

The Development of One Health Approaches in the Western Pacific

Ben Coghlan and David Hall

Abstract The Western Pacific Region, the most populous of six regional groupings of World Health Organization (WHO) member states, has seen the emergence of a series of novel zoonotic infections in the last decade. This has focused attention on addressing underlying risks and vulnerabilities in the complex interactions among people, animals, and environments as a better way to counter emerging diseases. This “One Health” approach is pertinent to the region because, it is a “hot spot” for the emergence of novel diseases from wildlife, because unexpected epidemics of re-emerging zoonotic diseases have caused morbidity and mortality in urban and periurban communities, and because it remains a sanctuary for well-known zoonotic infections. In this chapter, selected regional, multicountry, and national steps to operationalize One Health are discussed. While the region is well positioned to exploit the opportunities that have come with outbreaks of new diseases, the array of disconnected and overlapping initiatives from various consortia, donors, research institutes, and UN agencies is to some extent impeding the development of better ways of managing both new and old infections for the local, regional, and global good.

Contents

1	Introduction.....	94
2	Relevant Global and International One Health Endeavors in the Western Pacific Region.....	98
3	Selected Regional and Multicountry Steps Towards Operationalizing One Health.....	98

B. Coghlan (✉)
Burnet Institute, Melbourne, Australia
e-mail: coghlan@burnet.edu.au

D. Hall
University of Calgary, Calgary, Canada
e-mail: dchall@ucalgary.ca

- 3.1 Regional Strategies 99
- 3.2 Academic Initiatives 102
- 3.3 Surveillance and Laboratory Initiatives 102
- 3.4 Projects and Programs 103
- 3.5 Research Initiatives 104
- 4 Selected National Level One Health Activities 105
 - 4.1 Cambodia 105
 - 4.2 China 106
 - 4.3 Lao PDR 106
 - 4.4 Malaysia 106
 - 4.5 Pacific Island Countries and Territories 107
 - 4.6 Philippines 107
 - 4.7 Vietnam 107
- 5 Conclusion 108
- References 108

1 Introduction

The Western Pacific Region is one of six regional groupings of World Health Organization (WHO) member states. It is the most populous region with over one-quarter of the global population living in 37 countries and territories (World Health Organization, Western Pacific Region 2012). These countries are diverse: from China with the world’s largest population to some of the world’s smallest states like the Pacific Islands of Niue, Tokelau, Nauru, and Tuvalu (Population Reference Bureau 2011); from one of the most densely populated countries, Singapore, to the least densely populated country Mongolia (Population Reference Bureau 2011); from highly developed states such as Australia, Japan, and the Republic of Korea to countries ranked among the world’s least developed like Papua New Guinea and the Solomon Islands (UNDP 2011) (Table 1).



Table 1 Countries and Territories in the Western Pacific Region

1. American Samoa	11. Japan	21. New Zealand	29. Samoa
2. Australia	12. Kiribati	22. Niue	30. Singapore
3. Brunei Darussalam	13. Lao People's Democratic Republic	23. Commonwealth of the Northern Mariana Islands	31. Solomon Islands
4. Cambodia	14. Macao (China)		32. Tokelau (New Zealand)
5. PR China	15. Malaysia	24. Palau	33. Tonga
6. Cook Islands	16. Marshall Islands	25. Papua New Guinea	34. Tuvalu
7. Fiji	17. Micronesia, Federated States of	26. Philippines	35. Vanuatu
8. French Polynesia (France)	18. Mongolia	27. Pitcairn Islands (UK)	36. Vietnam
9. Guam (USA)	19. Nauru	28. Republic of Korea	37. Wallis & Futuna
10. Hong Kong (China)	20. New Caledonia (France)		

The emergence of a series of novel zoonotic infections from the region in the last decade triggered an unprecedented mobilization of the international public health community to address these threats. SARS in 2003, exposed weaknesses in national capacities to quickly identify, contain, and control a novel infection; these weaknesses equate to a persisting global threat. In 1997 and then again in 2004, bird flu (Influenza A/H5N1), the largest epizoonosis ever recorded, sounded a second call for global pandemic preparedness highlighting not only the shortcomings of human health services but the challenges of strengthening animal health and production systems, of restructuring food supply chains, and of sustaining responses for years. The virus remains endemic in poultry in China and Vietnam and has demanded far more than just emergency responses.

There is recognition that strategies to reduce the likelihood of disease emergence and transmission by addressing underlying risks and vulnerabilities in the complex interactions among people, animals, and environments, between human systems and natural ecosystems, may be a better way to counter emerging diseases. This has been referred to in various contexts as *ecohealth* (Charron 2012), particularly where it includes consideration of the role of environmental factors, and as a *One Health* approach in which health disciplines work together rather than in exclusion. This “One Health” approach is pertinent to the Western Pacific Region for three reasons.

First, the Mekong subregion within the Western Pacific Region has been designated a “hot spot” for the emergence of novel diseases from wildlife because of an amalgam of related anthropogenic drivers of disease emergence: rapid economic development, urbanization, advancing farming systems, demand for livestock products and deforestation, as well as population increases and aging (Jones et al. 2008). These factors cannot be addressed by the human or animal health sectors alone, necessitating a collective engagement with a range of sectors and communities.

Second, unexpected epidemics of re-emerging zoonotic diseases including rabies, anthrax, and leptospirosis have caused morbidity and mortality in urban and peri-urban communities in the Western Pacific Region. Some of these epidemics are being addressed using *One Health* approaches, and indicate the value in learning from and working with partners in the region when developing public awareness and preparedness plans for emerging infectious diseases (EIDs).

Third, the region remains a sanctuary for well-known zoonotic infections such as brucellosis that have been eliminated in many parts of the world but may be effectively addressed with an approach that is better tuned to tackle the complexities of real-world problems (World Bank 2009).

It is fitting then, that serious global commitment to this nascent approach was made in the region in Hanoi in 2010: the International Ministerial Conference on Animal and Pandemic Influenza aimed to “set the scene for a worldwide effort, over

Table 2 Selected global One Health initiatives and organizations implementing One Health activities in the Western Pacific Region

Chatham House Centre on Global Health Security	Global Initiative for Food Systems Leadership (GIFSL)
Centers for Disease Control and Prevention (CDC) One Health Office (OHO)	Health and Ecosystems: Analysis of Linkages (HEAL)
Connecting Organizations for Regional Disease Surveillance (CHORDS)	International Development Research Centre (IDRC)
Critical Ecosystem Partnership Fund (CEPF)	International Livestock Research Institute (ILRI)
DISCONTTOOLS	Office International des Epizooties (OIE) Performance of Veterinary Services
International Association for Ecology and Health	One Health Commission
EcoHealth Alliance	One Health Initiative
EcoHealth Network	One World, One Health Initiative
EcoHealth International Association for Ecology and Health	Swiss Tropical and Public Health Institute (Swiss TPH)
EcoHealth–One Health Resource Centers, Chiang Mai University and Gadja Mada University	Towards a Safer World
Emerging Pandemic Threats (EPT) Program, USAID	Veterinarians Without Borders/Vétérinaires sans Frontières-Canada
Epizone European Research Group	World Bank Trust Fund for Avian Influenza
	World Health Organization (WHO) Department of Food Safety and Zoonoses
Food and Agriculture Organization of the United Nations (FAO)	World Organization for Animal Health (OIE)
Global Early Warning System for Animal Diseases, Including Zoonoses (GLEWS)	World Small Animal Veterinary Association (WSAVA)
Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADS)	

the next 20 years” declaring the “...need for sustained, well-coordinated, multi-sector, multi-disciplinary, community-based actions to address high impact disease threats that arise at the animal-human-environment interface.”(UNSCIC 2010).

2 Relevant Global and International One Health Endeavors in the Western Pacific Region

Numerous overlapping global and international initiatives from various consortia, donors, research institutes, and United Nations (UN) agencies are being implemented in the Western Pacific Region. While some initiatives have committed to improve coordination through systemic measures such as the *One World, One Health initiative* (FAO et al. 2008) and the *FAO-OIE-WHO collaboration concept note* on health risks at the human–animal interface (WHO et al. 2008), there is no overarching coordination of the multitude of activities being conducted in the region under a broad interpretation of One Health—this was emphasized at the recent Davos One Health summit with a major conclusion being the need to “intensify the collaboration and coordination between the leading and relevant...institutions in the broader One Health area” (Ammann 2012). In general, there are also no direct links with other global endeavors such as the Millennium Development Goals (UN Web Services Section 2010) and the Millennium Ecosystem Assessment (Millennium Ecosystem Assessment 2005).

Some of the global/international initiatives and organizations implementing these activities in the Western Pacific Region are listed below (Table 2). Only a selected number will be discussed in this chapter. This is an incomplete listing, but is illustrative of both the variety of work being addressed by various actors and institutions and the numerous (separate) networks operating in an environment of a broader One Health movement.

3 Selected Regional and Multicountry Steps Towards Operationalizing One Health

Western Pacific ministries of Health and Agriculture have had experience of being abruptly forced to work together in new ways to address new diseases. Not all interactions have been successful, and efforts to date have not yet fully embraced a One Health approach, as most stakeholders currently understand it; rather, most initiatives are continuing efforts to combat key EIDs. There are, however, a number of endeavors that illustrate the movement towards One Health. Most of these initiatives are at the regional rather than the national or community levels.

3.1 Regional Strategies

3.1.1 Asia Pacific Strategy for Emerging Diseases

The cornerstone of regional plans to confront EIDs is the *Asia Pacific Strategy for Emerging Diseases* (APSED) (World Health Organization 2010; World Health Organization, Western Pacific Region 2010). This is essentially a “health security” construct aiming to strengthen national systems to comply with the legal requirements of the International Health Regulations (2005) (World Health Organization 2005) and to improve national capacity to combat EIDs. The latest iteration of the strategy (2010) drew heavily on the lessons learned from the 2009 pandemic of influenza A/H1N1 and allows countries flexibility to decide how they can best achieve the vision of the eight areas of focus: (1) surveillance, risk assessment, and response; (2) laboratories; (3) zoonoses; (4) infection prevention and control; (5) risk communications; (6) public health emergency preparedness; (7) regional preparedness, alert, and response; and (8) monitoring and evaluation. The *Emerging Disease Surveillance and Response* unit of the WHO is responsible for assisting countries to implement APSED. APSED is not a One Health vision, however, lacking the synergies between all sectors whose activities impact on health.

3.1.2 Asia Pacific Economic Cooperation

Asia Pacific Economic Cooperation (APEC) considers emerging diseases to be of high importance because of their preventability and the substantial direct (e.g., treatment and hospitalizations) and indirect (e.g., lost time to work, trade sanctions) costs that such diseases have caused to their 21 members states in recent years. Since 1996, APEC has supported the APEC Emerging Infections Network (APEC EINet 2012), a network that seeks to gather and disseminate notifications of EIDs affecting APEC member states, foster collaborations among academic institutes, government, and business where they relate to EIDs, and enhance regional biopreparedness. This mechanism is useful for dialog between sectors beyond just the animal and human health sectors, although the degree of communication and idea sharing does not approach the *transdisciplinarity* advocated by most One Health proponents.

Nonetheless, APEC did fund the *Technology Foresight Project* (2006–2007) (The APEC Center for Technology Foresight National Science and Development Technology Agency 2008; Damrongchai et al. 2010), a succinct effort in transdisciplinarity that brought together a range of experts from policy makers and technology developers to virologists and economists to map the convergence of new technologies and the opportunities for their accelerated development in order to limit the human and financial impact of novel diseases. While narrowly focused on the technological aspects of disease prevention and control, and a project rather than an ongoing, inbuilt process, this work encompassed the development of new

vaccines, treatments, diagnostics, models and simulations, and tracking strategies for people and animals.

APEC have since drafted a *One Health Action Plan* (Asia–Pacific Economic Cooperation 2011) setting out a common “vision” for member states to operationalize One Health approaches according to their capacities and level of engagement with the concept. The plan aims to strengthen cross-sectoral efforts at the political and leadership level, in teaching and training, in (government) functions to prevent, investigate, respond and control diseases, and across borders. The community is identified as a critical partner in disease prevention and control, and action to ensure the sustainability of cross-sectoral approaches is called for.

3.1.3 ASEAN

The Association of Southeast Asian Nations (ASEAN) has defined a *roadmap* to prevent, control, and eradicate highly pathogenic avian influenza (HPAI) and other highly pathogenic emerging diseases among member states by 2020 using a risk-based approach to address the major transmission pathways in each country (ASEAN Secretariat 2010a). The roadmap describes itself as a “translation” of the One Health approach to systematically eradicate HPAI, while simultaneously addressing other transboundary and zoonotic diseases. While the focus is on animal health and production, the advantages of engaging with multiple disciplines, multiple sectors, and multiple agencies are noted.

This is an encouraging output from ASEAN, but is one of the few documented instances of ASEAN activities related to One Health, either in progress or completed. Furthermore, the emphasis on HPAI rather than a broader One Health approach potentially misses an opportunity to embrace a wider notion of health including the role of wildlife, the integration of resources from various health and nonhealth authorities, as well as concrete plans for regular communication across health and related disciplines. ASEAN is in a unique position to be the premier institution in Asia coordinating, influencing, and even governing to some degree an integrated One Health approach for part of the Western Pacific Region. The HPAI roadmap is a step in the right direction but much remains to be done if ASEAN is to be a One Health leader. ASEAN’s biggest challenge may be the reluctance of member nations to advise on what others should be doing. This is, however, a requirement for an integrated One Health network to be effective among the member states.

The *ASEAN Plus Three EIDs Programme* has improved joint country investigations of disease outbreaks and developed a regional risk communication strategy (ASEAN Secretariat 2010b). A new program funded by the Japanese Government is directed at improving laboratory capacity and networking (ASEAN Secretariat 2009), continuing a long and successful history of Japanese funding to develop diagnostic and research laboratory capabilities in the region.

3.1.4 The Food and Agriculture Organization of the United Nations

The *Food and Agriculture Organization (FAO) Regional Strategy for Highly Pathogenic Avian Influenza and other EIDs of Animals in Asia and the Pacific, 2010–2015* (Emergency Centre For Transboundary Animal Diseases 2010) outlines a common approach for dealing with endemic HPAI and for addressing emerging and re-emerging diseases. The strategy also aims to join up the fragmented support provided by various partners and donor agencies within the region. This is the latest in a series of initiatives led by FAO and its partners to combat HPAI since the first outbreaks in Southeast Asia, initiatives that were themselves preceded by other efforts founded in One Health concepts including the FAO Emergency Prevention System (EMPRES) and the Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs).

3.1.5 Donor Strategies

Most of the major Pacific Basin donors have made significant contributions to initiatives to address emerging diseases. The Public Health Agency of Canada leads the *Canada–Asia Regional Emerging Infectious Disease (CAREID) Project* aiming to strengthen the capacity of Cambodia, Laos PDR, the Philippines, and Vietnam to detect and respond to emerging diseases (Public Health Agency of Canada 2012). Similarly, the Australian Government’s international development assistance agency has articulated a regional strategy for strengthening health systems to respond more generally to EIDs: the *Pandemics and EIDs Framework 2010–2015* (AusAID 2010). The *Asian Development Bank* has implemented a series of communicable diseases control projects along borders in the Greater Mekong region to improve community surveillance of endemic and epidemic diseases including EIDs (Asian Development Bank 2012). And the USAID *Emerging Pandemic Threats Program* (U.S. Agency for International Development 2010) operates globally with specific activities related to four project areas in Southeast Asia: wildlife pathogen detection, risk determination and reduction, outbreak response capacity, and institutionalization of a One Health approach. This last element is elaborated on in the next section (Academic Initiatives).

The European Union (EU) has also been active in supporting One Health initiatives through a range of endeavors. The flagship is the *EU Regional Highly Pathogenic Emerging Diseases (HPED) in Asia Programme* (2009–2013) (European Commission 2012) which spans two WHO regions, the Western Pacific and the South–East Asia Regional Offices. It aims to help ASEAN and the South Asian Association for Regional Cooperation (SAARC) to control, respond, and prepare for these diseases, and aligns with specific initiatives of OIE, FAO, and WHO via separate projects channeled through these three UN specialized agencies.

The European External Action Service recently published a comprehensive examination and summary of One Health case studies, many of which are active in the region, and a complementary database of One Health initiatives, studies, and

actors (Hall and Coghlan 2011). This publication is well positioned to act as a guide in identifying individuals who can serve as One Health focal points in the region and to provide a starting point for operationalizing regional activities and networking in One Health.

It is important to note that the EU has commented in a number of fora that an approach to One Health needs to be positioned with consideration of societal needs. This “whole of society” approach to health hazards will require a wide-scale change in the attitudes and perspectives health professionals hold with regard to risk management.

3.2 Academic Initiatives

3.2.1 Southeast Asia One Health University Network

There are a number of existing networks of Southeast Asian Universities that encompass aspects of One Health such as the ASEAN University Network, the Asia Partnership on Emerging Infectious Disease Research, the Asia Pacific Academic Consortium for Public Health, the Asian Ecohealth Network, and the Southeast Asia Veterinary Schools Association. Through the RESPOND component of the *Emerging Pandemic Threats Program* (U.S. Agency for International Development 2010), USAID is supporting a new One Health academic collaboration, Southeast Asia One Health University Network (SEAOHUN) (Fenwick 2011), that brings together multiple faculties including schools of medicine, veterinary science, public health, and allied sciences from universities throughout the region. Cambodia, Laos, Indonesia, Malaysia, Thailand, and Vietnam have universities that belong to the network with China, Myanmar, and the Philippines to join in 2013. The network aims to develop transdisciplinary capacity to investigate and control outbreaks of emerging diseases and to build the evidence base for One Health approaches through research. This effort will define One Health competencies and develop a common regional approach to incorporating them into accredited education and professional in-service training.

3.3 Surveillance and Laboratory Initiatives

3.3.1 The Mekong Basin Disease Surveillance Initiative

The Mekong Basin Disease Surveillance Initiative (MBDS) (Mekong Basin Disease Surveillance 2007a) is a network established in 1999 to advance cooperative action among the six countries of the Mekong subregion to improve infectious disease surveillance and outbreak response. This aims to “reduce morbidity and mortality from communicable diseases, particularly amongst marginalized people living in the Mekong region” (Mekong Basin Disease Surveillance 2007b). From sharing of

surveillance data from four border sites in 2003, the scope of the network has expanded through a second memorandum of understanding (MOU) in 2007 to the consideration of community-based surveillance, epidemiology capacity, information and communications technologies, risk communications, laboratory capacity, policy research, and extended cross-border cooperation. These seven new strategies will contribute to the development of national capacities identified in the International Health Regulations (2005) (World Health Organization 2005) to detect, investigate, report, and respond to public health threats. While not originally envisaged as a One Health activity and lacking some of the attributes of a One Health network, MBDS nevertheless provides a successful framework on which One Health approaches can be added or modeled.

3.4 Projects and Programs

3.4.1 Southeast Asia Foot and Mouth Disease Campaign

The Office International des Epizooties (OIE) coordinates the Southeast Asia Foot and Mouth Disease (SEAFMD) (OIE 2002) across eight ASEAN countries, a program recognized internationally as a model for regional coordination of animal disease control. Although foot-and-mouth disease (FMD) is not normally considered as a zoonotic disease (it rarely causes mild skin lesions in humans), the model stands as an example of an integrated effort among government agencies, international organizations, village communities, and donors all committed to controlling one disease. Individual national plans are harmonized with a regional strategy that has received high-level political commitment and that has adopted a progressive, long-term approach for the eradication of FMD. Close cooperation and the introduction of new techniques including zoning to roll back FMD in various parts of Southeast Asia including Malaysia and Thailand have contributed to the success of the program.

3.4.2 International Livestock Research Institute

Together with a large number of partners, International Livestock Research Institute (ILRI) is involved in a number of initiatives that could be deemed pertinent to One Health. *Ecohealth approaches to the better management of zoonotic emerging infectious diseases in the Southeast Asia Region (EcoZEID)* (Gilbert 2011) adopts a learning by doing approach in six countries aiming to demonstrate how capacity for research and disease control can be developed to address specific risks and impacts of EIDs. ILRI also manages the *Field Building Leadership Initiative (FBLI): Advancing ecohealth in Southeast Asia* (China, Indonesia, Thailand, and Vietnam) (Tung DX 2011). This program combines research, capacity building through education and in-service training, and knowledge translation through connections to policy makers to design sustainable agricultural practices that result in improvements to human health, livelihoods, and environments.

3.4.3 Community-Based Avian Influenza Risk Reduction Program

CARE Australia implemented locally tailored community-level pilot projects to enhance disease surveillance and reduce risk behaviors related to avian influenza in Cambodia, Laos, Vietnam, and Cambodia during 2007–2009 (AusAID 2008). Although this program has concluded, the ensemble of projects elucidated some of the earliest lessons for operationalizing One Health in the Western Pacific Region: the importance of political, organizational, and community commitment to move lessons from pilots into systematic practice; sustained application of resources to stimulate lasting culture change; and the value of mixing multiple disciplines and agencies to overcome the Gordian knot of competing priorities in order to develop acceptable, effective solutions.

3.5 Research Initiatives

3.5.1 Asian Partnership on Emerging Infectious Disease Research and the Building Ecohealth Capacity in Asia Project

Supported by Canada's International Development Research Centre (IDRC), Asian Partnership on Emerging Infectious Disease Research (APEIR 2012) expanded an earlier network focused on research to fight avian influenza [The Asian Partnership for Avian Influenza Research (APAIR)]. The Chinese Academy of Sciences, the Thai Ministry of Public Health and the National Research Council, the Ministry of Science and Technology of Vietnam, and the Cambodian Ministry of Research and Technology and the Ministry of Health comprise the partnership to generate multidisciplinary research based on a broader ecohealth rather than One Health concept.

In the region, IDRC is also co-funding with the Australian Agency for International Development (AusAID) a related project on a smaller scale: the Building Ecohealth Capacity in Asia (BECA) project (Hall et al. 2012) which aims to increase involvement of researchers in Ecohealth and One Health initiatives. Although this is a relatively small project, it has been contributing to building a network of researchers working with several of the initiatives outlined in this chapter.

3.5.2 Ecohealth Emerging Infectious Diseases Research Initiative

Along similar lines, the Canadian and Australian Governments jointly fund the Ecohealth Emerging Infectious Diseases Research Initiative (Eco EID) (IDRC CRDI 2012), a multicountry project supporting research on how diseases emerge and spread in Southeast Asia and China, as well as developing research capacity and improving the translation of research into policy.

3.5.3 National Center of Competence in Research North–South

A rare nondisease focused approach branded with the One Health label, National Center of Competence in Research (NCCR) (National Center of Competence in Research North–South 2012) has mapped changing land use patterns and the transformation of agriculture in Lao PDR and Vietnam and are linking this with public health and economic impacts for small-scale farmers. NCCR is also documenting the health issues faced by internal migrants in Vietnam whose movements and changing employment have been triggered by rapid economic development. These activities demonstrate the potential breadth of the One Health approach in moving beyond traditional ideas of the boundaries of health.

3.5.4 Zoonotic Emergence Network, China and Malaysia

The majority of emerging disease “events” since 1940 have been zoonoses and the majority of these jumped from wildlife (Jones et al. 2008). Such viral spillovers have focused attention on interactions with wildlife and their environments; wild animals are also increasingly being farmed in Southeast Asia. A group of partners selected Malaysia because of Nipah virus and China because of SARS coronavirus to examine the risk of viral emergence among people regularly exposed to diverse animal species (hunters, indigenous people, and market workers) (EcoHealth Alliance 2012). Project partners include Ecohealth Alliance, the Global Viral Forecasting Initiative, the Malaysian Ministry of Health and Departments of Wildlife and National Parks and Veterinary Services, the Guangdong Entomological Institute and Centers for Disease Control, and the Chinese Institute of Zoology. This network brings together a range of animal and human health actors to specifically study aspects of the crucial intersection among animals, humans, and the environment that the One Health approach intends to address.

4 Selected National Level One Health Activities

Rather than overtly applying One Health approaches, national level planning has, with few exceptions, evolved along targeted planning for specific diseases coupled with some generic pandemic preparedness.

4.1 Cambodia

In Cambodia, the *National Committee for Disaster Management (NCDM)* has ultimate responsibility for dealing with emergencies of any nature and has played a key role in coordinating responses to HPAI. Specific plans for how ministries

cooperate during emergencies have been outlined and align separate departmental plans (Sovann 2006). The bureaucratic arrangement of responses to zoonoses under an emergency structure is different from many countries in the region. In principle, however, a One Health approach includes the components of disaster risk reduction as expressed in the *Hyogo Framework for Action, 2005–2015* (United Nations International Strategy for Disaster Reduction 2007).

4.2 China

The *Global Environmental Institute* is a Beijing-based nongovernmental organization that seeks to develop sustainable market-based models to untangle domestic environmental issues through engagement with local communities, government agencies, research groups, civil society, and the private sector (The Global Environmental Institute 2012). Unlike most initiatives in the Western Pacific Region, this organization is not being driven by concerns about specific infectious diseases and embraces a somewhat broader concept of One Health that intimately links with private enterprise. From a similar perspective, Kunming Medical University and the World Agroforestry Centre, Kunming has been developing projects and programs to address national ecohealth issues. Both institutions have played key roles in leading One Health and ecohealth research in China, particularly research in mountainous regions.

4.3 Lao PDR

The *National EID Coordination Office* of the Government of Laos has recently been established a Zoonosis Coordination Mechanism that enables collaborative action by the Ministry of Health, Agriculture, and Forestry to control zoonotic diseases (Lao Voices 2011).

4.4 Malaysia

Outbreaks of a new disease, Nipah virus, led to the formation of an *Interministerial Committee* for the control of zoonotic diseases directly linking human and veterinary health actors. Nipah virus provided a key case study of how disease incursions from wildlife can be amplified by human activities and rapidly spread in the absence of sensitive surveillance systems and rapid responses. Further research continues under the *Zoonotic Emergence Network (ZEN), China and Malaysia* (as discussed above). The Interministerial Committee has drafted an Infectious Disease Outbreak Rapid Response Manual (Ministry of Health Malaysia 2003).

4.5 Pacific Island Countries and Territories

The imperative to link-up animal and human health actors in Asia has been less pressing in the Pacific where the livestock sector is smaller and where HPAI has had only a limited impact. Low population density, the nature of market value chains in which livestock may be less likely to return to vendors, and fewer migratory bird flyways associated with HPAI may be other reasons for the slower development of One Health activities in the Pacific. Nevertheless, Pacific Island Countries and Territories have been a general source of concern for the region in that any weak link increases the regional vulnerability to emerging and re-emerging infectious diseases. Under the umbrella of international and regional programs such as GF-TADs (OIE Regional Representation for Asia and the Pacific 2012) on the animal health side and International Health Regulations (IHR) and APSED on the human health side, sectoral capacities have been gradually improving. Efforts to develop a regional One Health strategy, however, have not yet been realized. One Health approaches have obvious application in addressing endemic diseases of animals in some of the larger Pacific states, as well as efforts to conserve biodiversity.

4.6 Philippines

The Filipino Government has established an *Inter-Agency Committee on Zoonoses* composed of representatives from the Department of Health, Department of Agriculture, and Department of Environment and Natural Resources (Aquino III BS 2011).

4.7 Vietnam

Vietnam has been one of the countries worst affected by HPAI (A/H5N1) in terms of the impact on the formal and informal agricultural sectors and on human life. The government quickly developed a joint program run by the Ministry of Health and Ministry of Agriculture and Rural Development to address H5N1. This joint action culminated in a new strategy, *The Vietnam Integrated National Operational Program on Avian Influenza, Pandemic Preparedness And Emerging Infectious Diseases (AIPED), 2011–2015: Strengthening responses and improving prevention through a One Health approach* (Vietnam Ministry of Agriculture and Rural Development and Ministry of Health 2011). While still focusing on the elimination of H5N1, the strategy has adopted a risk-based approach to attending to the drivers of disease emergence to prevent a range of known and unknown communicable diseases. It involves government, nongovernment, community, and private actors. It remains to be seen how well this can be implemented. Nonetheless, this is one of the first incorporations of One Health principles in a national plan.

With the support of USAID, Vietnam has also been active in developing an academic network to support training and research in One Health. *The Vietnam One Health University Network (VOHUNET)* is part of the SEAHOHUN.

5 Conclusion

The application of One Health in the Western Pacific Region is in an early phase with few concrete examples of successful operationalization; even from these few examples there appear to be many areas of duplication and lack of coordination. Nonetheless, serious attempts at articulating attributes of One Health considered important for the region have been made in strategies and documents at the regional level with serious commitment to implement One Health approaches. This illustrates the sharp shift in thinking about the components of disease control and preparedness that have come with the surfacing of new diseases; the need for broader input from numerous sectors and the involvement of communities are seen as essential to balance competing ideas and to generate creative, innovative responses. Relearning the age-old lesson that human action (and inaction) plays a fundamental role in disease emergence has renewed focus on the possibilities of prevention including prevention that reaches to tackle determinants far upstream. This, however, demands even greater levels of interaction and communication to manage complex human and natural ecosystems.

The Western Pacific Region is well positioned to exploit the opportunities that have emerged with recent, dramatic outbreaks of new diseases and to accelerate the development of better ways of managing both new and old infections for the local, regional, and global good. These opportunities are also opportunities for donors involved in health and agriculture and those committed more generally to socioeconomic development to join up siloed initiatives. And the vacuum of governance is yet another opportunity to establish a means of leadership, mentorship, and coordination in the region to reduce inefficiencies, link disconnected networks, improve understanding and knowledge transfer, and speed capacity development and preparedness planning.

References

- Ammann WJ (2012) Chairman's summary remarks, GRF One Health summit 2012. In: Proceedings of global risk forum One Health summit Davos 2012 "One Health, One Planet, One Future", Davos, Switzerland
- APEC EINet (2012) Public Health Informatics, University of Washington School of Public Health. <https://www.cphi.washington.edu/projects/foundational-research/apec-einet>. Accessed 13 June 2012
- APEIR (2012) Asian partnership on emerging infectious disease research. <http://www.apeiresearch.net/main.php>. Accessed 12 April 2012

- Aquino III BS (2011) Administrative order no. 10, April 11, 2011: creating the Philippine Inter-agency Committee on Zoonoses, defining its powers, functions, responsibilities, other related matters and providing funds thereof. Supreme Court E-Library. <http://elibrary.judiciary.gov.ph/index10.php?doctype=Administrative%20Orders&docid=13267651001687696250>. Accessed 12 April 2012
- ASEAN Secretariat (2010a) Crossing borders and traversing bridges of partnerships—roadmap for an HPAI-Free ASEAN community by 2020. ASEAN Secretariat, Jakarta
- ASEAN Secretariat (2010b) The official website of the Association of Southeast Asian Nations. Joint statement of the 4th ASEAN+3 Health Ministers Meeting Singapore, 23 July 2010. <http://www.aseansec.org/24936.htm>. Accessed 12 April 2012
- Asian Development Bank (2012) Greater Mekong Subregion (GMS) regional communicable diseases control (CDC) project: Cambodia, Lao PDR, Viet Nam. <http://www2.adb.org/Documents/IndigenousPeoples/VIE/38017-VIE-IPDP.asp>. Accessed 12 April 2012
- Asia-Pacific Economic Cooperation (2011) APEC One Health Action Plan: a framework to assist APEC economies strengthen cross-sectoral networks and functioning against the threat of emerging and zoonotic infectious diseases. <http://www.zoonoses.csiro.au/Resource.aspx?id=24>. Accessed 22 July 2012
- AusAID (2008) Community-based avian influenza risk reduction program for the Mekong Region Phase 2: mid-term review report. www.ausaid.gov.au/Publications/Documents/cbairp-mtr.pdf. Accessed 12 April 2012
- AusAID (2010) Pandemics and emerging infectious diseases framework 2010–2015. Commonwealth of Australia, Canberra
- Charron DF (2012) In: Charron DF (ed) Ecohealth research in practice. Innovative applications of an ecosystem approach to health. International Development Research Centre, Ottawa
- Damrongchai N, Satangput P, Tegart G et al (2010) Future technology analysis for biosecurity and emerging infectious diseases in Asia-Pacific. *Sci Public Policy* 37(1):41–50
- EcoHealth Alliance (2012) Zoonotic Emergence Network (ZEN), China and Malaysia. http://www.ecohealthalliance.org/health/22-zoonotic_emergence_network_zen_in_malaysia_china. Accessed 12 June 2012
- Emergency Centre For Transboundary Animal Diseases, Regional office for Asia and the Pacific and the Food and Agriculture Organization of the United Nations (2010) FAO regional strategy for highly pathogenic avian influenza and emerging disease of animals in Asia and the Pacific 2010–2015. FAO, Rome. www.fao.org/docrep/012/i1474e/i1474e00.pdf. Accessed 12 April 2012
- European Commission (2012) Development and cooperation — EuropeAID. Highly pathogenic emerging diseases (HPED) in Asia. http://ec.europa.eu/europeaid/where/asia/regional-cooperation/animal-human-health/hped_en.htm. Accessed 1 July 2012
- FAO, OIE, WHO, UNSIC, UNICEF and World Bank (2008) Contributing to One World, One Health: a strategic framework for reducing risks of infectious diseases at the animal-human-ecosystems interface. FAO, OIE, WHO, UNSIC, UNICEF, World Bank. <http://www.fao.org/docrep/011/aj137e/aj137e00.htm>. Accessed 1 July 2012
- Fenwick S (2011) Development of a One Health University Network in South East Asia. Presented to the progress meeting on ecosystem approaches to the better management of zoonotic emerging infectious diseases in the South East Asian region, Bangkok, 10–13 December 2011. Bangkok, DAI Thailand. <http://www.slideshare.net/ILRI/development-of-aonehealthuniversitynetworkinseasia>. Accessed 1 July, 2012
- Gilbert J (2011) One Health approaches to prevent and control zoonoses. Presented to the Agriculture, Fisheries & Conservation Department (AFCD) workshop on “One Health: Past, Present, and Future”. Hong Kong, 27 September 2011. <http://www.slideshare.net/ILRI/one-health-approaches-to-prevent-and-control-zoonoses>. Accessed 12 April 2012
- Hall DC, Coghlan B (2011) Implementation of the One Health approach in Asia and Europe: how to set-up a common basis for action and exchange of experience. European Union: European External Action Service, Brussels. http://eeas.europa.eu/health/docs/index_en.htm. Accessed 1 July 2012

- Hall DC, Nguyen-Viet H, Willyanto I et al (2012) Improving food safety in Asia through increased capacity in ecohealth. *J Public Health Epidemiol* (In Press)
- IDRC CRDI (2012) Ecosystems and human health. Canada–Australia research partnership for the prevention of emerging diseases. http://www.idrc.ca/EN/Programs/Agriculture_and_the_Environment/Ecosystem_Approaches_to_Human_Health/Pages/Eco-EID.aspx. Accessed 12 June 2012
- Jones KE, Patel NG, Levy MA et al (2008) Global trends in emerging infectious diseases. *Nat* 451:990–993
- Lao Voices (2011) Laos discusses zoonotic disease co-ordination mechanism. <http://laovoices.com/laos-discusses-zoonotic-disease-co-ordination-mechanism/>. Accessed 12 June 2012
- Mekong Basin Disease Surveillance (2007a) <http://www.mbdsoffice.com/>. Accessed 1 July 2012
- Mekong Basin Disease Surveillance (2007b) <http://www.mbdsoffice.com/aboutus.php>. Accessed 1 July 2012
- Millennium Ecosystem Assessment (2005) <http://www.maweb.org/>. Accessed 13 June 2012
- Ministry of Health Malaysia, Disease Control Division (2003) Infectious diseases outbreak rapid response manual. <http://jknn.s.moh.gov.my/doc/cdc/Infectious%20Diseases%20Outbreak-Rapid%20Response%20Manual.pdf>. Accessed 12 April 2012
- National Center of Competence in Research North–South (2012) Newsletters. No.8 February 2012. www.north-south.unibe.ch/content.php/page/id/251. Accessed 12 June 2012
- OiE (2002) SEAFMD Campaign—Home Page. <http://www.seafmd-rcu.oie.int/index.php>. Accessed 12 April 2012
- OiE Regional Representation for Asia and the Pacific (2012) Global framework for the progressive control of transboundary animal diseases (GF-TADs). http://www.rr-asia.oie.int/representation/programmes/programme_g/index.html. Accessed 12 April 2012
- Population Reference Bureau (2011) World population data sheet. <http://www.prb.org/DataFinder/Topic/Rankings.aspx?ind=30>. Accessed 12 April 2012
- Public Health Agency of Canada (2012) Canada–Asia regional emerging infectious disease (CAREID) project. <http://www.phac-aspc.gc.ca/id-mi/careid-eng.php>. Accessed 1 July 2012
- Sovann R (2006) Mainstreaming disaster risk management into local and national development planning. Presented at the 6th meeting of the ADPC regional consultative committee on disaster management, 9–11 November, Kunming, PRChina. http://www.rccdm.net/index.php?option=com_docman&task=doc_view&gid=123&Itemid=215. Accessed 12 June 2012
- The APEC Center for Technology Foresight National Science and Development Technology Agency (2008) Roadmapping converging technologies to combat emerging infectious diseases: a project of the Asia–Pacific Economic Cooperation (APEC) and the Industrial Science and Technology Working Group (ISTWG). APEC Secretariat, Singapore. http://publications.apec.org/publication-detail.php?pub_id=117. Accessed 13 June 2012
- The Global Environmental Institute (2012) <http://www.geichina.org/index.php?controller=Default&action=index>. Accessed 12 June 2012
- Tung DX (2011) Field building leadership initiative: advancing eco-health in Southeast Asia. Presented at the progress meeting on ecosystem approaches to the better management of zoonotic emerging infectious diseases in the South EastAsian region, Bangkok, 10–13 December 2011. <http://www.slideshare.net/ILRI/field-building-leadership-initiative-advancing-ecohealth-in-southeast-asia>. Accessed 12 April 2012
- UN Web Services Section (2010) A gateway to the UN system’s work on the MDGs. Department of Public Information, United Nations. <http://www.un.org/millenniumgoals/>. Accessed 13 June 2012
- UNDP (2011) Human development reports. International human development indicators. <http://hdr.undp.org/en/data/map/>. Accessed 12 April 2012
- United Nations International Strategy for Disaster Reduction (2007) Hyogo framework for action: building the resilience of nations and communities to disasters. 2005–2015, Geneva. <http://www.unisdr.org/we/coordinate/hfa>. Accessed 12 April 2012

- UNSC (2010) International ministerial conference on animal and pandemic influenza, Hanoi, 20–21 April 2010. Summary, achievements and next steps. Report prepared by UNSC
- U.S. Agency for International Development (2010) Emerging pandemic threats: program overview. http://pdf.usaid.gov/pdf_docs/PDACP822.pdf. Accessed 12 April 2012
- Vietnam Ministry of Agriculture and Rural Development and Ministry of Health (2011) The Vietnam integrated national operational program on avian influenza, pandemic preparedness and emerging infectious diseases (AIPED), 2011–2015: strengthening responses and improving prevention through a One Health approach. Vietnam Ministry of Agriculture and Rural Development and Ministry of Health, Hanoi. http://www.avianinfluenza.org.vn/index.php?option=com_remository&Itemid=228&func=fileinfo&id=168. Accessed 1 July 2012
- World Bank (2009) People, pathogens and our planet Vol 1: towards a One Health approach for controlling zoonotic diseases. World Bank, Washington
- World Health Organization (2005) International health regulations (2005). <http://www.who.int/ihr/en/>. Accessed 12 April 2012
- World Health Organization (2010) Securing our region's health: Asia Pacific strategy for emerging diseases. World Health Organization, Geneva. http://www.wpro.who.int/emerging_diseases/documents/SecuringsRegHealth15/en/index.html. Accessed 12 April 2012
- World Health Organization, the Food and Agriculture Organization of the United Nations and the World Organisation for Animal Health (2008) Zoonotic diseases: a guide to establishing collaboration between animal and human health sectors at the country level. World Health Organization, Geneva
- World Health Organization, Western Pacific Region (2010) Asia Pacific strategy for emerging diseases (APSED, 2010). http://www.wpro.who.int/emerging_diseases/APSED2010/en/index.html. Accessed 12 April 2012
- World Health Organization, Western Pacific Region (2012). <http://www.wpro.who.int/countries/en/index.html>. Accessed 12 April 2012