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**Global and Regional Emergency Issues: Transboundary Animal
Diseases in the Region and Looking at the Environmental Factors
Affecting their Occurrence**

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I. Introduction

1. The Asia-Pacific region contains 59 percent of the world's population and 20 percent of its land mass but experiences a more than disproportionate share of natural disasters and ensuing human fatalities.¹ Demographic growth, widespread poverty and environmental degradation are increasing the vulnerability of communities throughout the Asia-Pacific region to natural disasters, at the same time as creating a favourable terrain for translating disasters into high human fatalities, suffering and livelihood shocks which can set back years of development efforts. Floods, earthquakes and unprecedented disasters, such as the 2004 Tsunami, have been increasingly prevalent and it is clear that regional mobilization is needed to respond to these emergencies, the economic and social costs of which are increasingly placing pressure on the economies of all regional countries.

2. Most natural disasters and emergencies occurring in Asia and the Pacific are short-term shocks, which need to be addressed through an immediate regional and global response, supported by coordinated planning. While animal disease outbreaks have been a constant threat to the livestock sector and to the millions of poor households dependent on them for their livelihood and food security, the situation has evolved over the past ten years and is now serious enough to be considered an emergency. This is particularly due to the escalating threat and challenge of epidemic diseases and the recent high visibility of zoonotic disease, such as highly pathogenic avian influenza (HPAI), which has raised the importance of controlling the disease at source to safeguard public health.

3. The emergency nature of animal disease control stems from the recognition that of the 175 pathogenic infectious agents known to be “emerging” in human populations, 75 percent of them are zoonotic, or transmissible from animals to human.² The World Health Organization (WHO) estimates that, on average, one new disease emerges every year, mainly due to changes in land use and livestock production systems. Most of these diseases are highly infectious in nature, and can potentially travel large distances very rapidly, threatening livestock industries globally, and causing sickness and death in humans in their wake. They can also threaten food security and prevent the poor from benefiting from the lucrative trade opportunities offered by increasing global and regional demand for livestock and livestock products.

4. Animal-borne infectious diseases pose a long-term threat to the region and the wider world, as well to human health. Consequently, a new strategic vision is needed to manage the risk of these disease outbreaks, as well as leverage multi-sectoral and cross-border participation, and private-sector partnerships; this new strategic vision should also have a broad regional reach, and obtain high-level political commitment.

5. The incidence and spread of animal diseases – zoonotic or otherwise – are the end product of a complex process. The pathogens, through the vector of their animal hosts, interact in the environment and determine the impact and the complex nature of possible responses. Changing livestock production systems, combined with greater movement of people, animals, goods and services, technology and investments, are challenging regulatory authorities not only to keep abreast of these changes but also to make the necessary adjustments, such as implementing good farming practices and instituting timely disease control measures. All of these factors are creating a fertile ground for the emergence of diseases once thought to be uncommon, and call for

¹ Inter-Agency Secretariat of the International Strategy for Disaster Reduction (2004). *Living with Risk, A Global Review of Disaster Reduction Activities*. Geneva, United Nations.

² World Bank (2008). *World Development Report 2008: Agriculture for Development*. World Bank, Washington D.C., p. 225.

increased investments in order to be made so that experts from different disciplines can work together to develop new and innovative approaches in disease control.

6. This paper highlights the impact and current status of Transboundary Animal Diseases (TADs), reviews some of the policy considerations and current initiatives on animal disease control, and seeks guidance from regional policymakers on the priority needs for the region.

II. Trends Driving the Transformation of Livestock Systems, Trade of Livestock Products and Spread of Diseases in Asia and the Pacific

7. Meat consumption gains in Asia have almost doubled since the early 1980s, and have grown by over 5 percent annually and increased by almost 100 million tonnes, or two-thirds of global gains. This income and demographic-led growth in demand has been matched by a rapid growth in animal stocks, and a scaling up of production characterized by increased concentration of large-scale operations. These systems have been accompanied by a greater movement of animals between points of production to markets and slaughterhouses.

8. Meat demand in Asia and the Pacific is projected to grow from 113 million tonnes in 2006 (30 kg/caput) to 145 million tonnes in 2016 (35 kg/caput), thereby reinforcing continued growth, structural transformation of industries, and an escalation of animal movements in the region.³ This growing demand, fuelled by growing incomes and demographic changes, provides opportunities for the development of local livestock industries across the region. These opportunities have favourable implications for food security, rural income generation, agriculture development and economic growth, as local producers exploit their comparative advantage of producing animals for local consumption, or responding to cross-border demand for quality animals.

9. Regional trade in any product is always driven by the relative competitiveness of a specific industry and the evolution of local demand conditions. In the case of livestock, this relates to the availability of natural resources and production, as well as marketing and demand systems; these all have an impact on the relative price of animals and meat products, and the ability of industry to transform and add value to animals. However, in some countries these systems are limited by constrained consumer demand and lack of investments in meat slaughtering, cutting and processing, which all affect the competitive export of meats; however, the trade in live animals faces more flourishing prospects.

10. As globalization and trade interdependence has grown, so too have the threats engendered by smuggling and other actions which circumvent orderly trade. Informal movements of domestic animals across national borders have their roots in economics, cultural linkages across porous borders, and the growing interdependence between industries and producers of raw materials. While complex and profitable for market participants and for economies as a whole, it is clear that these movements can result in the introduction of animal diseases or human pathogens.

11. The presence of nearly 700 million head of cattle and pigs, nearly 1.5 billion sheep and goats, and 16 billion poultry in Asia and the Pacific has amplified the significant animal health risks posed by animal movements; in this situation a small animal disease outbreak can quickly turn into a full-scale epidemic. Animal disease outbreaks have traditionally been perceived as a localized economic issue with financial and livelihood ramifications for individual industries and households. The advent of more open trade implies that the economic effects of any disease can be magnified both nationally and regionally, particularly as diseases are increasingly moving across regional borders. In the past two decades this perception has been further supported by the emergence and prominence of zoonotic diseases, for example Nipah virus infection, BSE and

³ OECD-FAO Agricultural Outlook 2007- 2016. OECD, Paris and FAO, Rome.

H5N1 Avian Influenza. These zoonotic diseases have effectively highlighted the linkages between animal health, food safety of animal products and human health and have reinforced the need to assess the risks that led to the occurrence of emerging diseases.

12. Growth in demand for animal products, both within countries and across borders in Asia and the Pacific have increased the risk of animal disease transmission. The complexity of effective animal disease control in Asia is generally weak due to poor regulatory systems and unequal capacity of local animal health services to detect and respond to disease outbreaks. It has also been complicated by the differential growth in livestock demand among neighbouring countries in the region, particularly when the countries involved are at different stages of economic development.

13. Outdated and sometimes weak legislative capacity and institutional deficiencies in Asia and Pacific make it almost impossible to monitor and manage border controls on animal movements at national and regional levels. Interventions on animal health and disease transmission, therefore, need to be addressed within a new paradigm which integrates animal health programmes, food safety and socio economic impact assessment. This new paradigm should also review risks of animal disease outbreak and disease transmission within a broader economic and policy environment, thus fostering an enabling environment for sustainable disease control.

III. TADs as an Issue of Global Concern

14. The livestock sector is experiencing rapid globalization, not only in absolute volume but also as a share of global production. However, livestock markets and economies around the globe have been increasingly affected by animal disease outbreaks which have caused trade diversion and shifting market shares between exporters of meat products.

15. History as an indicator has, however, shown us that global meat markets are very resilient to these shocks, with markets typically recovering within a few years. The short-term costs to economies, industries, stakeholders involved in the sector are, however, considerable and even short-term market impacts have long-term implications for trading patterns, policy formulation, and industry and sector development. If not mitigated immediately, the loss of consumer confidence and even trading partners' confidence have long-term implications and damaging effects on the industry and economy of the country or countries concerned.

16. The risks and potential costs of animal disease transmission through infected products are escalating as industries become more concentrated. Differential demand growth in adjoining countries translates into more animal or commodity movements across borders, potentially shifting the burden and costs of disease outbreaks into neighbouring countries. As a result, the impacts of localised animal disease outbreaks can quickly become regional and global problems and lead to diverging trading relationships, changing consumption patterns, including shifts between different meat types and sources, as well as price shocks. Some of the key factors influencing the overall duration and impact of animal diseases include:

- **The type of disease and the consumer's response to potential human health issues:** The market and livelihood impacts of zoonotic diseases, e.g. the H5N1 avian influenza virus and BSE which is linked to variant Creutzfeldt-Jakob-Disease (v-CJD), typically have a more durable impact than those resulting from other animal diseases, such as FMD or non-H5N1 AI outbreaks. This is because consumer responses to perceived human health issues are often more excessive than the actual risks of animal-to-human disease transmission of zoonotic diseases.
- **The location/duration of the disease outbreak and global market concentration:** Despite the increasing share of global trade being provided by developing countries and growing export gains from non-traditional middle-income exporters, the degree of market concentration in the global meat market is high, with five major exporters accounting for nearly three-quarters of global meat exports. When a market shock occurs, this high

concentration in global meat markets, including those resulting from animal disease outbreaks, can translate into large swings in international prices.

- **Links to the international livestock markets:** The extent to which a country or region is impacted by a disease is also influenced by the linkages that they may have with international markets for livestock and meat products.
 - Over-reliance on animal and animal product exports can lead to significant market disruptions, both internationally and domestically. Such examples include the Canadian cattle industry which exported 12 percent of their live animals and nearly 50 percent of total beef production prior to the identification of a BSE-infected animal in May 2003. After two years and at a cost of over \$4 billion, exports of meat were finally recovering but live animal exports are still languishing. The HPAI outbreaks in late 2003 in Thailand had a serious impact on the Thai poultry industry, which was the world's fourth largest poultry exporter after the United States, Brazil, and the European Union. With approximately 40 percent of Thailand's estimated production of 1.5 million tonnes destined for export markets, market closures resulted in export earnings in 2004 falling from \$1.1 billion to \$674 million.
 - The net trade position of a major trading country and the trade share of production/consumption will also determine how localised the impact of an animal disease will be, as well as how global trading patterns are likely to be shaped. For example, the discovery of BSE-infected cattle in Canada and the United States had different impacts as their beef markets had different characteristics.⁴
 - In the case of countries which are neither importers nor exporters, the impact of an animal disease outbreak will be linked to the industry's structure and the contribution of the livestock sector to GDP in those countries. The extent of the losses beyond the production sector depends on linkages with other sectors within the agricultural supply chain. This is typically the case during HPAI outbreaks occurring in many Asian and African countries. In most cases, the impact of disease outbreaks will be localised and will only have a limited impact on regional/international markets, with the glaring exception being the potential purchase and consumption shocks generated by the H5N1 avian influenza, which is aggravated by concerns related to human-to-human viral transmission.
- **The structure of the industry and the degree to which the industry is linked to other economic sectors:** Livestock industries in many developed, and increasingly developing countries, have significant vertical linkages with upstream and downstream industries, as well as horizontal linkages between industries in different countries through foreign investment. Livestock industries can be significant users of raw materials from upstream industries and are a major provider of raw materials for downstream industries. Any shock to highly concentrated industries that undertake further processing and move packaged products to numerous outlets around the country will have knock-on effects throughout the supply chain. Consequently, the broader impact of animal diseases needs to be extended to identify the market impacts on other economic sectors.
- **The policy environment shaping the livestock sector:** The impact of a disease outbreak, duration, overall cost, and effect on stakeholders along the value chain, is influenced by policies related to disease responses, such as animal culling, vaccination, and movement and border controls, etc. The implementation of these control measures has varying impacts on households, industries, markets and economies. In addition, the

⁴ While the United States is one of the world's largest beef exporters, exports account for only 10 percent of production and it is a net beef and live cattle importer. The value of US beef exports following the discovery of two BSE-cows led to a drop of export earnings of \$2.6 billion in 2004, while the absence of US beef on global markets contributed to higher international prices. However, domestic prices remained relatively high as imports adjusted. This contrasts to the domestic impact in Canada where a more dramatic dependence on international export market, as indicated above, immediately translated into a fall of approximately 50 percent in cattle prices, and cattle and calf receipts for 2003 fell by 33 percent from the previous year's level (Statistics Canada, 2004). Since Canada is not a net beef importing country, imports could not adjust sufficiently to maintain stable prices.

nature and level of border controls and degree of market access (tariffs/quotas) not only influence the risk of diseases being introduced and spread but also determine the magnitude and duration of market shocks resulting from consumer responses to health concerns. High tariffs on meat products limit the access of local consumers to safe meat in the context of a disease outbreak; furthermore, rising prices combined with unavailable supplies due to imports not being allowed will encourage illegal border movements of potential diseased animals as markets respond to widening price differentials across borders.

17. The proliferation of animal diseases has broad implications and needs to be accompanied by a comprehensive set of measures, such as assessing and understanding the differential and localised costs of disease outbreaks; the role of production and marketing systems in transmitting viruses; and the role of policymakers in addressing these issues. Certainly, there is greater awareness on the direct and indirect costs of animal diseases for producers, industries, consumers, as well as to the economy as a whole.

18. One of the long-term consequences of the cost of animal diseases is that longer term investment in the sector will be shaped by the increased market volatility engendered by disease outbreaks. Governments in developed countries are able to compensate a given sector; in developing countries, however, these diseases hit small producers particularly hard, especially in terms of their livelihoods and food security. Policymakers are increasingly being forced to face the difficult question of how the livestock sector should be structured and what needs to be done to limit the damaging impact of animal disease outbreaks, particularly if they affect human health as is in case of zoonotic avian influenza viruses.

IV. An Overview of the Priority Diseases in Asia

19. FAO is actively involved in the control of major transboundary animal diseases of socio-economic importance within the Asia-Pacific region, namely: Highly Pathogenic Avian Influenza (HPAI); Foot-and-Mouth Disease (FMD); Classical Swine Fever (CSF); Peste des Petits Ruminant (PPR); Rinderpest (RP); Haemorrhagic Septicaemia (HS); and more recently, Porcine Reproductive and Respiratory Syndrome (PRRS). These diseases were prioritized by the region in consultations held in early 2003 under the Global Framework on Transboundary Animal Diseases; HPAI and PRRS have not been prioritized as they only emerged after the Global Framework was established. The table below summarizes the geographical distribution of disease outbreaks, as reported by Asia-Pacific countries in 2006-2007; subsequent sections will provide detailed epidemiological information on these diseases.

Table 1. Geographical distribution of TAD's outbreaks in 2006-2007

TADs	Geographic distribution of TAD's outbreaks
Avian Influenza (H5N1)	Asia, Middle East, Africa, Europe
FMD	
- FMD Serotype O Pan Asia	Malaysia, Nepal, Bhutan, Pakistan, Islamic Republic of Iran, Jordan, Turkey, Israel, United Arab Emirates
- FMD Serotype A- Im-05	Islamic Republic of Iran, Saudi Arabia, Turkey, Jordan, Pakistan
- FMD Serotype Asia 1	China, Russian Federation, Mongolia
- FMD Serotype O Cathay	Malaysia, Thailand
- FMD Serotype A	Lao PDR, Viet Nam

CSF	East and Southeast Asia, South Asia, China
PPR	India, Nepal, Bangladesh, Pakistan, Afghanistan, China
Rinderpest*	-
Hemorrhagic Septicemia	Southeast Asia
PRRS	China, Viet Nam

* The most recent evidence of rinderpest viral activity in Asia is thought to be in southern Pakistan, almost ten years ago.

A. AVIAN INFLUENZA

20. The most recent zoonosis to have emerged is the H5N1 HPAI virus – the first avian influenza virus to be associated with high bird mortalities in poultry stocks of between 20 and 100 percent, as well as human fatalities. The culling of over 250 million poultry in Asia since 2004, and the death of countless other (unregistered) birds, is a source of concern to health specialists, veterinarians, economists and policymakers as mass cullings create market shocks and threaten the food security of affected farming communities – a situation often compounded by the fact that those affected are rarely compensated. The 350 cases of transmission of the virus to humans and 217 recorded human deaths (cumulative data as of 15 January 2008) are fuelling concerns for human health and raising fears as to the virus's potential to create a possible human pandemic.

21. The HPAI outbreaks of late 2003 and early 2004 in Southeast Asia, have now spread to many other countries, including 26 in Europe, 10 in Africa, 7 in the Middle East and 17 in Asia. Enhanced surveillance, detection and response in several countries where outbreaks decreased or were eliminated have led to improvements but 11 countries are continuing to experience active infections. Long-term disease control in Asia and the Pacific is being challenged by ongoing outbreaks in several countries, particularly in countries such as Bangladesh and Indonesia, which have large populations of both birds and humans. Economic losses resulting from the outbreak of HPAI in the Asian poultry sector are estimated at over \$10 billion and concerted efforts aimed at controlling the spread of the disease throughout the region have not met with success, with the result that it is inflicting further economic losses and have wide-ranging negative impacts on the human population of Asia. It is becoming increasingly apparent that many of the reservoirs of infection are in the developing world, in particular amongst the lower-income livestock farming communities in these countries. HPAI affects all types of production systems but the problem is particularly important in sector 3 (please see next section on definition of production systems).

Factors in the Spread of Avian Influenza

22. Factors affecting the spread of Avian Influenza are:

- The incidence of HPAI in domestic poultry has increased substantially over the past ten years. In addition to this, the virus in domestic poultry has undergone considerable evolution since 1996.
- The combination of large Asian poultry stocks, and distinctive farming systems characterized by intense chicken-duck-human linkages, pose considerable threats for continued outbreaks. Agro-ecological factors have also played a role in the spread of the H5N1 virus. In Thailand and Viet Nam, for instance, the proximity of rivers and rice paddies serves as a link between duck operations, wild birds and scavenging chickens; these links maintain viral circulation, and sometimes result in full-blown outbreaks. However, such outbreaks are not as common in duck operations as in chicken-raising areas.
- In addition, the industrialization of the livestock sector, increased marketing of birds, accompanied by the movement of people and inputs, is contributing to the spread of

animal diseases. The cultural practices of marketing poultry in different countries are also contributing to the spread of the disease, with live poultry markets a high risk factor for disease spread. The mix of species in markets and farms provides a setting for the virus to circulate and its dissemination when chickens are traded.

- The disease has a seasonal pattern and occurs consistently in the months between December and March. The occurrence of the Chinese New Year, known as Tet in Viet Nam, is a time when large quantities of chickens and ducks are slaughtered and eaten.
- Migratory birds are also in winter residence in Southeast Asian countries at this time of year. Infections could have been introduced from migratory birds to local wild waterfowl and domestic poultry. Influenza A viruses are found in wild bird species and all known subtypes (H1 through H16) have been isolated in these species, and may be the source of the viral genes from which influenza viruses infect domestic poultry, as has been repeatedly shown for LPAI viruses. However, more research is needed on the role of wild birds in the transmission of the virus to and from domestic poultry.
- The choice of production system plays a role in the spread of disease. FAO has introduced the following four-tiered classification scheme to describe production systems: Sector 1 farms are part of an industrial integrated system with high level biosecurity and the birds are marketed commercially; Sector 2 farms belong to commercial poultry production systems with moderate to high biosecurity measures; Sector 3 farms raise mixed species of birds and have low to minimal biosecurity measures; Sector 4 farms raise scavenging chickens, along with other species and have very minimal biosecurity measures of any kind.
- It is important to note that this production classification system focuses more on biosecurity measures than on the number of birds per farm, although the density of birds is taken into account. Biosecurity encompasses all the measures that are taken to keep disease away from a farm and to prevent transmission of a disease from an infected farm to neighbouring farms. Sources of infection are identified and all necessary measures undertaken to minimize or prevent infections. The major biosecurity measures in farms that have adopted them are: isolation; traffic control; sanitation (change of wear, showering, cleaning and disinfection); rodent and insect control; a reliable source of purchased inputs (i.e. fertilized eggs, day-old chicks, feed, water, etc.); and all-in/all-out production. A Sector 1 production system strictly applies biosecurity measures; Sector 2 or 3 farms implement these measures in varying degrees; and Sector 4 farms either barely apply them or do not apply them at all.

B. FOOT-AND-MOUTH DISEASE (FMD)

23. Foot-and-mouth disease (FMD) is not a zoonosis but can be considered the most important livestock disease in terms of its economic impact as it results in the largest production losses in cattle and pigs, particularly in intensive dairy and pig systems in the Asia-Pacific region. The disease status of a country is an important determinant in the international trade of livestock products and an outbreak of FMD in a such a country is an effective barrier to trade. FMD outbreaks in beef-exporting countries is considered a catastrophe as restrictions on animal movement and international trade lead to serious economic losses. In non-exporting countries, local trade may be also affected due to animal movement restrictions.

24. FMD continues to be prevalent in many South American, African and Asian countries, and worldwide control is still a distant prospect due to inadequate resources and veterinary services; slow response to outbreaks; uncontrolled animal movement; and insufficient quantities of available vaccines. The economic impact of the disease is due to trade losses; reduced milk yields; increased probability of mastitis in dairy animals; abortions and delayed conception in breeding stock; perinatal mortalities; lameness in draught animals; and loss of weight in growing animals from reduced feed intake and stunted growth. In addition, restrictions on animal movement affect prices, imposing costs on farmers and the rural economy in general.

C. CLASSICAL SWINE FEVER (CSF)

25. Classical swine fever (CSF) is a viral transboundary animal disease that is highly contagious among domestic and wild pigs, such as boars and peccaries. The virus is mainly transmitted orally and often spread by the feeding of uncooked contaminated garbage. It can cause high mortality rates and there is no effective treatment for the disease. It is devastating to pig producers with multiple infection routes, including from pig to pig (wild or domestic); infected food; or contact with contaminated vehicles, premises or clothing, animal waste and semen. The virus is also very stable under favourable environmental conditions, and can survive for years in certain products, such as frozen meat. Classical swine fever can be found in different parts of the world but higher prevalence is to be found in East and Southeast Asia. The disease has been eradicated from the United States, Canada, New Zealand, Australia and most of western and central Europe. No cases of CSF have been reported on the African continent.

D. PESTE DES PETITS RUMINANTS (PPR)

26. Peste des petits ruminants (PPR) is a highly contagious and infectious viral disease of domestic ruminants (e.g. sheep and goats) and wild small ruminants (e.g. gazelles). It is characterized by the sudden onset of depression, fever, discharges from the eyes and nose, sores in the mouth, disturbed breathing and cough, foul-smelling diarrhoea, dehydration and death. In recent years cases of the disease have been documented in the Middle East. Outbreaks of PPR have also been reported in some parts of South Asia; China reported its first case of the disease in July 2007.

E. HEMORRHAGIC SEPTICAEMIA

27. Hemorrhagic septicemia (HS) is a fatal disease occurring among cattle and water buffalo and in susceptible animals; the clinical signs progress rapidly from dullness and fever to death within hours. It is an important disease in Asia, Africa, some countries in southern Europe and the Middle East; the highest incidence appears to be in Southeast Asia but under-reporting is common. Hemorrhagic Septicemia is not a fast-spreading transboundary animal disease, and there are no authenticated reports of human infections. However, Hemorrhagic Septicemia has been identified as a priority because of the high economic impact of the disease; the most important impact has mainly been felt by smallholder farmers, particularly those heavily dependant on draught animals. HS occurrence is usually attributed to poor management with lack of nutrition, poor environmental conditions and overworking of animals facilitating HS infection. The worst epidemics occur among animals in poor physical condition and during the rainy season. Stresses caused by poor food supply are thought to increase susceptibility to infection, and close herding and wet conditions appear to contribute to the spread of the disease.

F. PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME (PRRS)

28. The PRRS virus is highly infectious disease – a pig can become infected after exposure to just a few viral particles – but is not highly contagious. The virus can be transmitted vertically (from dam to offspring), or even horizontally (from infected to non-infected pig). The PRRS virus can be found wherever there are pigs, and has recently been devastating markets and the livelihoods of pig producers in Asia, particularly in China and Viet Nam. These outbreaks are however not considered to be sufficiently serious to be considered as a public health issue.

V. Prevention and Control of Animal Disease

29. A technically sound prevention and control programme against all these TADs should be based on: surveillance; diagnosis; preparedness and response; and good livestock production practices.

30. Investment on surveillance training is a first step for countries seeking to implement or invest in an animal health programme. Surveillance need not incur too many costs as there are a number of effective low-cost surveillance systems. Such systems may include farmer reporting; abattoir surveillance; veterinary negative reporting; sentinel herds or flocks; surveys; syndromic classification and surveillance methods; participatory techniques; risk factors; and indirect surveillance. The sophistication of surveillance systems varies according to available resources; they are all, however, designed to acquire disease status data in a timely manner in order to allow necessary and appropriate action to be taken.

31. Diagnosis consists of non-laboratory tests, such as clinical inspection, meat inspection, as well as laboratory tests to confirm clinical findings – both clinical inspection and laboratory tests are based on the principles of test sensitivity and specificity. Diseases such as FMD, PPR and CSF can be diagnosed clinically but need to be confirmed in the laboratory, especially if there has been no history of endemicity.

32. Emergency preparedness and response involves implementing control measures that help keep out the disease and, if present, limiting the spread of the disease. These measures include: animal movement management; vaccination; cleaning and disinfection; stamping out; and risk communications. Some FMD free countries may, depending on their trade status, resort to stamping out if FMD is detected. In FMD endemic countries, a sound vaccination programme should be implemented in combination with some of the other tools mentioned above. The same holds true for CSF, PPR, HS and PRRS. For HPAI, countries can resort to stamping out or vaccination, along with all the other disease response measures.

33. Lastly, to improve resistance of animals against diseases, good livestock production practices must be implemented by all types of production systems. This involves the selection of the right animals, good breeding and feeding practices, and proper husbandry procedures. For instance, HS could be prevented through vaccination, as well as good management of livestock feeding requirements.

VI. Factors to Consider in Developing a Strategic Vision of Regional Animal Disease Control

34. There is increased recognition that the major cause of many new and emerging human diseases and public health emergencies have resulted from pathogens originating from animals and animal products. The Asia-Pacific region has increasingly been at the forefront of many regionally coordinated and national emergency actions related to animal disease outbreaks over the past ten years.

35. Regional production systems combining high population densities and the raising of animals on mixed rain-fed/irrigated farms, which represent about 70-80 percent of all agricultural land, have increasingly raised concerns on animal-human interactions, as well as the risks posed to both animals and people. Zoonoses can emerge in such situations, and many of the risks involved are linked to the structure of farming systems, the human-animal interface and the role of market linkages.

36. It should be recognized that the Asian livestock sector, while accounting for less than 9 percent of GDP in the region, is reported to account for 18-25 percent of all agricultural value added.⁵ In addition, the cross-border movement of animals provides higher prices to local traders and producers. Legal live animal exports from Asian countries was estimated at more than \$1 billion in 2004 (compared to \$2.3 billion in the reported value of imports); however, flourishing

⁵ U. Pica-Ciamarra U. (2005). Livestock Policies for Poverty Alleviation: Theory and Practical Evidence from Africa, Asia and Latin America. PPLPI Working Paper No. 27, FAO/Pro-poor Livestock Policy Initiative, FAO, Rome.

cross-border informal livestock markets means that there is a considerable under-reporting of data.

37. While structural changes are dramatically changing the face of industries around the region, it is important to consider the role played by livestock in poverty alleviation in rural economies. The rural poor are especially exposed to zoonotic pathogens because of the proximity of their living spaces to farm animals, and because they may not be adhering to good animal production practices. Consequently, the strategic challenge for disease control in the Asia-Pacific region is to innovatively balance development versus disease control interventions.

38. FAO, in general recognition of the dramatic socio-economic impact imposed by Avian Influenza on industry stakeholders in the Asia region, is documenting the shape of poultry sectors in the region and the role that the sector plays in poverty alleviation and livelihood enhancement. Numerous livelihood and market chain studies in the region have generated a large body of information on gender and livelihoods impacts. Disease control policy options which balance the reduction of risk of disease transmission with minimizing market shocks and livelihood shocks are feeding into FAO HPAI control programmes and poultry sector policy dialogue with member countries in the region.

39. Since avian flu has so far been largely confined to poultry, FAO socio-economic activities on the livelihood impact of HPAI in Asia have focused on the microeconomic impact of production losses on the livelihoods of poor farmers. Bearing in mind the different stages of development in the poultry sectors and the varying experiences in HPAI control in Asian countries, the livelihood impact studies in Indonesia, Lao People's Democratic Republic and Viet Nam provide information on the varying severity of the microeconomic impact in areas where poultry farming is the main source of livelihood. In these areas, farming income and rural poultry consumption are affected. The poultry value chain studies completed in Indonesia, Myanmar and Viet Nam have assisted in identifying chains that pose high risks of spreading HPAI in these countries and one such chain is live markets which are now the focus of possible government policy change.

40. Policy interventions for animal disease control need to recognize the different impacts that selected animal disease controls will have on different stakeholders, as well as the regional risks and impacts of disease outbreaks. This is aggravated by serious development gaps among countries leading to varying levels of legislation, border controls, quality of public services, and industrial structures. Uneven development across the region is reflected by different policy, institutional, technical, and field-level support, ultimately leading in most cases to unsustainable solutions for disease control. It is therefore necessary to have strong regional coordination to harmonize policies, strengthened public and private veterinary services, and to develop regional disease outbreak preparedness plans.

VII. Responding to the Challenges

41. The emergence of zoonoses remains an imminent global threat as long as certain factors are not addressed, notably the presence of growing livestock populations and complex human-animal interfaces, which have been shown to facilitate disease agents to jump species into the human population. The 1996 World Food Summit recognized the broader economic impact of animal and plant disease outbreaks on the poor and the urgent need to seek and embark on steps to prevent plant and animal pests and disease. In 1994 FAO established the Emergency Prevention System for Transboundary Animal and Plant Pest and Diseases (EMPRES) in order to promote the effective containment and control of the most serious epidemic livestock diseases, and newly emerging diseases through international cooperation.

FAO Platforms to Address TADs

42. In November 2004 the Director-General of FAO established the position of Chief Veterinary Officer (CVO) and created the Emergency Centre for Transboundary Animal Diseases Operations (ECTAD) in order to further strengthen and streamline FAO support to countries and regions, in association with other international organizations, such as the World Organisation for Animal Health (OIE) and the World Health Organization (WHO). An ECTAD unit is now in place at FAO's Regional Office in Bangkok to oversee the activities of the regional and country teams. This unit is currently focusing its efforts on the HPAI crisis but its mandate also covers other TADs. FAO, through ECTAD, is mandated to address disease prevention and control activities in order to better understand the epidemiology of the disease, including the role of the wild birds, the role of markets and trade in disease transmission and maintenance. At the same time, it is also responsible for assessing the socio-economic impact of TADs on various stakeholders along the poultry chain, as well as identifying and supporting research issues.

43. FAO, together with OIE, also launched the **Crisis Management Center – Animal Health** in October 2006. This center forms part of ECTAD and is charged with implementing emergency response procedures and protocols based on the “Incident Command System” for a functionally-based emergency response. It mobilizes technical and operational resources to respond to outbreaks in newly infected countries. Since it became operational, FAO has implemented its rapid assessment and response capacity on missions deployed upon official government request. Missions have been dispatched in countries in the Asia-Pacific to respond to outbreaks of HPAI, FMD and PRRS.

44. The Technical Cooperation Programme (TCP) is another FAO facility used at the initial stages of an outbreak. The TCP is part of FAO's regular programme and financed from the assessed contributions of its Members. Launched in 1976, it is an FAO facility through which member countries can obtain FAO technical assistance to help them resolve pressing rural development and socio-economic issues in their agriculture, fisheries and forestry sectors. The TCP provides short-term technical support to address well-defined problems, as well as provide initial investments to assist countries in developing their disease emergency preparedness capacity. Once TCP projects are completed, donors usually come on board to build on the initial work and results provided by the TCP. Emergency responses to HPAI outbreaks through the TCP facility provide immediate assistance to countries affected with TADS. Table 2 presents the assistance extended by FAO through its TCP facility and donor assistance for HPAI control and prevention.

Table 2. List of contributions channeled through the FAO HPAI programme where Asia-Pacific countries are included as beneficiaries*

FAO assistance and donor assistance through FAO	Total fund contribution to the FAO HPAI programme as of 2007 (in millions of US dollars)
FAO (TCP)	9.6
ADB	4.1
Australia	8.6
Canada	5.1
China	0.5
France	6.7
Germany	8.8
Ireland	0.3
Japan	12.7

Netherlands	0.6
New Zealand	0.3
Norway	3.6
Saudi Arabia	1.0
Sweden	17.6
Switzerland	3.6
UK	5.6
UNDP-administered Donor Joint Trust Fund	6.2
United States	35.2

* Information as of January 2008.

45. HPAI has attracted a bigger portfolio in comparison with other TADs as it is an emerging zoonosis. FAO has funded activities related to other TADs through its own resources, specifically TCP resources, as well as resources provided by donors (Table 3).

Table 3. FAO and donor funded projects on TAD's control and prevention

FAO TCP projects and donor-funded projects	Project focus on TADs	Budget allocation (in millions of US dollars)	Status
GTFS/INT/907/ITA	Controlling TADs in Central Asian Countries	4.9	Ongoing
TCP/MON/3101 (FAO)	Strengthening early warning of transboundary animal disease diagnosis	0.387	ongoing
GCP/CMB/028/EC (EU)	Support to smallholder livestock production in Cambodia	1.8	ongoing
GCP/PHI/049/AUL (Australia)	Eradication of FMD in the Philippines	0.8	ongoing
TCP/DRK/3104 (FAO)	Emergency assistance for early detection, response and control of FMD outbreaks	0.4	ongoing
GCP/RAS/206/ASB (ADB)	FAO-ADB project on the control of transboundary animal diseases in the Greater Mekong subregion	1.0 2.46	Phase 1 completed Phase 2
OSRO/BGD/701/ CHA	Emergency Control of the Spread of FMD in Bangladesh through Strategic Vaccination	0.3	Near completion

Regional Platforms for TAD's control

46. FAO's Regional Office for Asia and the Pacific also serves as the secretariat of the Animal Production and Health Commission for Asia and the Pacific (APHCA). APHCA has 17 members with each member paying membership dues that are placed in a trust fund for the Commission's use. In the past year, FAO APHCA has approved a secretariat proposal to create a disease emergency fund for member countries that require immediate assistance during a disease outbreak. It has also responded quickly to country requests to look at the pig mortalities occurring in the region by conducting emergency workshops to alert countries of a possible pig disease outbreak, and to discuss the steps to be taken to address the problem. It has also assisted countries by helping them obtain FMD vaccines if they are experiencing FMD outbreaks.

47. The importance of strengthening response and reaction mechanisms to TADs outbreaks was further emphasized during the Second Regional Steering Committee Meeting of FAO/OIE GF-TAD for Asia and the Pacific in July 2007. The Second Steering Committee Meeting brought together the three Regional Specialized Organizations (RSO), namely: **ASEAN, SAARC and the SPC**, to discuss current issues pertaining to their respective regions. The specific aim for each RSO is to establish subregional Regional Support Units (RSUs), regional epidemiology units (REU), and regional reference laboratories. Each RSO through the RSU was urged to review their respective priority TADs. To date, ASEAN has identified HPAI, FMD and CSF as priority TADs. SAARC singled out HPAI, FMD and PPR and SPC flagged HPAI, CSF and FMD.

VIII. Recommendations

48. The trend towards increasing growth in livestock production and animal numbers in Asia will almost certainly continue, and while regulatory systems will improve, porous borders, changing industrial structures which necessitate increased animal movements and ever-increasing linkages in cross-border supply chains, will maintain incentives for informal cross-border trade. These challenges require significant investments in locally available human skills and institutions, and the implementation of much more rigorous and organized programmes that use epidemiology and economic research to assist in decision-making. It also necessitates regional coordination to combat transboundary animal diseases.

49. In view of the increasing frequency of disease emergencies, it is necessary to develop systems to facilitate forecasting, early detection, and structured risk-based surveillance leading to early warning. This in turn should lead to an organized and structured response to contain a disease outbreak and prevent it from evolving into a major epidemic. All countries must establish a system for disease surveillance and response in order to deal with emergencies in a timely manner. In addition, to facilitate dealing with outbreaks of known and emerging communicable diseases, including zoonoses, all countries should develop a national outbreak response plan.

50. Design and implementation of such strategies have to be based on sound animal health systems that include strong veterinary services and strengthened public-private partnerships on disease control and prevention.

51. All FAO member countries in Asia and the Pacific have endorsed the Global Framework for the control of Transboundary Animal Disease (GF-TADS). This initiative, created by FAO and the World Animal Health Organization (OIE), responds to the urgent need to address the recurrent and continually escalating problem of TADs. Effective control of these diseases can only be achieved through regional collaboration and cooperation. FAO (and OIE) therefore proposes, based on a consultative process in the region, to establish:

- A regional support unit (RSU) in both South Asia and Southeast Asia, located respectively in Nepal and Thailand, which fosters and develops a regional coordination and cooperation mechanism to combat TADs. These units would be responsible for formalizing regional collaboration and developing a cooperative regional framework to

support the generation of common regional policies and regulations governing animal movements and information-sharing.

- Regional Reference Diagnostic Laboratories in the two subregions to provide reference diagnostics, standardization of diagnostic reagents and tests for priority TAD, as well as coordinate and manage networks of National Diagnostic Laboratories.
- Regional epidemiology units staffed by multidisciplinary teams to coordinate and manage networks of national surveillance teams; facilitate policy dialogue; establish regional policies to control TADs; provide training, such as epidemiological tools and methods; and facilitate policy harmonization, animal movement protocols, and disease control programmes.
- Sub-regionally tailored disease risk mitigation approaches through the food chain. These approaches would incorporate the economic dimension of disease control, foster animal health and enhance food safety/quality along the food chain, as well as support the development of safe animal trade and disease control by identifying the numerous drivers of animal movements and links between farming systems and markets. Building mechanisms for ensuring healthy animals along the food chain should combine knowledge and use of economic incentives and regulatory requirements for animal health certification at slaughter and markets.

52. Delegates are invited to provide their views on the present paper, the importance of categorizing animal disease outbreaks as a priority long-term concern to the Asia-Pacific region, as well as endorse the need to create a long-term strategic vision for animal disease control.

Delegates may also wish to:

- Recognize that urgent responses are needed to address TADs and that countries must establish disease surveillance and response systems to quickly deal with emergencies. A national outbreak response plan should be prepared by countries to deal with outbreaks of known and emerging communicable diseases, such as zoonoses. This plan, prepared and implemented under the national CVO, should cover the following areas at minimum:
 - a) the designation of officers responsible for announcing disease outbreaks;
 - b) a core group of members to form part of an outbreak response task force, as well as a pool of potential members depending on the nature of the outbreak;
 - c) the designation of appropriately trained contact officers to deal with the media and engage in public information activities;
 - d) a mechanism for regular contact and information-sharing between human and veterinary public health services and laboratory services.
- Call on countries to contribute financial resources and provide human resources support to develop these centers, as well as commitment to developing effective systems for the prediction, early detection and structured risk-based animal disease surveillance, leading to early warning of outbreaks.
- Support the development of long-term strategic and integrated approaches to animal disease control which recognize the importance of regional collaboration and the establishment of regional support units in SAARC, ASEAN and SPC.
- Acknowledge that animal disease is a broad economic and human health issue which requires wide-ranging and innovative approaches to disease control. These approaches should build on a solid understanding of the drivers of animal and animal product movements, an appreciation of the important role played by livestock in rural economies, and the need to review the economic and regulatory environment supporting disease control.