy to calculate and are reliable within a region or context where markets, national economies, and costs of production are comparable. However, monetizing the cost of animal disease in this manner does not readily allow for comparison between countries or regions where these factors are disparate.

5.1.3. Zoonotic diseases

Determining the cost of zoonotic diseases is a challenge as the traditionally used measure for humans (DALYs) is a non-monetary value while the traditionally used measure for livestock and poultry disease (loss of financial value) is a monetary value, and therefore the total cost burden of a zoonotic disease cannot simply be determined by adding the two measures together. Understanding the cost of zoonotic diseases (and the relative contribution of both the human and animal components) is important in any discussion of OH as this information is fundamental to assigning prevention and control costs fairly to the various players. For many zoonotic diseases, the costs required to control an outbreak (or indeed the costs required for effective control of endemic zoonotic agents) under a traditional non-OH approach are not necessarily borne equitably by those that receive the benefit of the disease control action. For countries such as Vietnam that are actively trying to institutionalize a OH approach to business-as-usual in the public sector, this issue is particularly relevant because financial and human resources in the relevant public sector ministries (usually health and agriculture, but also including environment) are often scarce and not easily shared with other ministries.

Until recently, no satisfactory metric has been developed to estimate the cost burden of zoonotic that incorporates "costs" in both the human and animal sectors to estimate their relative share in the societal cost of disease. To be incorporated into the DALY metric, livestock costs need to be quantified into an animal disease burden metric that reflects the impact of the animal disease on its owner in terms of the time that might be required to replace that animal or recoup the losses caused by its illness. In 2018, such a method was proposed and termed a "zDALY" or a modified DALY for zoonotic diseases.[39] The zDALY incorporates an additional component to a DALY termed an "animal loss equivalent" (ALE). The ALE is estimated by calculating the monetary value of livestock losses due to the disease and local per capita income by using a time trade-off approach to estimate an equivalent burden to the human population. The ALE in effect reflects the "labor time lost" due to a zoonotic disease.

Following, a zDALY approach is applied to three scenarios of possible future zoonotic disease outbreaks in Vietnam. The potential to manage each outbreak using traditional non-OH approaches versus a cross-sectoral OH approach is discussed.

5.2. Outbreak scenarios

Three hypothetical outbreaks of zoonotic disease in Vietnam have been developed, each with distinctly different epidemiological features, consequences, risk factors, and recommended control strategies (***Table 11)***. The choice of outbreak scenarios has been informed by considerations around seriousness of the disease, geographical spread, and contagiousness amongst people.

The three scenarios that were developed for inclusion in the Plan were based around pathogens that currently exist in Vietnam at low (or controllable) levels but have the potential to emerge as significant health emergencies at local, regional, or national levels. The three pathogens (fluoroquinolone resistant *Salmonellae enterica*, a new variant of influenza A(H1N1)pdm09, and Nipah virus) have significantly different "costs" based on the circumstances surrounding the specific outbreak with which they are associated but also based on whether the economic burden is biased toward human disease or animal disease symptoms.

Table 11. Hypothetical scenarios of zoonotic disease outbreaks suitable for control through a One Health approach.

Epidemiological feature	Scenario 1	Scenario 2	Scenario 3
Agent	*Salmonellae*, fluoroquinolone resistant (WHO "High, Priority 2" pathogen)	Establishment in humans of a new variant of influenza A(H1N1)pdm09	Emergence of Nipah virus in Vietnam
Spatial distribution	Localized epidemic	Nationwide epidemic	Multiple, localized outbreaks
Contagiousness amongst humans	Moderate	High	Low
Clinical severity in people	Variable (mild to severe)	Moderate	High

DALYs associated with each outbreak scenario were calculated using the downloadable spreadsheet calculator provided on the WHO website.[8] Similar tools are available from other sources, but this spreadsheet format provides a flexible framework for combining DALYs for diseases that present with a range of symptoms or severity. Disability weights for various symptoms or clinical presentations were taken from online DALY calculator available from the Center for Evaluation of Value and Risk in Health at Tufts Medical Center.[9] The disability weights available at this site are based on expert analysis of all relevant published papers and government data. Age strata specific population data for

[8] https://www.who.int/healthinfo/bodreferencedalycalculationtemplate.xls. Downloaded October 4, 2021.

[9] Global Health Cost Effectiveness Analysis Registry at http://ghcearegistry.org/orchard/daly-calculator. Accessed October 4, 2021.

Vietnam (2019) was retrieved from public sources.[10] Life expectancy data for Vietnam (2019) was retrieved from the WHO.[11] Number of farms (dairy, poultry, and pig), their estimated sizes (number of animals or birds), and cost of production estimates are fictitious but considered reasonable.

Disease frequency, severity, and lethality data for each scenario (for humans and animals) was based on a limited, targeted review of published papers; this data is meant only to represent reasonable estimates for demonstration purposes and should not be considered as citable references. Cost of disease in animals was estimated using a simple partial-budget approach.

For calculation of ALEs, the Vietnam Gross National per-capita Income (US$ in 2021 value) was estimated at $2,660.[12]

5.2.1. Scenario 1: Salmonellae enterica, fluoroquinolone resistant (WHO priority pathogen)

Nontyphoidal Salmonellae (NTS) are associated with both diarrhea and bacteremia (blood-borne disease) and AMR is common in these pathogens in low-middle income countries. WHO has classified fluoroquinolone resistant Salmonellae as a “High, Priority 2” pathogen due to it potential to cause significant and difficult to treat disease in humans.

A study was published in 2020 aimed at assessing the role of animals as a source of AMR in human NTS infections in Vietnam.[40] Six-hundred seventy-two NTS human and animal isolates were available for study and researched assessed the most like source of these bacteria that had been isolated. Amongst the 672 NTS isolates, 148 (22%) originated from human blood, 211 (31%) from human feces, and 313 (47%) from animal feces. The Typhimurium serovars were amongst the most common types found and there was a strong association between the source of isolate and its AMR profile. Modelling by found that chickens and pigs were likely the major sources of AMR nontyphoidal Salmonellae infections in human blood and feces; fluoroquinolone resistance was common in samples from human blood, feces, and animal feces (51%, 8%, and 19% of isolates were resistant, respectively). There is the clear potential for nontyphoidal Salmonella to cause a significant localized outbreak of zoonotic disease in Vietnam.

Epidemiology	The domestic water supply at a wet-market in the Dong Da urban district of Hanoi City province has apparently been contaminated by uncontrolled discharges or effluent from peri-urban livestock and poultry in the area. The contamination event has resulted in a significant increase of diarrheal disease in people working at or visiting the market during a specific 3-week period. The occurrence of clinical signs was strongly associated with people involved in trade

[10] Vietnam population pyramid. Retrieved from https://worldpopulationreview.com/countries/vietnam-population and attributed to the United Nations (https://population.un.org/wpp/). Accessed October 4, 2021.

[11] World Health Organisation, Global Health Observatory data repository, Life tables by country at https://apps.who.int/gho/data/view.main.61830?lang=en. Accessed October 3, 2021.

[12] World Bank Vietnam Gross National per capita Income (GNI). Retrieved from https://data.worldbank.org/indicator/ny.gnp.pcap.cd?locations=VN. Accessed October 3, 2021.

of fresh vegetables, fresh meat, and some prepared food items. The causative agent, a fluoroquinolone-resistant Salmonellae bacterium, has been isolated directly from the water source at the market, from affected people, and on surfaces and goods at the market.

Human role and consequence

The disease appears to be moderately contagious amongst people (some household spread) and causes diarrhea, sometimes severe and requiring hospital care in affected people. Most cases appear to be associated with direct contact with contaminated goods from the market. There were an estimated 371,606 persons in the Dong Da urban district at-risk of becoming infected.

Animal role and consequence

There has been no obvious change in the health of pigs, poultry, or dairy cattle in the affected area before, during, or after the outbreak was identified in humans. Investigations have not identified any systematic or recent changes in antibiotic usage patterns in area farms. The causative agent has been detected in some animals on some farms in the affected area. Fluoroquinolone medications are known to be routinely used in farms in the area. There were an estimated 2,500 poultry flocks (layers or meat), 200 pig farms, and 75 dairy farms in the area surrounding the human outbreak (all assumed to be peri-urban small holders).

DALYs were calculated for three different presentations of the disease (severe, moderate, and mild diarrhea) then summed to estimate the total disease burden in people.

Disease presentation	Deaths (per 1,000)	Disabilities (per 1,000)	YLLs	YLDs	DALYs
Severe diarrhea	0.13	2.8	1,230	14	1,244
Moderate diarrhea	0.04	3.9	335	15	350
Mild diarrhea	0.02	13.7	101	4	105
		TOTAL	**1,665**	**34**	**1,699**

Livestock sector	USD	ALEs
Poultry losses	28,750	11
Pig losses	4,500	2
Dairy losses	11,953	4
TOTAL	**45,203**	**17**

Cost of outbreak in zDALYs	Number	Proportion
Total ALEs	17	1%
Total DALYs	1,699	99%

YLLs	*1,665*	*97%*
YLDs	*34*	*2%*
Total zDALYs	**1,716**	**100%**

Unsurprisingly, the social cost of this outbreak is borne largely by the affected human population with 99% of the zDALYs attributed to human illness. Peri-urban livestock and poultry raising is common across much of Vietnam. In these non-commercial settings, effluent and wastewater are often discharged into open drains or simply left to run off the site and it is very conceivable that this activity could result in sporadic (or perhaps even persistent, low-level) contamination of public water sources.

Though antibiotic distribution and use are regulated in Vietnam, compliance with applicable laws is imperfect. This coupled with inappropriate use (wrong drug, wrong form or concentration, etc.) increases the opportunity for development of antimicrobial resistant strains in livestock and poultry, and therefore in the environment where they are raised. Many of the enteric bacteria known to carry resistance against antimicrobials for use in humans such as the Salmonellae strain in this scenario may cause no, or only mild subclinical disease in animals and poultry but can cause significant illness in people. The fact that the bacterium in this scenario is also resistant to fluoroquinolone antibiotics makes any infection in humans potentially difficult to treat.

Within the DALYs that are accrued in people, virtually all are attributed to YLLs. This is a result of bad outcomes (death) in susceptible, young children and because they have so many potential years of healthy life ahead of them, their death even at a low incidence contributes substantially to the YLL metric. Most health adults cope reasonably will with the mild diarrhea that accompanies the disease in most cases. Many of these resolve without treatment or hospitalization after a few days and therefore contribute only a small amount to the YLD total.

Strategic budgeting lessons:

Traditional, non-OH control program:

- Treat affected humans as required.
- Re-establish safe water supply.
- Education and compliance activities with market vendors.

Progressive, OH-oriented control program:

All of the items described above, plus additional actions listed below:

- Regulatory reform and increased compliance with National Action Plan for reducing antimicrobial resistance.
- Education of livestock and poultry owners on judicious use of antibiotics.
- Coordinated surveillance for WHO priority pathogens amongst human and veterinary diagnostic laboratories.
- Engage with city planners to minimize opportunities for water contamination to occur.

5.2.2. Scenario 2: Emergence of new variant of influenza A(H1N1)pdm09

Prior to COVID-19, the last influenza pandemic, known as the 2009 H1N1 crisis, was the first pandemic to occur under the WHO's International Health Regulations. This classification triggered various interventions such as airport screenings, antiviral stockpiling, vaccination campaigns, bans on public events, and school closures in many countries. The pandemic (caused by influenza A(H1N1)pdm09) had significant economic impact across the world and a number of studies have described the "lessons-learned" and tried to assess the cost-effectiveness of the various interventions that were undertaken.[41] Vietnam researchers contributed to the global study of the disease with more than 20 published papers available describing various aspects of virology, diagnosis, epidemiology, and management of the disease in the country. Though the outbreak was not unusually severe in its presentation relative to other influenza viruses circulating at the time, the strain did apparently have the ability to move back and forth between pigs and humans, suggesting there will be on-going risk of recombination or mutation of the A(2009)pdm09 strain with the potential to cause significant morbidity and/or mortality in people, pigs, poultry, or other species. Indeed, at least two papers have already been published reporting ongoing evolution of the 2009 strain in Vietnamese pigs.[42, 43]

Given the very large and spatially related populations of waterfowl (farmed and wild), pigs, and people in Vietnam, emergence of a novel variant of the influenza A(H1N1)pdm09 strain is likely in the future.

Epidemiology	Emergence of a variant of the influenza A(H1N1)pdm09 virus.
Human role and consequence	The influenza variant is highly contagious amongst people and presents with clinical signs typical of seasonal influenza. Previous vaccination with seasonal influenza vaccine that contains "influenza A(H1N1)pdm09" provides incomplete protection from infection and clinical signs. Humans without prior vaccination with this strain are more likely to become infected and have more severe clinical disease than those that have been vaccinated in prior years. The outbreak is national in scope, putting all the national population of 98,168,900 persons at risk.
Animal role and consequence	Apparently little infection of, or spread within, domestic poultry but there is widespread and increasing occurrence of the virus in domestic pigs, associated with clinical signs typical of swine influenza. There were an estimated 425,000 poultry flocks (layers or meat), 155,000 pig farms, and 70,000 dairy farms in Vietnam, including commercial and small holders.

DALYs were calculated for three different presentations of the disease (severe lower respiratory disease, moderate upper respiratory disease, mild upper respiratory disease) then summed to estimate the total disease burden in people.

Disease presentation	Deaths (per 1,000)	Disabilities (per 1,000)	YLLs	YLDs	DALYs

Severe lower respiratory disease	0.13	2.8	1,230	14	1,244
Moderate upper respiratory disease	0.04	3.9	335	15	350
Mild upper respiratory disease	0.02	13.7	101	4	105
		TOTAL	**1,665**	**34**	**1,699**

Livestock sector	USD	ALEs
Poultry losses	2,556,250	961
Pig losses	184,667,969	69,424
Dairy losses	0	0
TOTAL	**187,224,219**	**70,385**

Cost of outbreak in zDALYs	Number	Proportion
Total ALEs	70,385	73%
Total DALYs	26,013	27%
YLLs	*21,990*	*23%*
YLDs	*4,023*	*4%*
Total zDALYs	**96,398**	**100%**

In contrast to scenario one, this scenario of the emergence of a new strain of influenza results in a markedly different social cost of the disease outbreak. In the first instance, the overall effect is much larger (96,398 zDALYs versus only 1,716 in scenario one). This is primarily a result of the combined effect of it being a national, rather than local outbreak. However, the distribution of the social costs is also rather different with the poultry/livestock sectors not contributing 73% of the zDALYs as compared to only 1% in scenario 1. However, this means that disease in humans is still contributing meaningfully to the total social cost of the disease.

While the scenario does not provide any information as to the source of the new influenza, we can assume from our knowledge of the parent strain that it likely contains gene from pigs, poultry, waterfowl, and humans and can therefore likely cause infection (though not necessarily clinical disease) in any of these hosts. The major contributor to the animal related zDALYs was the pig sector. The epidemiological history suggests the disease in pigs is not necessarily severe (in terms of death loss) but swine influenza in pigs tends to spread rapidly and affect a high percentage of any susceptible population. Like in people, the main clinical effects are related to fever and malaise, and therefore reduced feed intake, reduced growth, and poor efficiency of gain for a few days to a week.

Three forms of the disease in humans were included in the human DALY calculation; “Mild upper respiratory disease” was very common across the country with an incidence of 13.7 cases per 1,000 persons or nearly 16 million affected people. However, as in the pig population disease in this group is mild and therefore contributes minimally to the total

zDALY metric. More severe illness in people does generate some mortality but this is in a relatively small number of people.

Strategic budgeting lessons:

Traditional, non-OH control program:

- Public service messaging around personal hygiene to limit spread between humans.
- Plan for inclusion of emergent variant in WHO influenza vaccine recommendation in 1-2 years.

Progressive, OH-oriented control program:

All of the items described above, plus additional actions listed below:

- Coordinated, active surveillance for influenza amongst human and veterinary diagnostic laboratories to identify emergent viruses before they become widespread.
- Develop rapid response vaccine development and distribution process to immunize population quickly, rather than having to wait for 1-2 years.
- Investment in improved pig and poultry farm biosecurity (reduce contact with waterfowl) and health (vaccination, treatment, and accessible veterinary support to support disease control programs on-farm).
- Remembering that influenza virus has the potential to travel in all directions between waterfowl, pigs, humans, poultry, and other species, communication strategies should be developed that encourage sick humans from coming into contact with health livestock or birds.
- Organize development of farmer industry groups that can provide training, biosecurity support, advocacy, knowledge sharing, etc. amongst farmers. Not only can farmers benefit directly from these industry linkages, but farmer groups also provide a convenient single-point-of-contact that improves the ability of all sectors/ministries involved in OH to “consult with industry”.

5.2.3. Scenario 3: Nipah virus outbreak

Nipah virus (NiV)) first emerged in 1998 in Malaysia, causing an outbreak of respiratory illness and encephalitis in pigs. Pig-to-human transmission of NiV associated with severe fever and encephalitis was described soon thereafter. Since this time, the virus in people, pigs, and other livestock in other parts of Asia including India, Bangladesh, and Vietnam.[44, 45] Given the severe (often lethal) consequences of the disease to humans, the virus features on the list of high priority zoonotic pathogens of many countries and Vietnam has been identified as one of the countries at highest risk of an outbreak of Nipah in humans (***Figure 6***).[46]

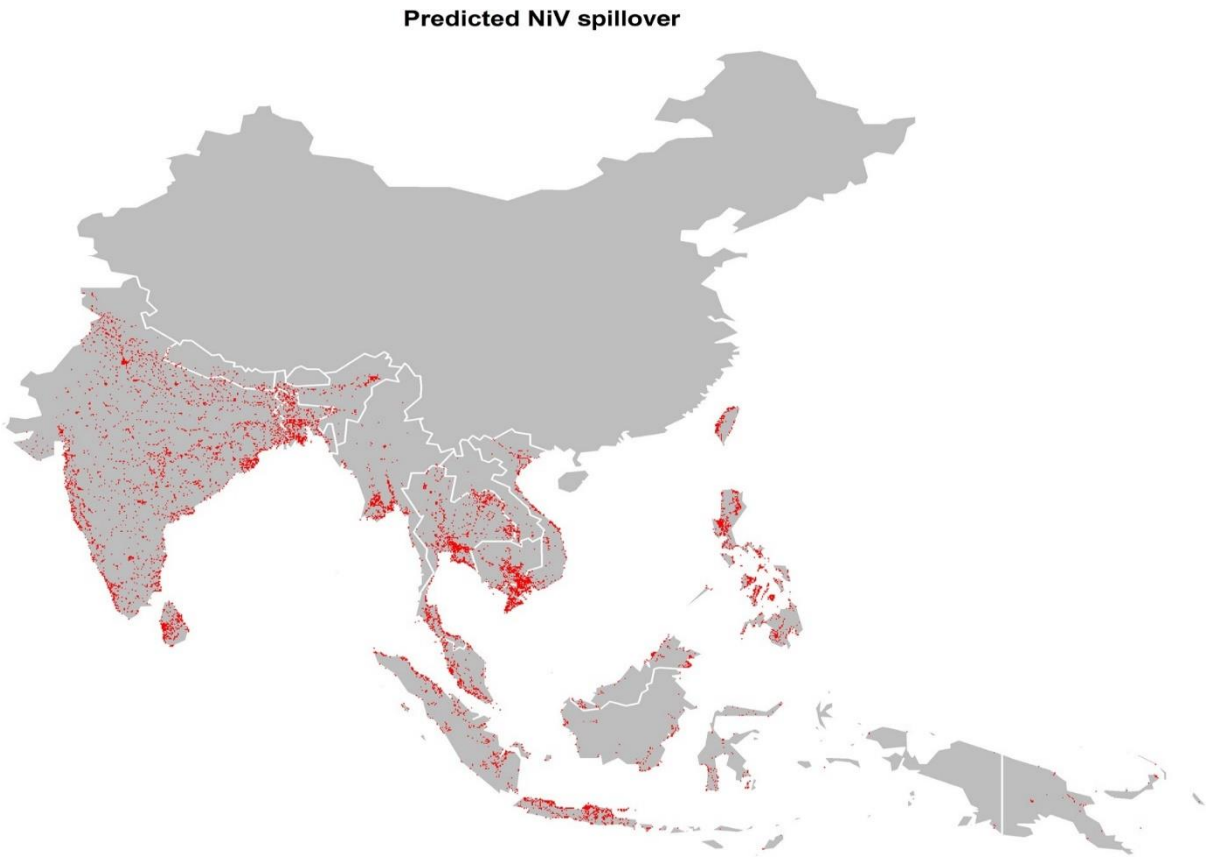


Figure 6. Predicted intensity of zoonotic Nipah virus transmission to humans in South and Southeast Asia

Vietnam has a number of risk factors (deforestation, encroachment of farming into forest areas, large population of susceptible fruit bats) that put it at risk for an outbreak of Nipah.

Epidemiology	Though the virus has been detected in certain species of fruit bats in some parts of Vietnam, Nipah virus disease has not previously been reported in livestock or people in the country. In this scenario, several localized outbreaks of Nipah virus disease in domestic pigs, pig farm workers and family members, and in the community surrounding the affected pig farms are being reported. Disease also appears to be associated with collection or consumption of raw palm sap. Three provinces are involved in the outbreak: Bà Rịa-Vũng Tàu (including Côn Đảo island which is known to have a population of fruit bats), Bình Thuận (livestock farming, forestry, mining, and cropping have had substantial negative impacts on the environment), and Đồng Nai (similar situation to Bình Thuận with development of large livestock farms which are impinging on local forests and environment).
Human role and consequence	Most people that become infected have had a direct or spatial association with fruit bats, often co-habitating around livestock holdings. There is a suggestion of limited spread occurring between people, but this is usually limited to family members or people giving care to infected patients. Severe clinical signs are common (including death), and this

occurs in a very high proportion of those people that become infected. Those that experience a less severe encephalitis usually avoid death but suffer from chronic debilitation for many years. The outbreak involves three provinces putting all the population of 5,604,920 persons in the provinces at risk.

Animal role and consequence

Pigs that become infected have severe clinical signs, including death. There were an estimated 7,000 poultry flocks (layers or meat), 1,000 pig farms, and 250 dairy farms in Vietnam, including commercial and small holders. When a farm is determined (or suspected) of being infected, the entire herd population is stamped out.

DALYs were calculated for two different presentations of the disease (severe encephalitis with high mortality, moderate encephalitis with low mortality) then summed to estimate the total disease burden in people.

Disease presentation	Deaths (per 1,000)	Disabilities (per 1,000)	YLLs	YLDs	DALYs
Severe encephalitis, high mortality	0.01	0.03	1,461	3	1,464
Moderate encephalitis, low mortality	0.003	0.03	425	94	519
		TOTAL	**1,886**	**97**	**1,983**

Livestock sector	USD	ALEs
Poultry losses	0	0
Pig losses	625,000	234,962
Dairy losses	0	0
TOTAL	**625,000**	**234,692**

Cost of outbreak in zDALYs	Number	Proportion
Total ALEs	234,962	99%
Total DALYs	1,983	1%
YLLs	*1,886*	*1%*
YLDs	*97*	*0%*
Total zDALYs	**236,945**	**100%**

Scenario three examines the very real threat of the emergence of Nipah virus in Vietnam. The prevalence of the virus and incidence of cases in humans and livestock are increasing across South and Southeast Asia and Vietnam should be preparing now for its likely eventual arrival.

This Nipah scenario produces an opposite effect to that of the Salmonella outbreak in scenario one in that virtually all the social cost of a Nipah outbreak (99% of zDALYs) are related to the occurrence of the disease in pigs. Based on experience of the disease in Philippines and elsewhere, contemporary strains of the virus are highly virulent and can be expected to cause heavy losses in susceptible pigs and the result is often voluntary cull of the herd by the farmer (or by disease control officials). The disease in people is somewhat similar to that occurring in pigs with high fever, clinical signs attributed to encephalitis, and death as frequent outcomes. However, while the virus seems to be reasonably efficient at moving between pigs, it is less likely to move between people; most human cases seem to arise as a direct result of contact with infected pigs…or the reservoir fruit bat.

Nipah virus is exquisitely requires a OH approach to both prevent and to manage. With a mobile wildlife vector (non-lethal infection in susceptible fruit bats), the virus will never be eradicable ones it gains a foothold a region. In this scenario, three provinces in the south of Vietnam were identified as they represent areas where key risk factor are present: Encroachment of large pig farms into areas known to have Nipa susceptible fruit bats, degradation of forest habitat by legal and illegal timber harvest, reduction of total forest area by urban development and cropping, and likely climate induced changes to the home range of the reservoir bats.

Even though infection in people has a very severe outcome in nearly all cases, the relatively low number of cases in humans, limited spread of the virus between humans, and the almost complete requirement for a human to come into direct contact with an infected pig or bat feces/virus for infection to occur means humans contribute in only a minor way to the total social cost of the disease.

There is no vaccine or treatment for Nipah infection in pigs or people.

Strategic budgeting lessons:

Traditional, non-OH control program:

- Supportive treatment of infected humans, often with limited capacity to isolate or quarantine human cases in a rural setting.
- Stamping-out of affected livestock populations when possible.

Progressive, OH-oriented control program:

All of the items described above, plus additional actions listed below:

- Pre-planned response and diagnostic capabilities in place because of on-going preparedness training and establishment of Emergency Operation Centers.
- Rapid recognition of outbreak due to coordinated epidemiologic reporting between human and animal health sectors.
- Regulatory reform, compliance activities, and national policy changes that will limit further human-induced changes to bat habitat.
- National R&D investment strategy that supports OH capacity in the public sector, particularly centers of excellence in zoonotic disease, vaccine development, epidemiology, and incident management.
- Cross-training, joint workspace, collaborative initiatives between public sector wildlife and animal health staff that ensures functional working relationships, trust, knowledge of risk factors, and local epidemiological intelligence.

5.3. Lessons learned from scenario analysis

The three scenarios present substantially different problems and opportunities about how a response effort might be managed.

Scenario	Disease burden		
	DALYs	ALEs	Total (zDALYs)
Salmonellae, fluoroquinolone resistant	1,699	17	1,716
Emergence of new variant of influenza A	26,013	70,385	96,398
Nipah virus outbreak	1,983	234,962	26,945

5.3.1. Monetary costs of outbreaks are different than social costs of outbreaks

There is a strong temptation for analysts and disease response managers to convert cost of an outbreak into monetary terms and either ignore the social costs of disease, or simply footnote them as "intangible" or "indirect, non-quantifiable" costs. As described in the introduction to this section, this is a particular problem that pertains to zoonotic disease outbreaks. The zDALY approach provides an easy-to-understand and credible method for summing the cost of a disease in humans (using DALYs to avoid the moral debate around cost of a human life) and the cost of disease in animals (typically stated in monetary terms) in the same "unit" – a zDALY. This approach has the added benefit that it adjusts the cost of disease in animals to the economic conditions for an "average person" living in that economy.

The scientific literature includes numerous papers that review the cost of Salmonella outbreaks in people (with many fewer reported for animal outbreaks and none could be located that reported total costs of humans and animals involved in an outbreak). Some are quite detailed with regard to costing such as a 2008 of a drinking water-associated Salmonella in the US.[47] The population of the city involved included 8,746 persons and all households. Through a survey, 21% of respondents reported diarrheal illness during the outbreak and of those 29% reported long term health consequences as a result. A detailed costing of the outbreak estimated the cost of the outbreak was US$1.5 million (range $196K to $6M) to city residents which rose to $2.6M (range $1.1 to 7.8M) when costs to GoV were added. Apparently, the cause of the contamination in the water supply was not identified and no investigation of livestock, poultry, or pet disease was formally conducted. Despite presenting a very detailed analysis of costs, the authors noted that the total cost was likely a conservative estimate by comparison to other reports in the literature. An explanation for the low estimated cost were not identified but this comment, plus wide certainty estimates that were associated with the total cost, show the difficulty of calculating human disease outbreaks in monetary terms, even when mortality is a minor consequence of the disease. A report of an outbreak of *Salmonella Napoli* in England from 1982 provides a similarly detailed approach to estimate costs of an outbreak with similar challenges around estimating indirect costs.[48] 245 cases were officially reported in the outbreak, but the researchers estimated the true number was likely closer to 7,228. The cost of the outbreak was estimated to be around £504,312 with 79% attributed to indirect costs such as "family and society". A study from Taiwan attempted to estimate the national annual burden of foodborne diseases including non-typhoid Salmonellae.[49] Relevant to the scenario work presented above, this study quantified the cost in DALYs and estimated non-typhoid Salmonella contributed around 509 DALYs per year (YLD = 413, YLL = 96 which was the highest of any of the diseases investigated. YLLs in

this estimate contributed 19% to the total DALYs while in the scenario above only 2% were attributed to YLLs. However, the Taiwan estimate is related to the underlying Salmonellae burden in the community which may be quite different that the YLL and YLD contribution associated with a specific outbreak. The reported DALY was determined based on actual caseloads (n = 14,266). No monetary costings were reported nor were animal cases of Salmonella considered in the Taiwan analysis.

Reports of outbreaks of human influenza outbreaks in the literature are even more numerous than that of Salmonellae but again fail to include papers that systematically attempt to include the cost of the disease in livestock; pigs were subsequently determined to be widely infected by the virus though likely did not contribute substantially to human cases.[50] A selected review of papers specifically related to the 2009 h1N1 pandemic were assessed related to outbreak costs. New Zealand reported their national pandemic to have a mean cost of $22M USD (range $16.2 to 28.6M USD) or a mean cost per capita of $5.08 USD (population of 4.3M people).[51] In Korea, the 2009 epidemic was estimated to have caused infection in 3,082,113 people (total population 49.1 million) and produce a total socioeconomic cost of $1.09B USD (0.14% of GDP). 39.2% of the amount was attributed to direct costs and 60.8% attributed to indirect costs.[52] Netherlands reported the burden of the 2009 epidemic in DALYs and estimated the outbreak produced 5,800 DALYs (or 35 DALY per 100,000 population) which approximated the burden for Vietnam in scenario 2 above (26 DALY per 100,000 population), though no monetary costs of the outbreak were presented.[53] England reported a cost of $34.1M USD across 10,348 hospital admissions though no estimates were made of the total number affected by the disease (hospital admission plus less severe cases not resulting in admission to a hospital); the population of the country at the time was 63M people.[54] The mortality burden due to 2009 H1N1 epidemic was reported to contribute only 1.0 excess respiratory deaths in the country per 100,000 population but no report was made of total number infected or costs associated with the outbreak.[55] The authors did note that the 2009 outbreak was substantially less severe in terms of mortality when compared to other historical novel influenza outbreaks. Denmark also reported data on the severity of the 2009 outbreak in that country.[56] Though no monetary losses were reported, the authors estimated that 274,000 people became infected (approximately 5% of the 5.6M in the country). Mortality due to the disease was estimated to be from 30-312 total cases (0.5 to 5.7 per 100,000) broadly in agreement with YLDs reported in the Vietnam scenario (1.7 deaths per 100,000).

Given the much more limited global experience with Nipah virus, reports of the cost of an outbreak of the disease in humans or in pigs are scarce. A very limited outbreak of the disease in Kerala, India was described in 2018.[57] The report indicated a total of 2,649 contacts were traced to the outbreak, samples were collected from 337 suspect cases, and evidence of infection was found in 18. The outbreak was assumed to be related to an unknown contact(s) between people and fruit bats in the area; approximately 19.2% of bats collected in the area were positive for the virus.[58] In a 35-week long outbreak of the disease in Malaysia in 1989/99, 265 cases were identified of which 39.6% were fatal. Approximately 93% of human cases involved people directly involved in pig farming or were family members of pig farmers. The outbreak was initially assumed to be Japanese encephalitis, a disease known to be endemic in the area. Control measures were implemented on this basis, significantly delaying an effective response. Pigs from the affected region were being moved to Singapore for slaughter which triggered a secondary outbreak of the disease in 11 abattoir workers there. No costing information was presented in either of these studies, regarding animal or human costs. Another paper suggested that “millions” of affected or at-risk “reservoir” pigs were stamped-out as part of the control program.[59] There were also substantial financial losses due to severe restrictions on export of pork from the country to neighboring regional trading

partners. Specifics on this aspect of the outbreak are lacking. One study investigated the long-term consequences to those farmers involved in this Malaysian outbreak of Nipah virus.[60] Seventy-eight former Nipah patients were interviewed 9 years after the outbreak. Most of these (92%) received free hospital care through the human health system so their direct costs of treatment were very low. However, during the outbreak families of these patients had to relied on savings and support from public and family members to meet their daily needs (the GoV provide USD $32 per pig compensation for stamping-out). Long-term consequences of the infection limited their ability to find alternative employment after the outbreak was over, and it was several years before raising of commercial pigs returned to the area. The low level of education of most of the affected meant they could not find good alternative employment which negatively affected their livelihood even after 9 years. Bangladesh has been experiencing episodic outbreaks of Nipah in livestock and humans, principally related to contamination of raw date sap by fruit bat urine. Humans and livestock can become infected from direct contact with this same urine, or through consumption of the raw syrup. While cost estimates (or numbers of humans or livestock affected) related to these outbreaks is not available, the cost-effectiveness of implementing simple control measures has been reported with estimates of $2.6 to 3.5M USD per year for a comprehensive training and communication program across 30 affected districts in the country.[61] Due to their proximity to Malaysia and having an endemic population of susceptible fruit bats, Australia has investigated the potential consequences of an incursion of Nipah virus, with particular emphasis on its impact on the domestic pig industry.[62] The two areas in which the outbreak was modelled had relatively small populations of pigs (144 farms with average of 2,122 pigs, and 77 farms with average of 3,126 pigs) thus limiting the extent of aggregated direct losses to farmers. However, the overall response mechanism in Australia would have substantial carryover effects to other industries and because of disruptions to their important pork export markets and to regional livestock movement standstills. Assuming a lag of 3 weeks before an outbreak was recognized and a response mounted, the outbreaks were estimated to cost $12.9M and 17.1M USD, respectively. No costs were attributed to human illnesses or death.

Assessing the burden of illness is challenging and it is apparent from the brief examples above, that data is often:

1. Not collected in a manner suitable for economic analysis
2. Confounded by other health-impacting variables
3. Incomplete regarding identifying all sources of disease cost
4. Not including disease (or disease control) burden in livestock, poultry, or pets

With tools available such as zDALY (and other techniques in the literature), Vietnam should take progressive action to understand the true burden of zoonotic diseases, both endemic and epidemic, when prioritizing health care spending.

5.3.2. Cost of response changes if One Health approach to preparedness is considered

The strategic budgeting lessons listed after each of the scenarios above compares the type of approach Vietnam could use in preventing or managing outbreaks of zoonotic diseases. Importantly, many of the measures described as “traditional (non-OH)” measures, may be less expensive in the short run as compared to those measures described as “progressive, OH” measures. This is true primarily because under both approaches, dealing with the direct losses attributed to the outbreak be it in humans or animals, needs to be accounted for.

The value however, in the progressive OH approach, will be the future financial benefits. These future benefits will not take a long time to accrue, but will certainly increase over time due to:

Joint, cross sectoral surveillance activities will detect zoonotic disease outbreaks sooner, therefore reduce their impact as measured by less cases, smaller geographical area affected, and less time to recover from the outbreak.

Information-sharing initiatives will support improved quality and capacity of human resources available to manage responses.

Communications and training around zoonotic disease risk factors will promote behaviors that reduces the number of outbreaks or cases.

High-quality involvement of human and animal disease experts with those people that are experts in wildlife, environment, and climate sectors will contribute to sustainable management and growth of the livestock and food industries. This includes reducing risk and opportunity of further emergence of antimicrobial resistant strains of bacteria.

Vietnam's future investment in health should be founded on the principles of OH and include strategic prioritization of their investment based on the total "social cost burden of disease" using methods such as zDALY or others. Potential health investments need to be assessed over a long enough time horizon such that the benefits that will accrue because of OH approach in GoV can offset their potentially increased cost up-front.

5.3.3. Benefits and costs are shared unequally in the short run

As shown clearly in the scenarios above, DALYs and ALEs are not accrued equally for every disease. In the three examples provided, one scenario shows most of the zDALY cost being attributed to people (Salmonellae), one scenario shows the zDALYs more equally divided (influenza), and one scenario shows the zDALY cost biased toward an animal contribution (Nipah). However, the costs related to intervention using a progressive OH approach follows a very different pattern. In Salmonella for example where most of the zDALYs arise from human illness, the OH approach demands substantial investment in changing behaviors in the peri-urban livestock industry. Though changing behaviors related to judicious use of antibiotics, improving veterinary services to accommodate a more "preventive" rather than "treatment" oriented management system of animals, and regulatory changes to support appropriate antibiotic distribution and use will take some years and be only incrementally adopted, once the changes are truly embedded in the livestock sector, the human sector stands to benefit far into the future through reduced number and severity of outbreaks. The other scenarios demonstrate similar concepts around the benefits of planning health care investments for short-term gains versus long-term benefits.

6. Monitoring and evaluation

Monitoring and evaluation (M&E) around implementation of this Plan are expected to be led by the OHP Secretariat, or a third-party at the midway point and at the end of the Plan.

The detailed activity tables in ***Section 4.4*** of this Plan have been specifically designed, in combination with the overall OH investment framework shown in ***Section 4.6.1,*** to assist the Secretariat in developing an M&E plan. Key outcomes and objectives link the six OHP Framework focus areas with needs and proposed activities identified in this Plan; numerous

frameworks such as the EU's Logical Framework methodology are available to undertake M&E activities. In consultation with the OHP Steering Committee, baseline and target values for the most critical activities described in ***Section 4.4*** can be established to support an ongoing M&E effort. These values will require deliberation between the Secretariat and that Committee and are their development is beyond the scope of this Plan. At the same time, the M&E will be carried out on the basis of the actual implementation commitments of the stakeholders within the framework of OHP in the 2021-2025 period.

7. References

1. Sawada, Y. and L. Sumulong, *Macroeconomic Impact of COVID-19 in Developing Asia*. 2021.
2. Vanzetti, D. and R. Peters, *COVID-19 and tourism – an update: Assessing the economic consequences*. 2021, United Nations Conference on Trade and Development (UNCTAD): Geneva; Available from: https://unctad.org/system/files/official-document/ditcinf2021d3_en_0.pdf.
3. Pollack, T., et al., *Emerging COVID-19 success story: Vietnam's commitment to containment*. 2021, Our World in Data and Global Change Data Lab: Oxford; Available from: https://ourworldindata.org/covid-exemplar-vietnam.
4. Woolhouse, M.E.J. and S. Gowtage-Sequeria, *Host Range and Emerging and Reemerging Pathogens.* Emerging Infectious Disease journal, 2005. **11**(12): p. 1842.
5. Anonymous, *Preventing the Next Pandemic: Zoonotic diseases and how to break the chain of transmission*. 2020, United Nations Environment Programme and International Livestock Research Institute,: Nairobi, Kenya. p. 72; Available from: https://wedocs.unep.org/bitstream/handle/20.500.11822/32316/ZP.pdf?sequence=1&isAllowed=y.
6. Anonymous, *Taking A Multisectoral One Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries*. 2019, World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO) and World Organisation for Animal Health (OIE): Brussels. p. 151; Available from: https://apps.who.int/iris/rest/bitstreams/1236638/retrieve.
7. Häsler, B., et al., *A review of the metrics for One Health benefits.* Revue Scientifique et Technique, 2014. **33**(2): p. 453-464.
8. Anonymous, *People, pathogens and our planet (Volume 2): The economics of one health*. 2012, World Bank: Washington DC. p. 50; Available from: https://openknowledge.worldbank.org/handle/10986/11892.
9. Schwab, J., *Fighting COVID-19 could cost 500 times as much as pandemic prevention measures*. 2020, World Economic Forum: Geneva; Available from: https://www.weforum.org/agenda/2020/08/pandemic-fight-costs-500x-more-than-preventing-one-futurity/.
10. van Nieuwkoop, M., *Staying focused on 'One Health' to prevent the next pandemic*. 2011, World Bank Blogs: Washington DC; Available from: https://blogs.worldbank.org/voices/staying-focused-one-health-prevent-next-pandemic.
11. Nguyen-Viet, H., et al., *Decades of emerging infectious disease, food safety, and antimicrobial resistance response in Vietnam: The role of One Health.* One Health, 2022. **14**: p. 100361.
12. Anonymous, *International health regulations (2005)*. 2014, World Health Organisation: Geneva, Switzerland. p. 74; Available from: http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf.
13. Anonymous. *OIE Standards*. 2021 April 26, 2021]; Available from: http://www.oie.int/standard-setting/overview.
14. Anonymous. *Global Health Security Agenda*. 2021 April 14, 2021]; Available from: https://ghsagenda.org.
15. Anonymous. *Codex Alimentarious: International Food Standards*. 2021 April 26, 2021]; Available from: http://www.fao.org/fao-who-codexalimentarius/en.
16. Anonymous, *Global action plan on antimicrobial resistance*. 2015, World Health Organisation: Geneva, Switzerland. p. 21; Available from:

https://apps.who.int/iris/bitstream/handle/10665/193736/9789241509763_eng.pdf;jsessionid=E79C2526B0A225364D368776B0608B4C?sequence=1.
17. Anonymous. *The International Food Safety Authorities Network (INFOSAN)*. 2021 April 26, 2021]; Available from: https://www.who.int/groups/international-food-safety-authorities-network-infosan.
18. Anonymous. *United Nations Sustainable Development Goals*. 2021; Available from: https://sdgs.un.org/goals.
19. Anonymous, *Antimicrobial resistance policy review and development framework - A regional guide for governments in Asia and the Pacific to review, update and develop policy to address antimicrobial resistance and antimicrobial use in animal production*. 2018, Food and Agriculture Organisation of the United Nations: Bangkok, Thailand. p. 64; Available from: http://www.fao.org/3/CA1486EN/ca1486en.pdf.
20. Anonymous, *The FAO Action Plan on Antimicrobial Resistance (2016-2020)*. 2016, Food and Agriculture Organisation of the United Nations: Rome, Italy. p. 17; Available from: http://www.fao.org/3/i5996e/i5996e.pdf.
21. Anonymous, *The OIE strategy on antimicrobial resistance and the prudent use of antimicrobials*. 2016, World Organisation for Animal Health: Paris, France. p. 12; Available from: https://www.oie.int/fileadmin/Home/eng/Media_Center/docs/pdf/PortailAMR/EN_OIE-AMRstrategy.pdf.
22. Anonymous, *A European one health action plan against antimicrobial resistance (AMR)*. 2017, European Community: Brussels. p. 22; Available from: https://ec.europa.eu/health/sites/health/files/antimicrobial_resistance/docs/amr_2017_action-plan.pdf.
23. Anonymous, *Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at their Interface*. 2018, World Bank: New York, United States. p. 138; Available from: http://documents1.worldbank.org/curated/en/703711517234402168/pdf/123023-REVISED-PUBLIC-World-Bank-One-Health-Framework-2018.pdf.
24. Anonymous, *The control of neglected zoonotic diseases: a route to poverty alleviation : report of a joint WHO/DFID-AHP meeting*. 2005, World Health Organisation: Geneva, Switzerland. p. 54; Available from: http://apps.who.int/iris/bitstream/handle/10665/43485/9789241594301_eng.pdf?sequence=1.
25. Trang do, T., et al., *Prioritization of zoonotic diseases of public health significance in Vietnam.* J Infect Dev Ctries, 2015. **9**(12): p. 1315-22.
26. Wielinga, P.R. and J. Schlundt, *Food Safety: at the center of a One Health approach for combating zoonoses.* Curr Top Microbiol Immunol, 2013. **366**: p. 3-17.
27. Shariff, M., *Food safety: a linchpin of One Health.* Rev Sci Tech, 2019. **38**(1): p. 123-133.
28. Li, A.M., *Ecological determinants of health: food and environment on human health.* Environ Sci Pollut Res Int, 2017. **24**(10): p. 9002-9015.
29. Essack, S.Y., *Environment: the neglected component of the One Health triad.* Lancet Planet Health, 2018. **2**(6): p. e238-e239.
30. Anonymous, *Millennium ecosystem assessment: Ecosystems and human well-being*. Vol. 5. 2005, Washington DC: Island Press.
31. Anonymous, *Global Economic Prospects, June 2021*. 2021, World Bank: Washington, DC. p. 198.
32. Ha, J., M. Ayhan Kose, and F. Ohnsorge, *Inflation in Emerging and Developing Economies: Evolution, Drivers, and Policies:World Bank*. 2019, World Bank: Washington, DC. p. 490; Available from:

https://www.worldbank.org/en/research/publication/inflation-in-emerging-and-developing-economies.
33. Feng, X., et al., *Using QALYs versus DALYs to measure cost-effectiveness: How much does it matter?* Int J Technol Assess Health Care, 2020. **36**(2): p. 96-103.
34. Murray, C.J. and A.K. Acharya, *Understanding DALYs (disability-adjusted life years).* J Health Econ, 1997. **16**(6): p. 703-30.
35. Wilkinson, T., *Methods for Economic Evaluation Project (MEEP) Final Report*. 2014, Bill & Melinda Gates Foundation and NICE International, Health Intervention and Technology Assessment Program 2014. p. 68; Available from: https://www.york.ac.uk/media/che/documents/reports/MEEP-report.pdf.
36. Wilkinson, T., et al., *The International Decision Support Initiative Reference Case for Economic Evaluation: An Aid to Thought.* Value Health, 2016. **19**(8): p. 921-928.
37. Stein, C., et al., *The Global Burden of Disease assessments--WHO is responsible?* PLoS Negl Trop Dis, 2007. **1**(3): p. e161.
38. Havelaar, A.H., et al., *World Health Organization Global Estimates and Regional Comparisons of the Burden of Foodborne Disease in 2010.* PLoS Med, 2015. **12**(12): p. e1001923.
39. Torgerson, P.R., et al., *zDALY: An adjusted indicator to estimate the burden of zoonotic diseases.* One Health, 2018. **5**: p. 40-45.
40. Parisi, A., et al., *The role of animals as a source of antimicrobial resistant nontyphoidal Salmonella causing invasive and non-invasive human disease in Vietnam.* Infection, Genetics and Evolution, 2020. **85**: p. 104534.
41. Pasquini-Descomps, H., N. Brender, and D. Maradan, *Value for Money in H1N1 Influenza: A Systematic Review of the Cost-Effectiveness of Pandemic Interventions.* Value in Health, 2017. **20**(6): p. 819-827.
42. Trevennec, K., et al., *Transmission of pandemic influenza H1N1 (2009) in Vietnamese swine in 2009-2010.* Influenza Other Respir Viruses, 2012. **6**(5): p. 348-57.
43. Baudon, E., et al., *Detection of Novel Reassortant Influenza A (H3N2) and H1N1 2009 Pandemic Viruses in Swine in Hanoi, Vietnam.* Zoonoses Public Health, 2015. **62**(6): p. 429-34.
44. Hasebe, F., et al., *Serologic evidence of nipah virus infection in bats, Vietnam.* Emerg Infect Dis, 2012. **18**(3): p. 536-7.
45. Singhai, M., et al., *Nipah Virus Disease: Recent Perspective and One Health Approach.* Ann Glob Health, 2021. **87**(1): p. 102.
46. Walsh, M.G., *Mapping the risk of Nipah virus spillover into human populations in South and Southeast Asia.* Transactions of The Royal Society of Tropical Medicine and Hygiene, 2015. **109**(9): p. 563-571.
47. Ailes, E., et al., *Economic and health impacts associated with a Salmonella Typhimurium drinking water outbreak-Alamosa, CO, 2008.* PLoS One, 2013. **8**(3): p. e57439.
48. Roberts, J.A., P.N. Sockett, and O.N. Gill, *Economic impact of a nationwide outbreak of salmonellosis: cost-benefit of early intervention.* BMJ, 1989. **298**(6682): p. 1227-30.
49. Lai, Y.H., et al., *Disease burden from foodborne illnesses in Taiwan, 2012-2015.* J Formos Med Assoc, 2020. **119**(9): p. 1372-1381.
50. Nelson, M.I., et al., *Continual Reintroduction of Human Pandemic H1N1 Influenza A Viruses into Swine in the United States, 2009 to 2014.* J Virol, 2015. **89**(12): p. 6218-26.
51. Wilson, N., et al., *A national estimate of the hospitalisation costs for the influenza (H1N1) pandemic in 2009.* The New Zealand Medical Journal (Online), 2012. **125**(1365).

52. Kim, Y.W., S.J. Yoon, and I.H. Oh, *The economic burden of the 2009 pandemic H1N1 influenza in Korea.* Scand J Infect Dis, 2013. **45**(5): p. 390-6.
53. Wielders, C.C., et al., *The burden of 2009 pandemic influenza A(H1N1) in the Netherlands.* Eur J Public Health, 2012. **22**(1): p. 150-7.
54. Lau, K., K. Hauck, and M. Miraldo, *Excess influenza hospital admissions and costs due to the 2009 H1N1 pandemic in England.* Health Econ, 2019. **28**(2): p. 175-188.
55. Lemaitre, M., et al., *Mortality burden of the 2009 A/H1N1 influenza pandemic in France: comparison to seasonal influenza and the A/H3N2 pandemic.* PLoS One, 2012. **7**(9): p. e45051.
56. Molbak, K., et al., *Burden of illness of the 2009 pandemic of influenza A (H1N1) in Denmark.* Vaccine, 2011. **29 Suppl 2**: p. B63-9.
57. Pallivalappil, B., et al., *Dissecting an Outbreak: A Clinico-epidemiological Study of Nipah Virus Infection in Kerala, India, 2018.* J Glob Infect Dis, 2020. **12**(1): p. 21-27.
58. Lam, S.K., *Nipah virus--a potential agent of bioterrorism?* Antiviral Res, 2003. **57**(1-2): p. 113-9.
59. Arjoso, S., et al., *The economic imperative of Nipah virus surveillance in Indonesia.* Trans R Soc Trop Med Hyg, 2001. **95**(4): p. 368-9.
60. Ng, C.W., et al., *Long-term socioeconomic impact of the Nipah Virus encephalitis outbreak in Bukit Pelanduk, Negeri Sembilan, Malaysia: A mixed methods approach.* Neurology Asia, 2009. **14**(2).
61. Nahar, N., et al., *A large-scale behavior change intervention to prevent Nipah transmission in Bangladesh: components and costs.* BMC Res Notes, 2017. **10**(1): p. 225.
62. Garner, M.G., et al., *The expected economic impact of selected exotic diseases on the pig industry of Australia.* Rev Sci Tech, 2001. **20**(3): p. 671-85.

8. Annex 1: Vietnam commitments to UN Sustainable Development Goals with most significant relevance to One Health

Goal	Target	
Goal 1: End all forms of poverty everywhere	1.4	By 2030, improve the resilience of the poor and the vulnerable and, at the same time, reduce their exposure and vulnerability to climate-related extreme weather events and other economic, social, environmental shocks and disasters
Goal 2: Eliminate hunger, ensure food security, improve nutrition, and promote sustainable agricultural development	2.1	By 2030, eliminate hunger and ensure access by all citizens, particularly the poor and the vulnerable including the elderly and infants, to safe, nutritious, and sufficient food throughout the year.
	2.4	By 2030, ensure sustainable food/foodstuff production and apply resilient agricultural production modalities, increasing productivity and output, that help maintain eco-systems, and strengthen the capacity for adaptation to climate change and other disasters and progressively improve land and soil quality.
Goal 3: Ensure a healthy life and enhance welfare for all citizens in all age groups	3.2	By 2030, end the epidemics of AIDS, tuberculosis, malaria epidemics and neglected tropical diseases; and prevent and combat hepatitis, water-borne diseases, and other communicable diseases.
	3.8	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, soil pollution and contamination.
Goal 6: Ensure availability and sustainable management of water and sanitation for all	6.1	By 2030, ensure full and equitable access to safe and affordable water for all citizens.
	6.2	By 2030, ensure access to adequate and equitable sanitation facilities and conditions for all citizens, with particular attention paid to the needs of women, girls, people with disabilities and other vulnerable groups; end open-air defecation practices; 100% of households have hygienic toilets.
	6.6	By 2030, protect and restore water-related eco-systems.
Goal 11: Promote sustainable, resilient urban and rural development; ensure safe living and working environments; ensure a reasonable distribution of population and workforce by region	11.6	Reduce adverse environmental impacts on people in urban areas, including by strengthening the management of air quality, urban waste, and other sources of waste.
	11.7	By 2039, ensure universal access to green, safe, and friendly public spaces for all citizens, particularly women, children, elderly people and people reasons with disabilities.
	11.9	By 2030, substantially increase the number of urban centers and human settlements adopting and integrated planning schemes and policies towards the to promote the inclusion, resource efficiency, mitigation and adaptation to climate change and resilience to disasters.

Goal 12: Ensure sustainable production and consumption	12.6	Encourage the business community to adopt sustainable practices, including the use of cleaner production technologies, effective use of natural resources and environmental protection; implement social accountabilities with regards to the poor and the vulnerable; and integrate sustainability information into periodical reports.
Goal 13: Respond in a timely and effective manner to climate change and natural disasters	13.2 13.3	Integrate climate change measures into national development policies, strategies, planning schemes and plans. Improve education, raise awareness, and strengthen-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Goal 15: Sustainably protect and develop forests; conserve biodiversity; develop eco-system services; combat desertification; prevent the degradation of and rehabilitate soil resources	15.7 15.8	Prevent and address the illegal exploitation, trafficking and consumption of protected flora and fauna under extinction threats and their products. By 2020, take effective measures to prevent, control and abolish the invasion of alien organisms in national land and water eco-systems; and strengthen the management of biological safety relating to genetically modified organisms.
Goal 17: Strengthen implementation modalities and promote global partnerships for sustainable development	17.4 17.5	Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technologies, and financial resources, to support the achievement of sustainable development goals in Vietnam. Encourage and promote public partnerships and public-private partnerships, building on the experiences and resource strategies of past partnerships.

9. Annex 2. One Health Partnership for Zoonoses Framework 2021-2025

PARTNERSHIP FRAMEWORK OF VIET NAM ONE HEALTH PARTNERSHIP FOR ZOONOSES (OHP)
BETWEEN
MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT; MINISTRY OF HEALTH; MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES
AND
INTERNATIONAL AND NATIONAL PARTNERS

I. BACKGROUND

The COVID-19 pandemic has resulted in the serious loss of human lives all over the world and posed the unpredictable challenge to public health, job and food system. The social and economic disruption caused by the pandemic is devastating, with dozens of millions of people risk falling into catastrophic poverty while the number of people with limited nutrition, currently estimated as nearly 690 million, might rise up to reach 132 million by the end of 2020. Millions of enterprises are facing with vital threat. Almost half of the 3.3 billion of the world labor force risks losing their livelihood.

In Viet Nam, "...the COVID-19 pandemic has caused severe impact on most sectors of the economy. The Agricultural Sector increased by 0.08%... the aggregate demand of the national economy decreased sharply; ...business and production activities faced many difficulties in all types and sizes of economic sectors including cooperative and household enterprises...The demand for labor dropped seriously; More than five million workers have been affected..." - referencing the Government Report presented by Prime Minister Nguyen Xuan Phuc at the 9th session, the 14th National Assembly, on 20/5/2020 in Hanoi.

In the context of scarce resources, many countries, including Vietnam, have to restrain their response while, at the same time, applying measures to resume production, business and services, etc. Meanwhile, public health challenges, caused by animal-origin pathogens (including pathogens emanating from the wildlife) such as H5N1; H7N6; and especially Coronavirinae, still persist. According to the report of a joint surveillant team led by FAO, among 13,032 SWAP samples, the overall prevalence rate of samples collected from ducks and chickens are 1.3% H5N1, 3.6% H5N6 and 12.7% H9. Moreover, many types of viruses (including coronavirus) are discovered in wildlife, in both legal and illegal wildlife supply chains in Viet Nam and many countries, especially at wildlife collection, trading and consumption areas such as wildlife farms, wildlife transport consignments and live animal markets (Bueno et al., 2016; Cantlay et al., 2017; Nguyen et al., 2020).

The Government of Vietnam, represented by the Ministry of Agriculture and Rural Development, the Ministry of Health, and the Ministry of National Resources and Environment, international partners and other stakeholders, who wish to strengthen and support the application of a One Health approach in Vietnam, develop and sign this framework for the Vietnam One Health Partnership for Zoonoses (hereafter referred to as the One Health Partnership). Such framework is built on the achievements of the previous One Health Partnership 2016-2020 and to address the short-comings of the previous one, with the following contents:

1. One Health approach to zoonoses

The COVID-19 pandemic has materialized the forecast about the challenges that the modern world has and will face, which include the risks of new, re-emerging, and recurring infectious diseases (often referred to as emerging infectious diseases [EIDs]) in humans, livestock, and wild animals. Emanating from human-animal-ecosystem interfaces, these diseases have the possibility to result in unpredictable consequences for human health, livelihoods, economic development, and many other areas. Scientific evidences show that more than 60% of newly-emerging infectious diseases in human originate from animals, of which approximately 70% arise from wild animals.

Intensive global efforts in response to specific EID outbreaks, together with a growing global understanding of wider risks based on ongoing research and technical and policy exchanges, have led to a consensus on the need for a coordinated One Health approach at global, regional, and national levels. One Health approach recognizes that the health of humans, animals (including livestock, the wildlife and other animals) and of ecosystems is closely inter-linked. Moreover, the occurrence and widespread of SARS-CoV-2 evidence the role of spillover effect caused by the mobility of human, animal and the commodities. One Health approach to EID threats at the human-animal-ecosystem interfaces aims to bring together key related actors across multiple ministries, sectors, and disciplines to identify potential public health risks related to zoonoses so as to undertake effective prevention and control actions.

The Joint Declaration at the 4th Senior Ministerial Conference of the Global Health Security Agenda (GHSA) in October 2017 in Uganda recognized the great achievements of all the countries in developing health security capacities at the national level through the One Health approach since the launch of the GHSA, stressing on the role of GHSA in promoting cross-country achievements. On that basis, the Joint Declaration affirmed the continuation of activities to promote global health security with One Health approach and supported program extension until 2024 for increased implementation of International Health Regulations (2005).

At global level, together with the GHSA (committed to by 69 country members, and international, private, and non-governmental organizations), a wide range of inter-agency and inter-governmental mechanisms, action plans and programs are established to contribute to One Health efforts, including the collaboration of FAO, OIE, WHO and other agencies to address the health risks emanating from human-animal-ecosystem interfaces. These include the Global Action Plan for Antimicrobial Resistance (AMR) in view of One Health approach, the Global Strategic Plan for Rabies Elimination, Eco-Health Alliance, USAID Emerging Pandemic Threats (EPT and EPT2) programs and, most recently, the Global Health Security (GHS) program.

Regional initiatives include the efforts of inter-governmental mechanisms, such as Association of Southeast Asian Nations (ASEAN) and Asia-Pacific Economic Cooperation (APEC), as well as regional multilateral programs and multi-stakeholder networks, such as the Asia Pacific Strategy for Emerging Diseases (APSED), which was revised and updated by WHO in 2010. This is a regional strategy to improve management and response capacity for emerging diseases. The strategy establishes a basic framework for improved national capacity and provide a necessary foundation for management of EIDs and public health emergencies of member countries in Asia-Pacific Region. The Southeast Asia One Health Network is a cooperation forum, supported by the European Union, to facilitate the sharing, connection, and close cooperation in One Health research projects in Southeast Asia. In addition, AMR is one of the ten new priority areas in the post-2015 ASEAN Health Development Program, and the 14th ASEAN Joint Declaration has confirmed a commitment to fight AMR via the One Health approach.

At national level, a number of countries have been taking the lead in developing One Health national forum or partnership, including Indonesia's National Committee for Avian Influenza Control and Pandemic Influenza Preparedness (KOMNAS FBPI) and the One Health Partnership in Vietnam. Bangladesh and Thailand have also developed a road map or strategy for the national One Health, and a number of initiatives are underway in African countries. Besides, AMR also fuels the risk of pandemic outbreak, especially in the context of COVID-19 with sudden increase of disinfectant, sterilizer and antibiotic in the hospitals. This has accelerated the gravity of antibiotic resistance, exacerbating the current pandemic and accelerating the risk of another dangerous one at the global level.

2. One Health in Vietnam

Asian region, including Vietnam, is considered as one of the five global "hot spots" with an extremely high risk for the emergence of new infectious disease pathogens, including those that may arise from livestock and wild animals. EIDs, detected in Vietnam over the past decade, include severe acute

respiratory syndrome (SARS, 2003), avian influenza A (H5N1, 2009), influenza A (H1N1, 2009), and COVID-19 (2020). During the same period, livestock diseases such as porcine reproductive respiratory syndrome (PRRS), foot and mouth disease (FMD), classical swine fever (CSF), and African swine fever (ASF) have caused significant economic loss, and some EIDs have also posed the risks to human health. Human and livestock interactions with the wildlife have been identified as the potential risk. Globalized and urbanized processes, together with human mobility via modem transportation, create opportunities for the jump of EIDs from animals to human now or in the future, meaning that even the outbreaks outside Vietnam may also pose a threat to the domestic community.

Partnership for Avian and Human Influenza (PAHI) was established in 2006 with 26 national and international signatories to the framework, which aimed at supporting the coordination of national and international efforts in Vietnam for the National Integrated Operational Program on Avian and Human Influenza (also called the "Green Book") 2006-2010, and extended for another five-year period to support the National Integrated Operational Program on Avian Influenza, Pandemic Preparedness, and Emerging Infectious Diseases (AIPED) 2011-2015. One Health Partnership for zoonoses (OHP) was established on the basis of PAHI since March 2016 with 27 national and international members to continue supporting the Government's efforts to prevent, detect, and respond to emerging epidemics at risk of becoming animal pandemics, by supporting the implementation of the Laws, Decrees, Circulars, Strategies, Action Plans, etc. relating to zoonotic diseases, especially One Health Strategic Plan of the MoH and MARD, 2016-2020.

Key programmatic responses have been implemented, with multilateral and multisectoral collaboration being supported by the United Nations (UN), international technical agencies, the World Bank (WB), United States Government (USG), European Union (EU), and other international, multilateral, bilateral, and civil society partners. A number of technical working groups have been established and operational, including the Biosecurity Working Group (BSWG) and the One Health Communications Network (OHCN). The Vietnam One Health University Network (VOHUN) has also brought together human health, animal health, livestock, wildlife, and ecosystem health experts within Vietnam's academic and research institutions. The Vietnam Health Partnership Group (HPG), established and chaired by the MOH and co-chaired by development partners, also established a subgroup on Communicable Diseases within the scope of One Health. The GHSA task force was established to implement International Health Regulations and GHSA in Vietnam under Decision No. 772/QD-BYT in 2017.

On 27 May 2013, the MOH and MARD also issued Joint Circular No. 16/2013/TTLT-BYT-BNN&PTNT, providing guidelines for coordinated prevention and control of zoonotic diseases. The Government of Vietnam issued the National Plan for Avian Influenza Prevention and Control 2019-2025, National Action Plan for Global Health Security 2020-2025, and National Plan for International Health Regulations 2019-2025.

As one of the first six countries in the Asia Pacific region to develop a national action plan on AMR during 2013-2020, Vietnam established early the National Steering Committee for Drug Resistance Prevention in 2014. As per areas of animal husbandry and aquaculture, MARD issued and implemented the national plan for management of antimicrobial use and for fighting AMR, 2017-2020.

3. Rationale for the One Health Partnership

In the global context of the COVID-19 pandemic being spread rapidly, the Government of Vietnam in general and the health sector in particular must mobilize all resources for the detection and treatment of infected cases and apply the most drastic measures to curb the rapid spread of the virus. Nevertheless, initial achievements are not durable and the challenge of other EIDs, with potential risk of another pandemic, still persists. The trade and consumption of wildlife as food, as well as the loss of forests due to natural disasters and deforestation, which narrow the wildlife' habitat, increases the risk of cross-infection at the interface of wildlife, animals, and humans.

SARS-CoV-2, the causative agent of COVID-19 pandemic, has zoonotic origins, meaning that the virus, which is now infecting humans, originally emerged from animals. The exact nature of the conditions conducive to the emergence of SARS-CoV-2 and its transmission from animals to humans are unknown. But the close contact between humans and wild animals from various origins via commercial wildlife trade supply chains for human consumption is likely at play. These wildlife trade supply chains and conditions bringing humans in close contact with the wildlife are very common in Vietnam and must be addressed under Vietnam's collective response to COVID-19 to prevent the next pandemic.

Besides, one would not be able to exclude the possibility that the virus may transmit backward from humans to animals. Consequently, the One Health strategy should target at controlling the epidemic at its sources.

Scientists have discovered many types of viruses (including coronaviruses) in wildlife and species in wildlife supply chains that are legal and illegal in Vietnam and in many other countries, especially at wildlife collection, trading, and consumption areas such as wildlife farms, wildlife transport consignments, and live animal markets. Numerous studies have also shown higher prevalence of virus, being found in wild mammals and birds than in other species.

Before the outbreak of a pandemic, there is little possibility to detect, identify or confirm its causal pathogens. Thus, disease control action plans should focus on the gradual disconnection of the links within the wildlife supply chains, which fuel the ignition of outbreaks and transmission of disease pathogens. It means the reduction of the volume and variety of the wildlife species being traded, as well as the number of wildlife traffickers. It is well known that the emerging infectious diseases; the expanded animal husbandry; and the loss of biodiversity are inter-linked at global level.

In addition, antimicrobial resistance (AMR) may be one of the contributors of dangerous pandemics. Unregulated and proliferated use of antibiotics in health and agriculture sectors intensifies the risk of AMR in humans and animals. Most of the health facilities now are facing with the wide spread of multi-drug resistance bacteria. The severity and speed of AMR development are increasing at an alarming rate. The burden caused by AMR also increases, due to escalated treatment costs and extended treatment courses, harming people's and community's health and hindering overall society's development. In the future, Vietnam, like any other countries, may be challenged by the lack of effective medication for infectious diseases, if proper solutions are not found. The WHO indicates that people are living in an era of antibiotic dependence, calling for global responsibility in preserving the precious antibiotic sources for the next generations.

New challenges for the prevention of pandemics of wildlife origins and AMR demand for multidisciplinary coordination mechanism (One Health approach). A sustainable One Health Partnership will contribute to fulfilling Vietnam's commitments to the GHS Agenda 2024 and the SDG Agenda 2030. Vietnam continues to actively engage in the GHS program, as one of the four leading countries in the Zoonotic Disease Control Package (ZDAP) and One Health cooperation programs at ASEAN and global levels.

Members of the One Health Partnership always affirm the importance of the partnership and ask for its continuity and sustainability at the meetings and workshops with domestic and international partners, organized to discuss the results and shortcomings in the management; coordination; and implementation of the One Health Partnership framework 2016-2020.

4. Strengthening One Health coordination

To continue strengthening the capacity for One Health coordination in Vietnam, the One Health Partnership on the zoonotic diseases in Vietnam (in brief, the One Health Partnership) will gather One Health stakeholders, including Vietnam governmental agencies with leadership role; international organizations; bilateral partners; non-governmental entities and private sectors.


The image part with relationship ID rId7 was not found in the file.


The image part with relationship ID rId7 was not found in the file.


The image part with relationship ID rId7 was not found in the file.


The image part with relationship ID rId7 was not found in the file.

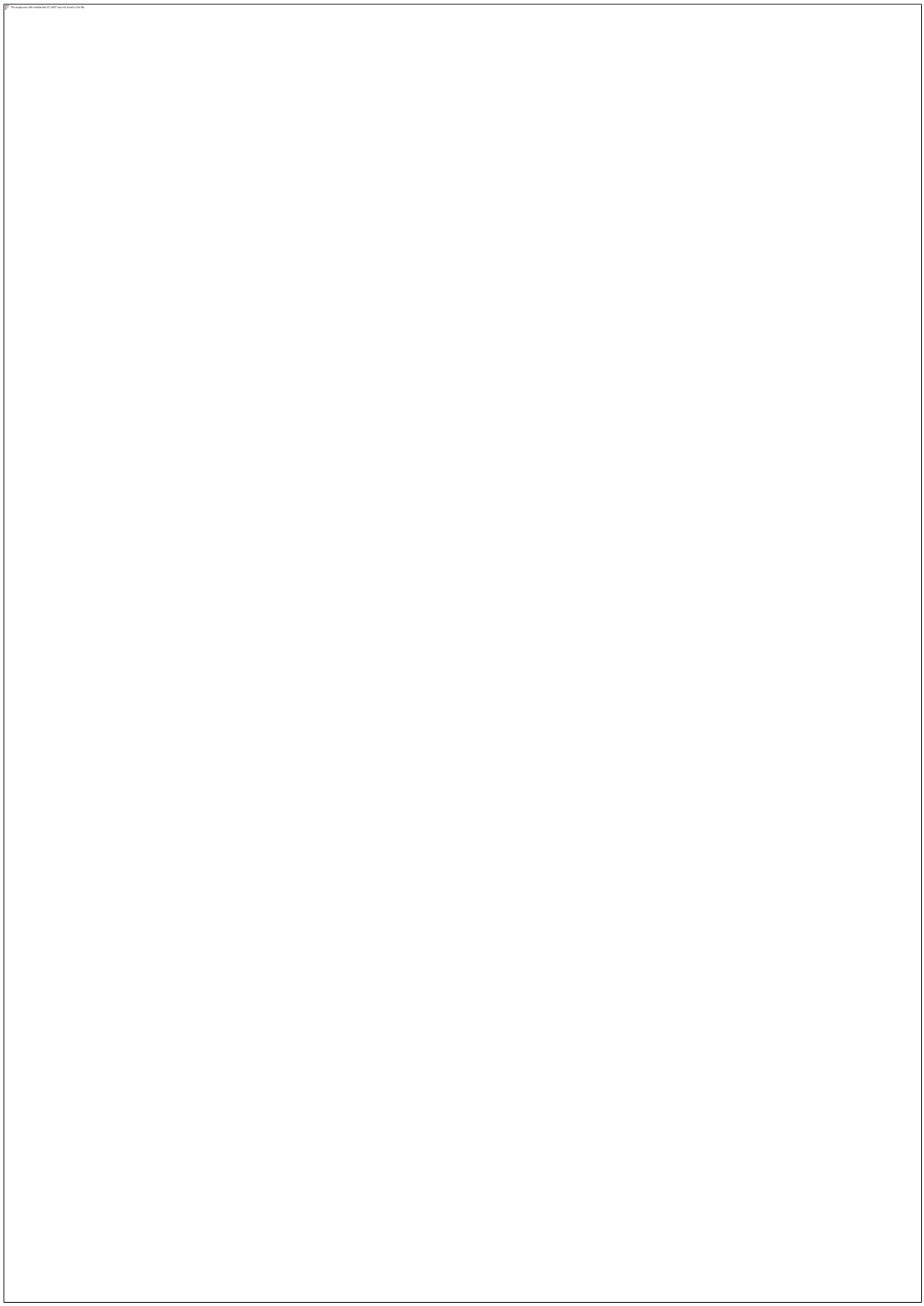

The image part with relationship ID rId7 was not found in the file.

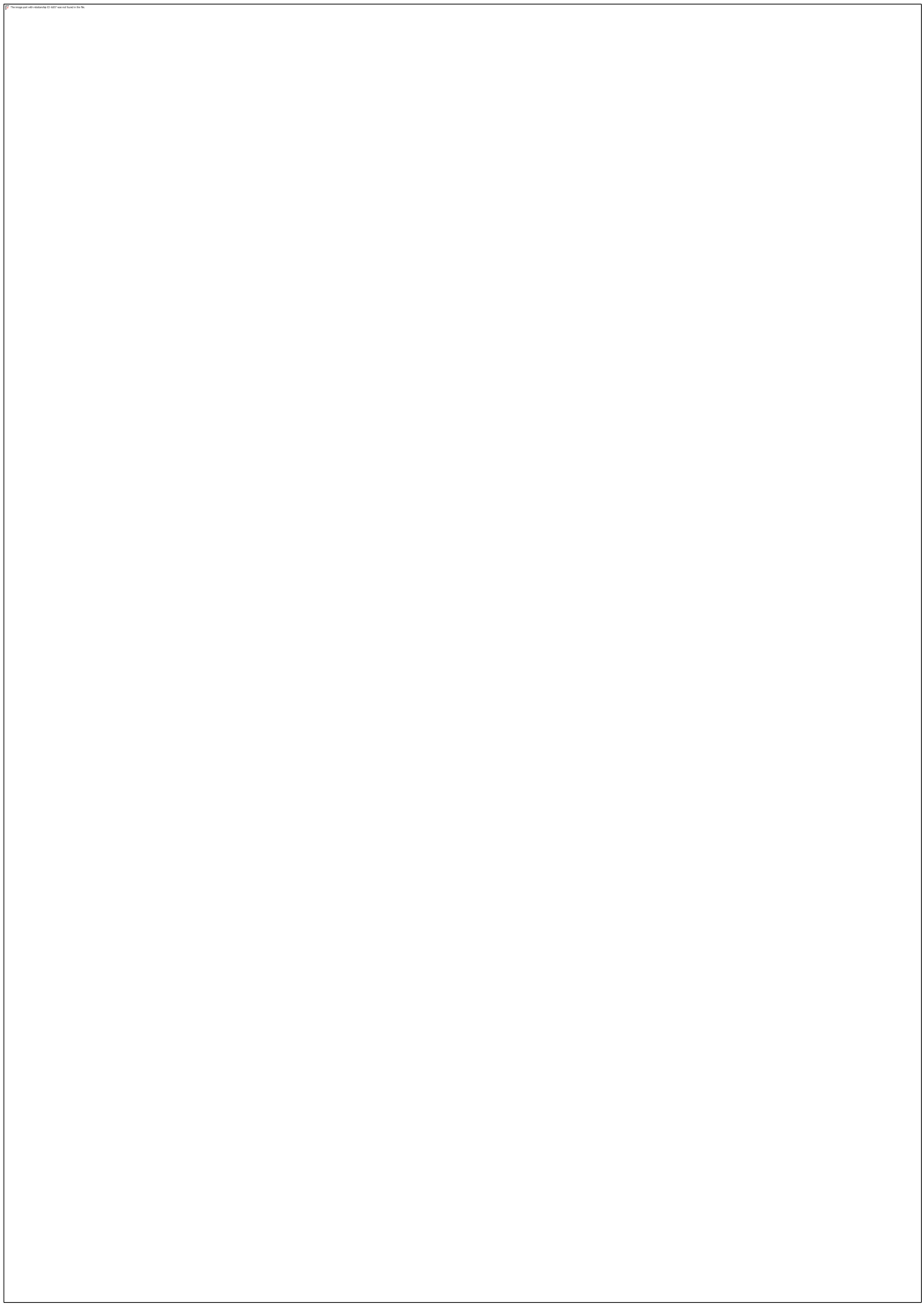

The image part with relationship ID rId7 was not found in the file.


The image part with relationship ID rId7 was not found in the file.


The image part with relationship ID rId7 was not found in the file.

10. Annex 3. MARD's Decision for the establishment of OHP


The image part with relationship ID rId47 was not found in the file.



11. Annex 4: List of stakeholder consultation meetings

No.	Name of organization	Date of meeting
1.	National Agriculture Extension Center (NAEC) – MARD	28/06/2021
2.	CITES Office – Viet Nam Administration of Forestry - MARD	28/06/2021
3.	Coordination Office of New Rural National Target Program - MARD	28/06/2021
4.	Viet Nam Environment Administration (VEA) - MONRE	30/06/2021
5.	General Department of Preventive Medicine (GDPM) - MOH	30/06/2021
6.	Medical Services Administration (MSA) - MOH	30/06/2021
7.	FAO	01/07/2021
8.	WHO	01/07/2021
9.	US Agencies	02/07/2021
10.	EU	05/07/2021
11.	UNDP	06/07/2021
12.	ADB	06/07/2021
13.	Australian Embassy	08/07/2021
14.	FHI	08/07/2021
15.	GIZ, KfW	12/07/2021
16.	UNODC	12/07/2021
17.	Department of Livestock Production - MARD	13/7/2021
18.	WCS	14/07/2021
19.	World Bank	14/07/2021
20.	RTCCD	15/07/2021
21.	Netherland Embassy	15/07/2021
22.	CIAT	16/07/2021
23.	ILRI	20/07/2021
24.	GHAI	20/07/2021
25.	NIHE	20/07/2021
26.	DARD, Department of Animal Health, Department of Forest Protection of Nghe An province	21/07/2021
27.	WWF	22/07/2021
28.	Nghe An CDC	23/07/2021

No.	Name of organization	Date of meeting
29.	French Agencies	30/07/2021
30.	Viet Nam Veterinary Association	03/08/2021
31.	VCCI	05/08/2021
32.	Department of Animal Health	12/08/2021
33.	Danish Embassy and Danish Veterinary and Food Agency	09/09/2021