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EMPRES 360 – spotlighting joint efforts to fight hunger and poverty through animal health

Eran Raizman (FAO)

One of my favourite childhood songs describes how a song is born: “like a baby, in the beginning it is painful, then it comes out and everybody is happy”. Similarly, publishing a book, a journal issue or even an article tends to be a painful process. And yet, once the task is accomplished, in addition to the relief, there is a sense of happiness. Because this is my first *EMPRES 360* as the editor and the head of the Emergency Prevention System for Animal Health (EMPRES-AH), I would like to congratulate my colleagues for their midwifery work and dedication to this publication. The importance of *EMPRES 360*, among other Food and Agriculture Organization of the United Nations (FAO) publications that contribute to sustainable international development, is the journal's capacity to bring a holistic message to all stakeholders: animal health is a major pillar in the economic and social development of every country and society.

Since 1994, *EMPRES 360*, previously named *EMPRES Bulletin*, has made communication a priority and it strives to improve publication quality and expand its readership. At *EMPRES 360*, we cover as many relevant subjects as possible, to fit the diverse backgrounds and interests of our readers. We believe that through *EMPRES 360*, we can show the strength of development work at FAO, as well as the progress of its activities and accomplishments. As part of our development philosophy, we aim to work in close collaboration with local stakeholders. Sharing knowledge through the *EMPRES 360* journal is one of our core activities to gain visibility and to contribute to countries' capacity building for sustainable development and the improvement of livelihoods and food security.

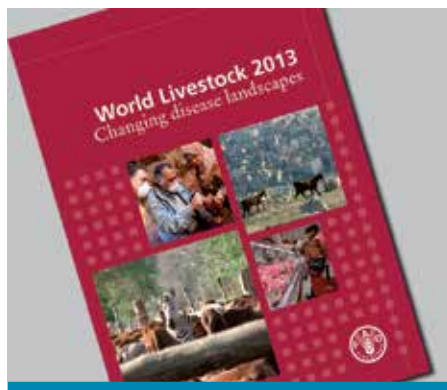
I am inviting you to enjoy our new issue of *EMPRES 360* and its diverse content, and to consider contributing to future issues of this important journal with your experience and knowledge. Your contributions will ensure that our knowledge is shared among those who are committed to fight hunger and reduce poverty.³⁶⁰

New head of EMPRES-Animal Health

Eran Raizman joined FAO in September 2013 after working for non-governmental organizations (NGOs) funded by the United States Agency for International Development (USAID) on animal production development projects in Africa, Central Asia and Latin America. He obtained his veterinary medicine degree from Universidad Austral de Chile. While in Chile, Eran was also involved in technology transfer and clinical work for small dairy holders and indigenous groups. In 2000, he moved to the United States of America to specialize in dairy production medicine at the University of California, Davis where he completed his Master's degree in preventive veterinary medicine. Eran then completed his Ph.D. in veterinary epidemiology at the University of Minnesota after which he conducted epidemiological research and taught epidemiology at the College of Veterinary Medicine at Purdue University, Indiana.



Cattle in a household in Bor area South Sudan



PERSPECTIVES

World Livestock 2013 Changing disease landscapes

Prepared from the FAO publication

INTRODUCTION

Over the past decades, several pandemics and major epidemics have emerged from animal reservoirs as a result of global trends and complex interactions of factors at the animal-animal-ecosystem interface. Examples of recent disease emergence include bovine spongiform encephalopathy (BSE) in the 1970s, human immunodeficiency virus (HIV) in the 1980s, severe acute respiratory syndrome (SARS) in 2003, Nipah virus encephalitis in 1998, H5N1 in 1996 with regional spread in 2003, the pandemic H1N1 in 2009 and, more recently, Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) in 2012 and H7N9 in 2013 in China with the likelihood of regional spillover.

To confront the challenges posed by emerging diseases of animal origin, and persistent zoonoses and high impact livestock diseases that pose a direct threat to the food and income security of rural communities that are dependent on livestock, more structural solutions with a greater focus on disease prevention are required at global, regional and local levels. In the recent publication *World Livestock 2013 – Changing disease landscapes* (available at www.fao.org/docrep/019/i3440e/i3440e.pdf), FAO advocates a paradigm shift in risk assessment that pays attention to proactive and interdisciplinary approaches which engage the society at large and are built on the analysis of disease dynamics. This publication examines why and how pathogens of animal origin have become major global health threats and what might be done to mitigate these threats.

This article summarizes the main messages from the publication illustrating the relationship between the patterns of some major diseases and global changes, and proposed elements of the response to reduce health threats of animal origin. The term disease landscape here refers to a mix of ecological, physical, economic and social factors that drive disease dynamics and influence the interplay between the pathogens, their hosts and the environment.

THE PRESSURE-STATE-RESPONSE CONCEPTUAL FRAMEWORK

Changing disease landscapes are explored using the Pressure–State–Response framework. This approach helps to explore disease dynamics in their agro-ecological and socio-economic context and to clarify the link between human action and disease. Global drivers (pressure) are considered to be the collective set of processes creating options for pathogens to emerge, spread and/or persist, impacting human and animal health, development and livelihoods. The resulting disease (state) and its impact need to be confronted through a response that may be directed to the state and/or the pressure (Figure 1).

PRESSURE AND STATE DRIVERS CHANGING THE GLOBAL DISEASE LANDSCAPE

Human demographic and economic developments are the predominant forces driving changes in disease dynamics. The world population has been growing exponentially, from 4 billion in 1975 to over 7 billion today. By 2050, the world population is expected to increase to over 9.6 billion people, translating into an ever

growing demand for food, energy and natural resources. Also, the world economy has been growing dramatically over the last decades in certain regions of the world. These global trends exert pressure on the earth's natural resources and propel a transformation of farming and natural landscapes. Animal agriculture is a dominant factor, with over a quarter of the earth's terrestrial surface used for livestock grazing and a third of the global arable land used to grow feed for livestock. Pressures on agricultural land use are generally high throughout the developing world and particularly high in Asia, but a major increase in pressure for and on arable land is projected for the decades ahead in Africa as well. At a local scale, land pressures are highest in and around urban agglomerations and densely settled areas.

Apart from demographic growth and the pressures on the natural resource base, the changing farming landscapes and food supply systems, increases in global travel and trade, climate change, persistent poverty and inadequate public and animal health systems have been implicated as drivers of today's global disease landscapes. Examples of diseases and corresponding driving forces are summarized in the following sections.

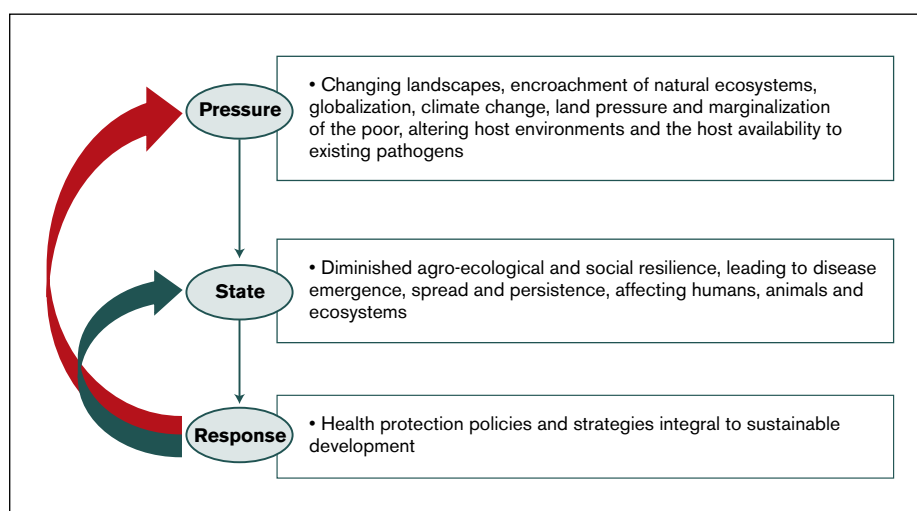


Figure 1: A disease Pressure-State-Response analysis framework

AGRICULTURE CHANGES AND DISEASES

During the second half of the twentieth century major changes took place in animal agriculture in the developed world, with rapidly expanding international food supply networks and production plants based on mass rearing of animals and integrated production, processing and distribution chains. Intensive livestock production, especially pigs and poultry, brought high animal densities featuring low genetic diversity, facilitating increased disease transmission and pathogen adaptation. Strict bioexclusion and health protection regimes generally prevent infectious disease outbreaks, but major disease outbreaks occur occasionally, when a pathogen undergoes a virulence jump, escapes the vaccine used, acquires resistance to the antibiotics applied or travels along the food supply chain. These breakout pathogens sometimes present serious veterinary public health threats, as was experienced with the emergence of avian influenza viruses and other viruses of public health importance.

The rapid expansion of the poultry sector in Asia, along with compounding factors such as the mixing of new and old poultry farming systems, the presence of live bird markets, contact between poultry and wild waterfowl, and poor biosecurity are all associated with the persistence and spread of H5N1 highly pathogenic avian influenza (HPAI) and other viruses.

Intensive pig production, with intercontinental shipments of live piglets, is believed to influence the composition of the global swine influenza gene pool. A new H1N1 pandemic influenza A virus (pH1N1), presumably of swine origin, emerged in March 2009 in Mexico and the United States of America and rapidly spread throughout the world, causing the first influenza pandemic of the twenty-first century. While the location of the pig-to-human virus jump remains unknown, the genetic makeup and emergence of this quadruple reassortment suggested a mechanism involving intercontinental movement of live pigs and their viruses. Another example of disease emergence in intensive pig production is the new strain of highly virulent

porcine reproductive and respiratory syndrome (hPRRS) virus. Since 2006, it has become predominant in China, with half of the world's pig population, and has continued to spread to Southeast Asia.

The development of antibiotic resistance and the subsequent emergence of multidrug-resistant bacteria have been connected to the dependence on antibiotics as feed supplements in intensive livestock production. Management of this issue in the future represents a considerable challenge given the increased global reliance on these production systems to supply food.

DISEASES ASSOCIATED WITH PRESSURES ON LAND USE AND THE NATURAL RESOURCE BASE

Changes in land use systems and deforestation lead to increased contact between wildlife, domestic animals and humans. This increased contact offers pathogens an opportunity to infect novel host species. Wildlife species, including bats, primates and rodents are a source of diverse microbes and an important reservoir of emerging infectious disease agents. Modeled predictions of land use system changes from 2000 to 2030 enable identification of potential hotspot areas for pathogens originating from wildlife to emerge in humans and livestock. These include areas where cropland is converted to human settlements; where croplands are replacing pastoral systems and forested areas; and where pastoral and cropland systems are encroaching on forested areas.

The encroachment of humans into the natural habitat of wildlife may result in increased pathogen spillover to humans, and eventually generate a species jump with sustained human-to-human transmission. The human activities involved include farming near forests, deforestation and logging, hunting and preparation and/or consumption of bushmeat. The most salient example of a wildlife pathogen that jumped from one primate host to another (chimpanzees to humans) through bushmeat hunting is the HIV-1 virus that emerged in sub-Saharan Africa. In southeastern Asia, the SARS virus emerged from bats and spread to

humans via the consumption/handling of palm civets. The Nipah virus in Malaysia also spread from bats and caused an epizootic in herds of intensively raised pigs, from which the virus was passed on to humans. In Australia, Hendra virus occasionally infects horses as well as humans. Presumably deforestation and agricultural expansion led to increased contact between flying foxes and recreational horses, the principal

“ Globalization contributes to a worldwide redistribution of pathogens, vectors and infected hosts ”

intermediate host for the Hendra virus. The emergence of Ebola-Reston virus infection in the Philippines in domestic pigs and pig workers in 2008 is yet another example of novel disease emergence from bats, although clinical disease in pigs or humans is not fully known.

GLOBALIZATION AND DISEASES

Globalization, in the form of increased international travel by people, and the trade and traffic of commodities, contributes to a worldwide redistribution of pathogens, vectors and infected hosts, starting novel pathogen-host interactions and triggering new disease complexes. Poultry (Figure 2) and pig meat exports have rapidly increased over the past two decades, with an increase of 520 percent and 207 percent, respectively. Similar trends are noted for global trade in bovine meat and dairy products.

Increases in export volumes of livestock products do not necessarily translate to an increased risk of international disease spread. Experience shows that bulk shipment of livestock products dispatched from territories or compartments certified as free of major infectious diseases can be sustained at

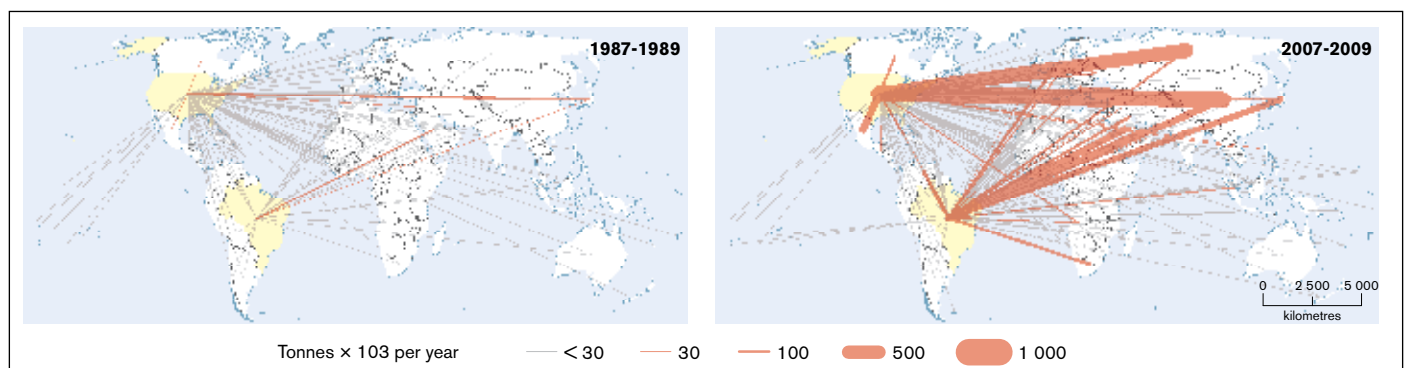


Figure 2: Export of poultry meat from the United States of America and Brazil

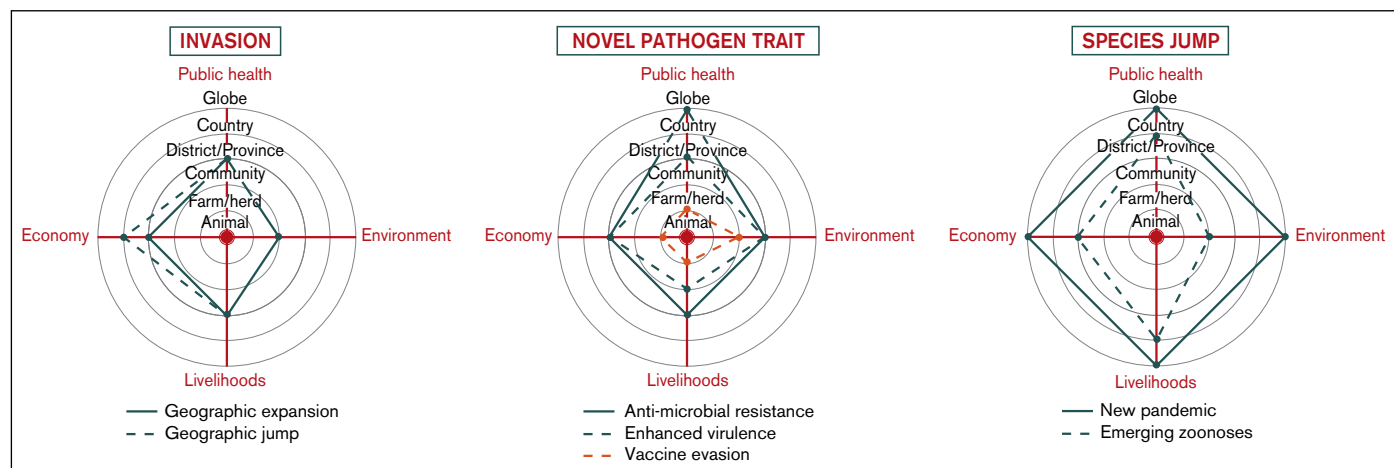


Figure 3: Examples of tentative impact profiles for different emerging disease dynamics

a manageable low-risk status for disease spread. The same cannot be said for some of the international trade in live animals and animal products despatched from disease-endemic countries with inadequate veterinary and public health systems, as was experienced on many occasions where pathogens were spread through trade in livestock and livestock products.

For example, illegal imports of foot-and-mouth disease (FMD) virus-contaminated food items combined with swill feeding to pigs presumably explain the FMD epizootic that occurred in 2001 in the United Kingdom of Great Britain and Northern Ireland. The major epizootic of Rift Valley fever (RVF) in the Arabian Peninsula in 2000–2001 was attributed to shipments involving live animals and mosquitoes from Africa.

The international trade in pigs and pig meat contributed to the ongoing spread of African swine fever over long distances (from Africa to Europe) through contaminated pig meat products that are fed to pigs as food scraps. Similarly PRRS has spread through trade in live animals and products. Also, the globalization of intensive poultry production and supply has been a factor in the spread of multiple poultry diseases such as H5N1 influenza, infectious bursal disease, Newcastle disease and avian infectious bronchitis.

CLIMATE CHANGE AND DISEASE

Climate change, one in a set of factors globally modulating disease landscapes, directly and indirectly affects the ecology and behaviour of hosts, vectors and pathogens, enhancing a global redistribution of disease complexes. Climate change impact operates in tandem with the effects of globalization as a driver of change in disease occurrence, leading to changes in the geographic range and occupancy pattern of disease complexes and pest agents. Climate change is projected to become the fastest growing driver of biodiversity loss by 2050, taking over from agriculture. Changes in biodiversity will arguably lead to changes

in disease patterns and diseases may bring biodiversity loss. Livestock is increasingly recognized as i) a main contributor to climate change, ii) a (potential) victim of climate change and iii) an entry point for mitigating climate change (Figure 3).

Climate change in combination with other factors, in particular, international trade, may be responsible for the apparent increase in the incidence of arthropod-borne viral diseases in the eastern Mediterranean basin, which is posing a risk to the temperate climate zones of Europe. The emergence of bluetongue virus type 8 in 2006 and Schmallenberg virus in 2011 in northern Europe are distinct examples. Climate anomalies are associated with El Niño Southern Oscillation modulate rainfall and the subsequent risk of RVF in much of Africa. Other examples of human and zoonotic diseases associated with climate change and other global drivers include dengue, Japanese encephalitis, chikungunya and West Nile virus.

POVERTY AND DISEASE

More than 70 percent of emerging infectious diseases in humans over the past few decades have jumped species from animals to humans. Apart from these new emerging diseases, a staggering burden of 'old' diseases remains in place in many developing countries which

affect people and their livestock, including a large number of neglected zoonotic diseases. These diseases quietly devastate poor people's lives and their livelihoods. Poor people aggregate in slums and peri-urban settings with relatively high numbers of livestock and scavenging animals. Poor sanitation conditions explain the high incidence of infections originating from animals. Hence low-income countries have a high incidence of diseases in humans and animals. Developing countries with weak animal health systems lack both the incentives and the means to fight common infectious diseases that have major impacts. Thus, livestock diseases form part of the poverty trap. They compromise sustainable agricultural development, causing efficiency losses throughout production as well as poor nutrition of families and communities which results in stunted growth and problems with cognitive development.

ANALYSIS OF LIVESTOCK DISEASE IMPACT DYNAMICS

A tentative analysis of the diverse impacts of livestock disease has been proposed and is illustrated in Figure 4 for three distinct disease emergence scenarios: where a pathogen (i) becomes established in a new area (invasion), (ii) displays novel virulence traits

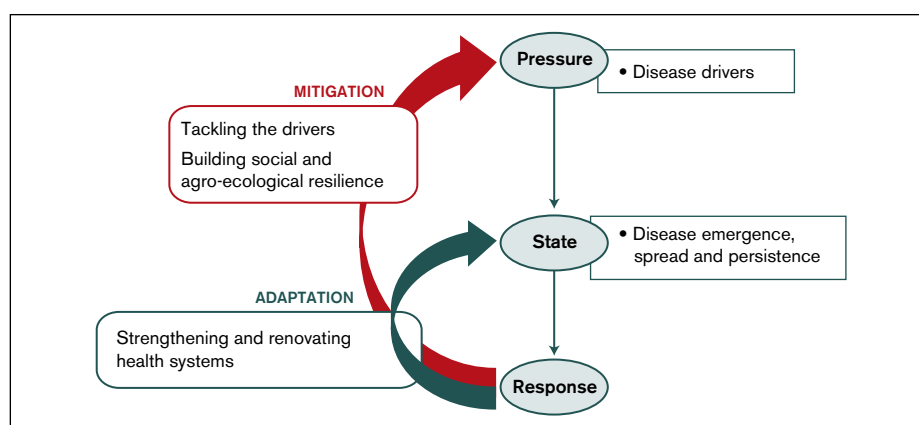


Figure 4: Examples of tentative impact profiles for different emerging disease dynamics

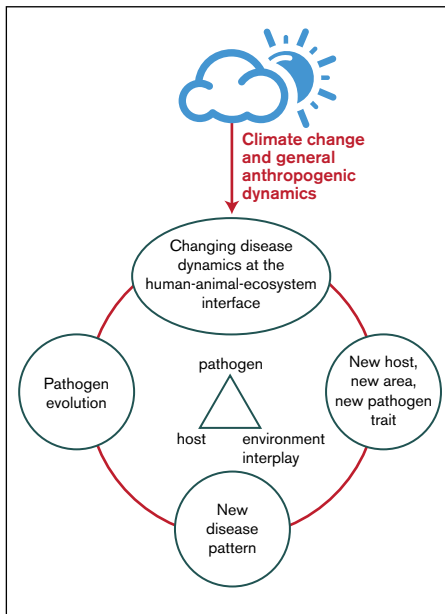


Figure 5: Pressure-State-Response framework: adaptation and mitigation

or (iii) performs a species jump from animals to humans. The direct and indirect impacts include those to human health, the state of natural resource base and biodiversity, poverty and livelihoods, the economy and food prices. The extent and level of impact (animal, farm, local community, rural or urban areas, country or globe) are shown in Figure 4 for the main impact domains (human health, livelihoods, economy and environment) creating distinct impact profiles. Drawing up these impact profiles helps to set priorities in animal and human health protection, sustainable development, poverty alleviation and food security.

RESPONSE

The growing global health threats of animal origin pose significant challenges affecting people, animals and ecosystems. In order to counter these challenges health risk management strategies and policies require adjustment. The analysis of the various drivers that act as a pressure force creating

a state, as well as the disease dynamics and multiple impacts may guide the identification of response elements. The response is, in fact, twofold, comprising both adaptation and mitigation. While adaptation in the form of creating more responsive health systems is the priority, mitigation or prevention is increasingly necessary to define the structural solutions to address the root causes of global health threats. A common factor in the risk management of all the different disease challenges is to shift attention to prevention and to build greater social and agro-ecological resilience (Figure 5). This shift towards preventive measures entails society-wide action and will rely on major institutional and policy support, from local to global levels (Figure 6).

A 'business as usual' approach to risk management will no longer suffice. A more driver-conscious risk assessment entails consideration of the full chain of causation, from the incubation of pathogens in the animal reservoir to emergence, spread, persistence and/or recrudescence. Such assessment will enable the required shift to the left on the disease outbreak timeline and will mitigate the disease impacts. By shifting to the left there will be less infected cases over time through robust early warning, detection and response mechanisms.

It is important to give all of the above efforts a place under a common, sustainable development framework depicting how the different components and actions form integral parts of a unified programme initiative. FAO advocates the One Health perspective to investigate the interplay between environmental factors, animal health and human health, bringing health professionals, veterinary specialists, sociologists, economists, ecologists and communication experts together in health risk management and preventive action. The One Health approach is rapidly gaining in relevance and acceptance, but an international policy and institutional support will be necessary to achieve the required paradigm shift in global health management.

In summary, the more prominent sets of global drivers and disease-driver complexes that require international attention and that need to be addressed with more vigour and urgency are captured in the four streams of work:

- tackling the poverty-driven endemic disease burdens in humans and livestock;
- dealing with biological threats driven by globalization and climate change;
- providing safer animal-source food from healthy livestock and agriculture;
- preventing disease agents from jumping from wildlife to domestic animals and humans.

These four areas of action are each discussed in the *World Livestock 2013 – Changing disease landscapes*, along with the initiatives and examples that are already in place or are being developed for specific interventions at global and regional levels.

CONCLUSION

Global health threats are anticipated to continue unless more effective actions are taken to address the variety of underlying causes. With human behaviour and practices driving these disease changes, it follows that human action is required to achieve a reversal of this increased disease activity.

The need for a more integrated, transdisciplinary, system-based approach to understand and control disease emergence, spread and persistence has become increasingly obvious because of the wide range of actors involved. A One Health approach to disease risk management within a holistic framework is rapidly gaining in importance in the international arena, but to succeed major institutional and policy support will be necessary.

Addressing the emergence, spread and persistence of animal origin pathogens is an international public good of growing importance. The call is for cohesive and concerted global efforts in health protection with greater emphasis on building social and agro-ecological resilience, strengthening health systems and developing safety practices at the grassroots level. Sustainable agricultural food systems that minimize the risk of emerging disease will therefore be needed to meet the food requirements of the rising global population, while protecting human health and conserving biodiversity and the environment. ³⁶⁰

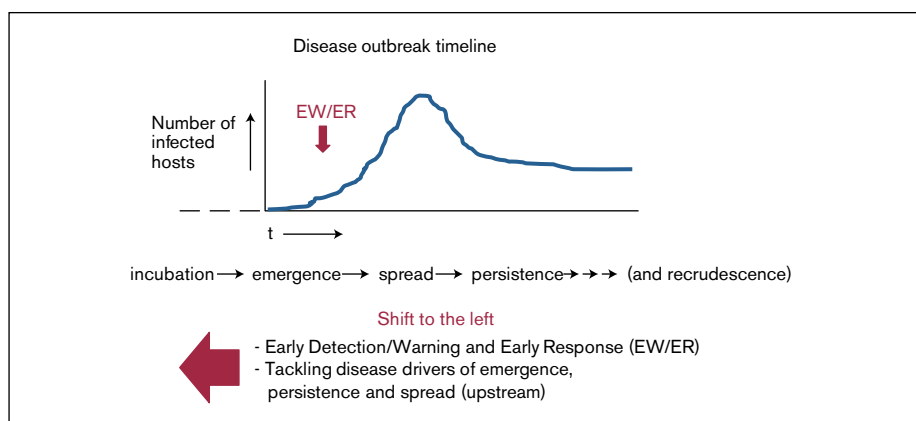


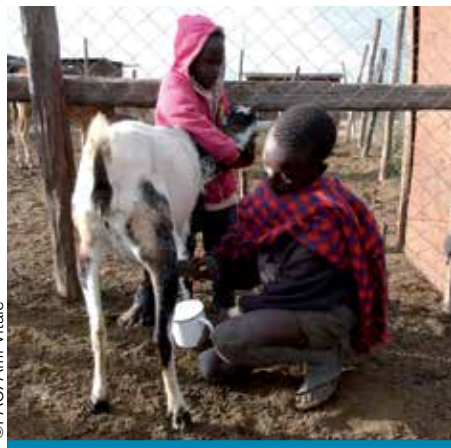
Figure 6: Speeding up response and tackling the drivers of disease emergence, spread and persistence

PERSPECTIVES

Prevention and control of transboundary animal diseases for the benefit of smallholders and pastoralists: the importance of an animal health economics perspective

Contributors: Anni McLeod (Independent Consultant) and Julio Pinto (FAO)

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It is often stated that transboundary animal diseases (TADs) must be prevented and controlled because they cause economic losses to smallholder livestock keepers and pastoralists. If this statement is correct - and few would dispute it - then TAD prevention and control programmes should be planned with a high priority given to the economic welfare of these people. The reality is that many animal health programmes would work much better if more attention was paid to smallholder needs. When the livelihoods of smallholders and pastoralists are a priority, long-term strategies will explicitly incorporate their concerns and involve them in solutions. When emergency plans are required to deal with unforeseen circumstances, a smallholder-friendly animal health system will incorporate processes to monitor the effectiveness of control measures and their impact on smallholders, and to adjust

tactics where possible to minimize this impact. Here, we review three examples of TAD prevention and control to find out what might be done differently.

EMERGENCY CONTROL OF ZONOTIC DISEASE TO PREVENT A HUMAN PANDEMIC

In the global initiative to prevent and control strains of zoonotic influenza A viruses such as the avian influenza H5N1, H7N9 and H1N1 viruses, protection of human health has been the highest priority. This priority has often resulted in a focus on controlling outbreaks in livestock as quickly as possible and reducing exposure of humans to potentially infected birds and animals.

Outbreaks have been controlled by culling, along with restricted movement of animals within defined geographical limits,

temporary restrictions on the operation of live bird and animal markets, and vaccination to prevent disease spread. When care is taken in selecting the measures used for control and the way they are deployed, including an analysis of potential economic and livelihood impacts, it should be possible to control disease while at the same time limiting damage to livelihoods. However, in the case of H5N1 and H1N1, often this kind of analysis was not done in advance and small-scale livestock keepers suffered losses that could have been prevented or reduced.

Culling is always, without exception, economically and emotionally damaging to livestock keepers, in particular to those in developing countries, as it results in loss of assets and cash flow problems. One of the important strategic developments in H5N1 highly pathogenic avian influenza (HPAI)

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FAO-EU project: reducing the vulnerability of Afar pastoral and agro-pastoral communities to recurrent drought

control in the most badly affected countries has been a movement from widespread culling, where much of the cost was borne by farmers, to targeted culling and, in some cases, vaccination, shifting the burden of cost towards the public sector. This was a welcome development that should be considered in future contingency plans for zoonotic disease control.

Compensation for birds and animals culled can help mitigate asset loss from culling, but only if a compensation policy and funding are in place from the start of an outbreak and adequate compensation can be accessed quickly and with minimal transaction costs. These requirements present challenges that may be beyond the control of animal health authorities facing an outbreak, raising two important questions: whether culling should be attempted if these conditions are not met, and what needs to be done to ensure that robust compensation plans and financing are in place ahead of emergencies.

While farmers never fully recover loss of assets and production losses, compensation is an important part of an outbreak control strategy. It is also believed to be helpful in encouraging farmers to report disease. Some countries that lacked compensation strategies for HPAI have now introduced them, although there are still challenges in obtaining sufficient funding and in the operation of funds. In addition, outbreak response must be effective and rapid since farmers usually are not compensated for animals that die of disease before the response team arrives. As well as compensation, farmers may appreciate help to re-establish operations after an outbreak. Timely information about when they can restock, interest-free loans to buy replacement animals and assistance in recapturing a market that has been taken over by larger operations, can all help to restore cash flow. However, this kind of assistance is rarely available to smallholders.

Measures to prevent future outbreaks of influenza viruses and reduce their spread include preventive vaccination, promotion of biosecurity and hygiene by changing management systems, and controlling or restricting the sale of live animals in market places. Biosecurity regulations that include restricting urban pig and poultry production, confining previously scavenging pigs and poultry, moving the location of markets or replacing live animal markets for these species with slaughter facilities almost always create economic hardship for small-scale producers and traders. There is also a largely unrecorded population of former poultry and pig keepers and traders in certain circumstances who have been unable to meet the requirements of new regulations and may or may not have found alternative livelihoods.



Kenya: A woman with two goats at the local livestock market where traders take their animals for sale

©FAO/Ami Vitale

Negative effects can be reduced through: advance consultation with those most likely to be affected; credit to assist with improvements to biosecurity that can be accessed by people with few assets; and advice on low-cost biosecurity measures tailored for small-scale and extensive producers and traders. These things are only rarely done, but they are possible with a combination of public, civil society and

“ Many animal health programmes would work much better if more attention was paid to smallholder needs ”

private investment. One of the main barriers to this kind of comprehensive effort is the difficulty of making plans and investments that require cooperation between government departments and the private sector. International agencies such as the Food and Agriculture Organization of the United Nations (FAO) are in a position to facilitate collaborative efforts, drawing on the formal networks and partnerships that they already have in place.

One of the important lessons from H5N1 HPAI is that it is difficult to provide useful economic and livelihoods analysis quickly in the face of an outbreak because the necessary data on livestock populations, trade volumes and animal movements, and their contribution to household consumption,

cash flow and income are very rarely available. Some excellent reports have been produced on the poultry sector in recent years, but very little was available between 2003 and 2005 when the first serious outbreaks occurred in Asia, and the valuable data and knowledge base that was built up when emergency funding was plentiful is not being maintained. Two things can be done to prevent a recurrence of this situation in the future. One approach is to plan well in advance so that data deficiencies and gaps can be identified and dealt with. An additional action is to set up and regularly maintain databases of critical information so that some analysis can be done quickly when emergencies occur. FAO and others in the international community have an important role to play in promoting this type of action and advocating for funds to be made available even when there is no immediate emergency to provide the political incentive to finance such activity. They also have a responsibility to develop scenario analyses that include assessments of the potential livelihood impacts of disease control measures (see also www.fao.org/docrep/019/i3440e/i3440e.pdf).

PROGRESSIVE CONTROL BY VACCINATION

The progressive control pathway (PCP) approach promoted by FAO applies to diseases like rinderpest, foot-and-mouth disease (FMD), peste des petits ruminants (PPR) and classical swine fever (CSF) where an interest to eradicate and target disease control is shared between governments and livestock owners. When a vaccination policy supports this strategy and a reliable vaccine is available, progressive control is seen as a government priority. The logistics of vaccination are planned like a military

campaign and timing is often dictated by the government budget cycle and vaccine production contracts. The priority is to achieve target levels of coverage, herd immunity and, ultimately, to reduce outbreak frequency and spread.

For the livestock owner, critical factors are the cost and inconvenience of having animals vaccinated, the priority given to the disease in question compared to other animal health problems and the perception of the effectiveness of the vaccine in terms of protecting animals. Cost-effectiveness estimates could be an important tool in aligning the priorities of veterinary services and farmers, but they are rarely used as such. Cost to the public budget per dose injected, including human resources and logistics, has sometimes been estimated retrospectively. For example, the cost per dose of using private and public veterinarians was compared after the fact for vaccination done under the Pan African Rinderpest Campaign (PARC). Yet a much more important indicator to measure is cost per animal protected. Low protection levels might simply indicate that the vaccine does not match the field strain or that the cold chain is not working, but they might also result if animals are not being presented for vaccination or if there is a fast turnover of animals.

In northern Kenya, where the last pockets of rinderpest persisted after it had been eradicated from much of Africa, pastoralists often failed to present their animals for regular vaccination. From an economic perspective this was a logical choice, since government campaigns were organized at a time of year when animals were widely dispersed for grazing. To reach a vaccination site pastoralists had to trek many miles and were at high risk of being raided en route, while the risk of rinderpest outbreaks was considerably lower. Since a large part of the cost of vaccination in pastoralist areas is reaching the animal, it makes economic sense to plan vaccination campaigns at a time of year when there will be maximum uptake, ideally providing vaccinations for multiple species or diseases at the same time.

Smallholder pigs and poultry present a different challenge. They may be more accessible, but their population dynamics mean that consistently good protection can only be achieved by vaccinating several times a year. For poultry, too, the cost of vaccination may be a sizeable proportion of the value of the bird. Better protection rates may be achieved if vaccines are made available in local shops in a form adapted for farmer use, provided that farmers are willing to buy it. This approach may involve reducing the cost per dose, providing vaccines that can be combined with other vaccines, selling a vaccine that is less attractive to farmers in a

'two-for-one' bundle with a more attractive vaccine or similar marketing ploys. Much greater attention should be given to market research as a tool for planning vaccination strategies, including promoting adequate access to vaccines and cost-sharing by producers.

DISEASE-FREE ZONES AND COMMODITY-BASED TRADE

Disease-free zones are a traditional approach to developing an export market from a country where a particular trade-restricting TAD is endemic. Only livestock originating from the part of the country designated as the free zone are eligible for export. They are separated from those in the infected area by a buffer or surveillance zone with very limited and strictly controlled movement of livestock and livestock products into or through the free zone.

From the perspective of an importing country, this is a reasonable measure to protect its livestock population from diseases

“Disease-free zones are classic approach to developing an export market from a country where a particular trade-restricting TAD is endemic”

that, if imported, may be very costly to control. For the exporting government and exporters from the free zone, it represents part of the cost of producing for global markets. For farmers outside the free zone, this measure can represent a high opportunity cost if it excludes them, for example, from dry season grazing within the free zone, or from passing through the free zone with livestock to reach local markets on the other side, or from bringing animals or livestock products as gifts to relatives within the free zone.

The majority of exported product tends to come from large-scale commercial producers who are able to produce animals of the size and quality required. Smallholders and pastoralists suffer the disadvantages of a disease-free zone but benefit less often from the export opportunities it offers and, therefore, have little incentive to comply with the movement restrictions it imposes. One of the possible alternatives to zoning is commodity-based trade. Another is compartmentalization, a concept defined by the World Organisation of Animal Health

(OIE) that makes it possible for a value chain rather than a geographic area to be certified as disease free, and has attracted interest from large intensive swine or poultry production companies.

Commodity-based trade fulfils requirements from the World Trade Organization (WTO) to reach acceptable levels of risk for the international trade of animal products. It allows export of products originating from a livestock population that is not disease free, provided that they have been processed in a way that renders the products of negligible risk.

For example, beef or pork for export under a commodity-based trade agreement would come from animals that had been kept in a disease-free farm or quarantine station for a defined period of time and had been slaughtered in an export-certified slaughterhouse. The meat would then be matured in a chiller, deboned and deglanded, and hygienically packed. For smallholder farmers this approach has the advantage that those who do not wish to export need not bear the costs of accessing export markets. Instead, they can focus on local markets while larger commercial farms might export much of their production. In practice, however, commodity-based trade has been adopted very selectively. Honey- and heat-treated, tinned livestock products have been exported as negligible-risk commodities, but there has been a considerable reluctance in disease-free countries to accept frozen beef from areas that are not disease free, even when it complies with all OIE recommendations to render it a negligible-risk product. Commodity-based trade does not automatically provide access to international markets as exporting countries must meet requirements for quality and cost, but it does offer the potential to pursue export options with less jeopardy to the livelihoods of livestock keepers who do not export. TAD control that prioritized the interests of smallholders would place more emphasis on this approach.

CONCLUSION

In conclusion, reviewing strategies for TAD prevention and control from an economic perspective helps us to weigh the merits of alternative approaches as they affect livestock keepers. The use of economic and livelihood analysis when planning makes it more likely that prevention and control strategies will be adapted to local conditions, accepted by farmers and will achieve their stated goal of reducing economic losses to smallholders and pastoralists. 360



PERSPECTIVES

Avian influenza A(H7N9) surveillance for uninfected countries in Southeast Asia and South Asia

Contributors: Carlene Trevennec (FAO), Astrid Tripodi (FAO), Sophie Von Dobschuetz (FAO)

A novel avian influenza strain A(H7N9) arising in poultry and capable of causing severe disease in humans emerged as a serious zoonotic disease with pandemic potential in eastern China when human cases of the influenza were first detected in and around Shanghai in March 2013. As of 22 April 2014, the detection of the virus in poultry and/or humans has extended to 13 Chinese provinces (Anhui, Jiangxi, Henan, Hunan, Fujian, Jiangsu, Zhejiang, Guangdong, Guangxi, Guizhou, Shandong, Hebei and Jilin), two municipalities (Shanghai and Beijing), Hong Kong SAR, Macao SAR and Taiwan Province of China. In addition, one tourist from China who became sick before travelling tested positive in Malaysia. Serological evidence of H7 circulation has been found in five additional provinces (Heilongjiang, Hubei, Sichuan, Qinghai and Ningxia).

Domestic poultry appear to be the main host of this virus, although the exact reservoir species and production sectors at higher risk of virus circulation have not yet been fully identified. Large numbers of animals were tested in China with the virus detected in only a few poultry and environmental samples collected all along the poultry supply chain and predominantly from live bird markets (LBMs), although information on the nature of the farms tested is not available. In China, the detection of the virus has relied on polymerase chain reaction (PCR) screening at provincial level followed by confirmation via egg-based virus isolation at national level. Avian influenza A(H7N9) has been difficult to detect after control measures were implemented in markets and the timely response and effective risk management by China resulted in an initial rapid decrease of human cases mid-2013. However, starting from December 2013, the number of human cases has been rising again, with the number of reports in early 2014 already exceeding those of 2013. Surveillance has been conducted in neighbouring countries, and up to now no H7N9 virus has been detected.

A major challenge for devising a surveillance strategy for avian influenza A(H7N9) is its 'silent' infection in birds: this

low pathogenic avian influenza (LPAI) virus produces no or very limited clinical signs in infected birds. This lack of presentation of the disease increases the risk of undetected incursion and spread of the virus in the animal population as well as exposure of humans. Given the continuous circulation of H7N9 in China and the continued threat of a possible introduction into neighbouring countries, a robust short-term risk-based surveillance is needed to detect virus presence early and in order to rapidly respond to incursion into previously unaffected areas. Importantly, early detection may prevent the establishment of the virus in poultry production systems in currently uninfected areas, and so avoid spillover infections in humans.

Risk-based surveillance strategies are designed according to levels of priority for surveillance, which are related to the likelihood of virus incursion. Based on existing knowledge of avian influenza epidemiology and the history of H5N1 highly pathogenic avian influenza (HPAI), two main criteria have been identified to determine the level of priority: (i)

shared borders with infected areas or countries and (ii) evidence of poultry trade with infected areas or countries. Thus, uninfected countries/areas are defined into three categories: low, moderate and high priority for surveillance. Surveillance strategies (Figure 1), efforts and investment will be adapted accordingly.

Due to the absence of clinical signs in poultry infected with influenza A(H7N9), active surveillance is required to determine the presence or absence of this virus from LBMs and poultry holdings. The surveillance strategy relies on longitudinal surveillance through repeated sample collection rounds. The higher the sampling frequency and number of samples tested and the shorter the interval between sampling, the greater the likelihood of earlier detection. However, countries will need to adapt the frequency of sampling rounds according to their capacities and available resources.

Given the very low detection rates of influenza A(H7N9) in poultry, according to official results provided by the Chinese animal health authorities during the two waves of infection indicated by human

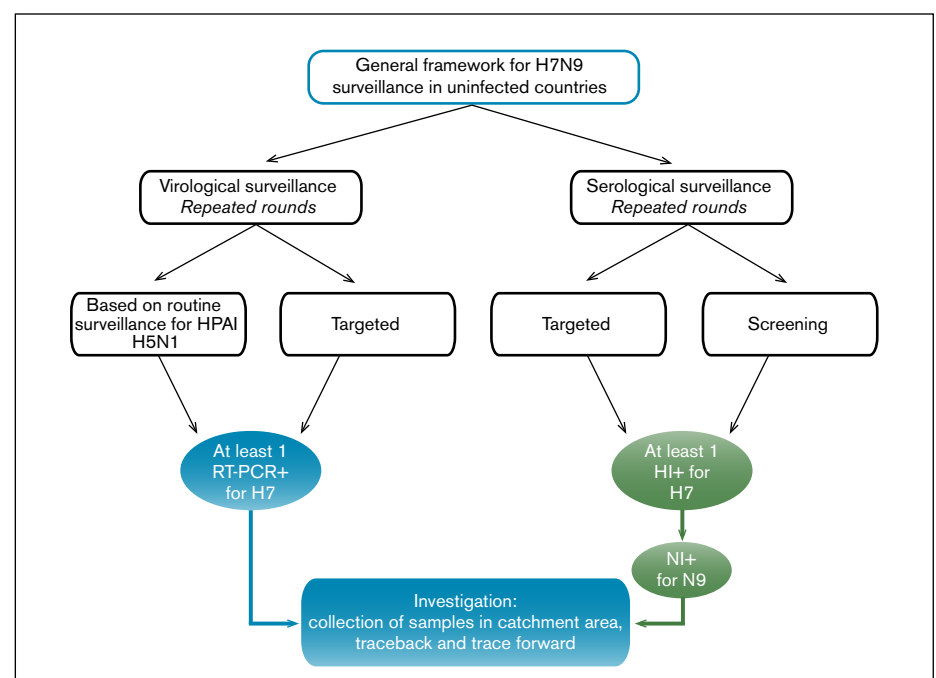


Figure 1: H7N9 surveillance activities suggested in uninfected countries



Roosters for sale at the local market

cases, large numbers of virological samples will be required for the detection of a H7N9 incursion at the early stage when the expected prevalence is low. Thus, it is recommended that a targeted virological surveillance be conducted on at-risk sites where avian influenza viruses are likely to spread and amplify, including: (i) market chain sites gathering imported birds from infected areas or countries; (ii) poultry production systems linked to affected areas or countries; (iii) high-risk poultry production zones or compartments; and (iv) high-risk poultry species. Depending on country-specific features, ports of entry can be LBMs, villages, farms or other types of gathering points that may not be along the border but may have direct traffic of poultry from infected areas or countries. The identification of such sites should be done through a cross-border market chain analysis. Though a lower priority, virus surveillance within the country in other LBMs or gathering points where influenza viruses are amplified and maintained is also recommended. The production type to target will vary with the country. Both imported poultry (i.e. live spent hens and spent quails as well as live commercial broilers) and local native poultry from the commercial sector are considered higher risk and should be tested. Considering both experimental data and field results, chicken and quail are the priority species to be targeted.

For those countries in the South and Southeast Asia regions that have no vaccination of poultry against H7 in place, the detection of H7-seropositive poultry may suggest an exposure to the H7N9 virus and should be followed up by the neuraminidase inhibition test for N9. In addition to virological surveillance, serological screening is therefore highly recommended for scanning purposes.

Seroconversion generally occurs less than two weeks after exposure. It should be noted, however, that serology cannot differentiate between recent or long-standing exposure unless the levels of paired serum antibodies are compared at least three weeks apart. As antibodies remain detectable after infection has been cleared, serological tests provide: (i) baseline exposure rates and (ii) historical evidence of previous virus exposure in the population. Serological testing on imported poultry populations can aid in identifying high priority areas, markets and border points of likely virus incursion. Good locations for serological screening are markets with slaughter facilities and poultry slaughterhouses. LBMs, gathering points and slaughterhouses offer the advantage of covering large geographical areas with birds coming from various origins, although vendor reluctance to have live birds sampled before sale is a constraint. Since the described risk-based surveillance approach rarely targets the egg production sector, layer farms can also

be randomly selected for serology. Where no slaughter facilities are accessible and if resources are sufficient, broiler farms should also be sampled. However, the priority for most at-risk countries will be to concentrate on points of entry.

Where existing surveillance strategies can be adapted and to avoid duplication of sampling activities, it is recommended that chicken samples collected for routine surveillance of H5N1 HPAI are also tested for H7N9. Though a lower priority, H7N9 testing of duck samples may allow early detection of potential spillover to domestic duck populations.

National animal health authorities may adapt the guidelines according to their

“ Due to the absence of clinical signs in poultry, active risk-based surveillance is required for H7N9 detection ”

country's level of H7N9 incursion risk, the specific features of the area targeted, already ongoing surveillance for other poultry diseases and national surveillance capacities. The detection of at least one positive result from serological or virological testing should lead to further investigation along the market chain by systematic tracing of poultry movements.

Management of cross-border movement of infection is best achieved by all of the market chain approaches and by the elimination of informal channels of trade, as far as possible. In the long term, regional disease risk management would be facilitated by more integrated approaches to the poultry supply chains with at-source measures being included in disease risk mitigation strategies. ³⁶⁰

For further information which addresses the avian influenza A(H7N9) emergency

- *Surveillance guidelines for uninfected countries in Southeast Asia and South Asia* (available at www.fao.org/docrep/019/i3601e/i3601e.pdf);
- *Guidelines for emergency risk-based surveillance* (available at www.fao.org/docrep/018/aq244e/aq244e.pdf);
- *Risk management along the food chain* (available at www.fao.org/docrep/018/aq241e/aq241e.pdf);
- *Laboratory protocols and algorithms* (available at www.fao.org/docrep/018/aq251e/aq251e.pdf).

ADVANCES

Towards the institutionalization of regional animal health networks in West and Central Africa

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In 2013, in Bamako, Mali a meeting was held to transfer the coordination of animal health networks in West and Central Africa to regional coordinators. Networks involved included the Regional Network of National Epidemiological Surveillance Systems for highly pathogenic avian influenza (HPAI) and Other Priority Animal Diseases In West and Central Africa (RESEPI) and the West and Central Africa Veterinary Laboratory Network for Avian Influenza and other Transboundary Diseases (RESOLAB).

Since 2005, the Food and Agricultural Organization of the United Nations (FAO) regional Emergency Centre for Transboundary Animal Disease Operations (ECTAD) unit for West Africa and Central Africa based in Bamako has been providing support on the prevention and control of HPAI and other transboundary animal diseases (TADs), including building capacities of national veterinary services in the region in terms of disease preparedness, early warning, response and monitoring. FAO ECTAD Bamako has provided assistance to strengthen veterinary

service capacities through organization of training activities in epidemiology and laboratory diagnosis, provision of epidemiological and laboratory equipment and reagents, support for regional experts to participate in international conferences, the organization of annual regional coordination meetings and the improvement of disease information sharing between countries.

This broad range of activities was mainly carried out through specialized regional networks of which the most active to date are the laboratory network (RESOLAB) and the epidemiological surveillance network (RESEPI). The networks have also fostered technical collaboration between the epidemiological surveillance networks and the laboratory networks, including strengthening the links between the regional support laboratories. It is now clearly established that both networks gather animal health experts who contribute effectively to the preparation and the implementation of regional control strategies for major animal diseases including HPAI, peste des petits

ruminants (PPR), African swine fever (ASF), rabies and foot-and-mouth disease (FMD) in the region.

FAO ECTAD Bamako has been coordinating the two networks since their establishment by developing a multidisciplinary platform and a functional framework that have facilitated the prevention and control of TADs in West and Central Africa. For instance, the FAO ECTAD Bamako Web site (www.fao-ectad-bamako.org) is an interactive and user-friendly tool that provides visitors with important information.¹

Despite these inputs and achievements, challenges remain for an effective and sustainable ownership of the networks by the Member States and regional economic communities (RECs) to which they belong, namely the Economic Community of West African States (ECOWAS) for West Africa and the Economic Community of African Central States (ECCAS) for Central Africa. Overcoming these challenges will depend on the capacity of RESOLAB and RESEPI members to take over the coordination of



Participants at the Regional Handover Meeting for the Transfer of the Coordination of Animal Health Networks of West and Central Africa to Regional Coordinators, Bamako, Mali

¹ The Web site has had almost 1.3 million visitors to date.

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the networks and for these networks to be anchored within the RECs.

During the last RESEPI and RESOLAB coordination workshops, held respectively from 10–13 September 2012 in Accra in Ghana and from 3–7 December 2012 in Dakar in Senegal, it was agreed that there was the need to speed up the transfer of coordination of the networks from FAO to a regional mechanism. The main conclusions of these two meetings included:

- the establishment of a RESOLAB/RESEPI network for each REC (RESOLAB/RESEPI-WA for West Africa and RESOLAB/RESEPI-CA Central Africa)² in order to facilitate their institutional anchorage within ECOWAS and ECCAS;
- the appointment of regional coordinators for each network.

The meeting held in Bamako, Mali and organized by FAO and the United States Department of Agriculture (USDA) from 12–14 November 2013 aimed to identify institutional arrangements and operational modalities for the transfer of the RESEPI and RESOLAB network coordination to regional coordinators. The meeting was attended by 21 participants composed of RESEPI and RESOLAB regional coordinators from seven countries: Cameroon, Chad, Gabon, Ghana, Mali, Nigeria and Senegal as well as the director of the Laboratoire National d'Elevage et de Recherches Vétérinaires

de Dakar-Senegal (a RESOLAB regional support laboratory), and the directors of the Central Veterinary Laboratory and the National Veterinary Services of Mali. Representatives of FAO ECTAD Bamako, the African Union Interafrican Bureau for Animal Resources (AU-IBAR), the Economic Commission on Cattle, Meat and Fish Resources (CEBEVIRHA) which belongs to the Central African Economic Monetary Community (CEMAC), the Interstate School of Veterinary Medicine and Sciences of Dakar (EISMV), the World Organisation of Animal Health (OIE), the United States Agency for International Development (USAID) and USDA also took part in the meeting, which was organized under the auspices of the Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs).

Participants gave presentations on and reviewed the architecture and the functioning of Animal Health networks in sub-Saharan Africa, the terms of reference of regional coordinators, and the opportunities and funding mechanisms for each REC. They prepared a multiyear work plan for each region and a roadmap in view of the institutionalization and the sustainability of the networks, including action to be taken at country and regional levels. The need for a comprehensive assessment of the networks was highlighted and its conclusion will contribute to the institutionalization and funding of the networks.

Representatives from Central Africa announced the next establishment of an animal health centre within the CEBEVIRHA in N'Djamena (Chad). The centre will host the coordination activities of the RESOLAB-CA and RESEPI-CA networks.

“ RESOLAB and RESEPI networks gather animal health experts who contribute effectively to the preparation and the implementation of regional control strategies for major animal diseases in the region ”

At the end of the meeting, participants endorsed a final communiqué (available at www.fao-ectad-bamako.org/fr/Final-Communique-Regional-meeting?lang=en) with 18 recommendations addressed to network regional coordinators, countries, RECs, donors, and FAO and its partners within the GF-TADs. ³⁶⁰



©FAO/Giulio Napolitano

Ethiopia: a training course of facilitators for the establishment of Pastoral Field Schools (PFS) being held under the shade of a tree

² RESOLAB/RESEPI networks are composed of Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, the Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, the Niger, Nigeria, Senegal, Sierra Leone and Togo for West Africa; and Cameroon, the Central African Republic, Chad, the Congo, the Democratic Republic of the Congo, Gabon, Equatorial Guinea and Sao Tome and Principe for Central Africa.



ADVANCES

FAO supports animal health networks in Eastern Africa

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In order for the Eastern Africa region to coordinate animal disease control efforts, epidemiology and laboratory networks were established in the years 2009 and 2008, respectively with the objective of improving transparency, collaboration and communication among the participating countries. In this region, transboundary animal diseases (TADs) are the major animal health constraints that affect food security, livestock producers' livelihoods and the export trade. Therefore, it is important to cooperate on relieving these major livelihood impediments. Two meetings were held in 2013 to begin the coordination process:

1. REGIONAL MEETING OF CHIEF VETERINARY OFFICERS AND PARTNERS FROM THE HEALTH AND WILDLIFE INSTITUTIONS IN EASTERN AFRICA ON ONE HEALTH ISSUES AND REGIONAL NETWORKS (24–25 JUNE 2013, ADDIS ABABA, ETHIOPIA)

The concept for the Eastern Africa Regional Animal Health Network (RAHN) was mooted in a meeting that was held in 2010 in Zanzibar. This initial meeting was organized by the Food and Agriculture Organization of the United Nations's Emergency Centre for Transboundary Animal Diseases (FAO-ECTAD) with participation of the Chief Veterinary Officers (CVOs), FAO, African Union Interafrican Bureau for Animal Resources (AU-IBAR), World Organisation for Animal Health (OIE), United States Agency for International Development (USAID) Emerging Pandemic Threats (EPT), Istituto Zooprofilattico Sperimentale delle Venezie (IZSVe)-Padova, South African Centre for Infectious Disease Surveillance (SACIDS) and regional epidemiology and laboratory focal points. The CVOs who attended were from Burundi, the Comoros, the Democratic Republic of the Congo, Djibouti, Ethiopia, Kenya, Rwanda, Somalia, the Sudan, the United Republic of Tanzania, Uganda and Zanzibar.

This second Eastern Africa meeting on One Health issues and regional networks organized by FAO for CVOs and partners was held at the FAO Subregional Office for Eastern Africa in Addis Ababa. Representatives from eight countries¹ and participants representing the National Animal Health Diagnostic and Investigation Center (NAHDIC), the African Union Interafrican Bureau for Animal Resources (AU-IBAR), the African Union Panafrikan Veterinary Vaccine Centre (AU-PANVAC), the Intergovernmental Authority on Development (IGAD), the International Livestock Research Institute (ILRI), OIE and FAO (SFE, FAO Ethiopia, FAO Somalia, FAO South Sudan, FAO Uganda, ECTAD Nairobi) attended the meeting. The meeting was organized within the framework of the European Commission-funded programme entitled Reinforcing Veterinary Governance (VET GOV) in Africa (OSRO/RAF/118/EC) and was officially opened by Dr Modibo Traore, FAO subregional coordinator for Eastern Africa and FAO representative in Ethiopia, the African Union (AU) and the United Nations Economic Commission for Africa (UNECA).

The objectives of the meeting were to: provide an update about the new influenza strain A(H7N9) virus; discuss strategy and actions to be initiated in the subregion to address this emerging virus; launch RAHN; provide an update on the FAO regional Strategic Framework and provide a platform for different partners to update future activities. In addition, the meeting also reviewed the outcomes of the previous CVO meetings held in Zanzibar, Mombasa, Nairobi and Kampala on networks and subnetworks as well as the peste des petits ruminants (PPR) strategy for Eastern Africa. The following outcomes arose from the presentations, discussions and exercises.

It was agreed to establish RAHN with the coordinator responsible for the general management of the network to be appointed under the approved terms of reference. The

CVO of Kenya was nominated as the first coordinator for this network. Considering the importance of One Health, countries were encouraged to establish a One Health coordination committee to include all relevant One Health stakeholders. Also, key regional institutions and international organizations were urged to support the One Health initiative with appropriate actions. Regarding the low pathogenic avian influenza A H7N9 that is unusually dangerous to humans, it was recommended that this emerging issue be addressed using a One Health approach

“ Countries were encouraged to establish a One Health coordination committee to include all relevant One Health stakeholders ”

and that FAO and AU-IBAR collaborate with the participating countries to conduct a risk assessment for virus incursion. Countries were urged to revitalize their intersectoral preparedness plans and procedures developed during the highly pathogenic avian influenza (HPAI) crisis and to develop surveillance and response plans based on the risk assessment.

The meeting supported the adoption of ongoing initiatives on PPR prevention and control, developed jointly by FAO, AU-IBAR, AU-PANVAC and IGAD. Participating countries were urged to update the IGAD PPR coordination committee on national activities contributing to the regional initiative. In order to ensure ownership and sustainability of the different initiatives and their funding through the national budgets,

¹ The Democratic Republic of the Congo, Ethiopia, Kenya, South Sudan, the Sudan, Uganda and United Republic of Tanzania.

it was acknowledged that briefs and other advocacy documents were required to sensitize the relevant national authorities to these needs. It was suggested that FAO, OIE and AU-IBAR assist countries to prepare the briefs.

2. JOINT EASTERN AFRICA EPIDEMIOLOGY AND LABORATORY ANNUAL COORDINATION MEETING

The previous Joint (4th) Eastern Africa epidemiology and laboratory annual coordination meeting was held in Bujumbura, Burundi from 16–19 July 2013 with participation from ten countries (Burundi, the Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Kenya, South Sudan, the Sudan, United Republic of Tanzania and Uganda). Other institutional participants were from AU-IBAR, IGAD, IZSve-Padova, AU-PANVAC, OIE, FAO-Burundi and the Eastern Africa foot-and-mouth disease (FMD) and African swine fever (ASF) subnetworks. The meeting was organized within the framework of the implementation of the European Commission-funded programme, VET GOV in Africa and the USAID-funded project IDENTIFY. The meeting was officially opened by Mr Mwikomo Boniface, Assistant Minister of Agriculture and Livestock of Burundi.

The meeting agenda included plenary sessions, individual country presentations, partner and collaborator presentations, and group work that were all done separately by the two networks. In the resulting discussions, it was agreed that the CVOs

(through the newly formed CVOs network) in collaboration with the regional economic communities (RECs) initiate mechanisms to institutionalize the networks at the national and regional levels to achieve improved operationalization and sustainability. Network focal persons and coordinators were advised to intensify lobbying and advocacy to the governments and to apply alternative appropriate networking methods, including use of mobile phones and e-mail to communicate relevant surveillance issues. In addition, the meeting tasked the regional coordinators of the Eastern Africa Region Epidemiology Network (EAREN) and the Eastern Africa Region Laboratory Network (EARLN) to develop proposals in collaboration with partners to mobilize funds to support network activities. Particularly urgent were the needs to map ongoing surveillance-related projects and to establish resource flow linkages. It was also suggested that regional epidemiology and laboratory network coordinators should be appointed for a period of two years with clear terms of reference. An early task for these coordinators was to develop a position paper to be presented to the RECs through the CVOs and RAHN. Key points would be to improve information sharing on all activities related to epidemics-surveillance, training and other relevant activities amongst all stakeholders. The two networks have compiled data on brucellosis and FMD and it was suggested that this data could be compiled into a regional summary document that would be useful for further programme planning and monitoring.

The ASF working group plan was regarded as a good model to adopt and the two key disease subnetworks (ASF and FMD) were encouraged to implement their action plans integral to RAHN. It was suggested that district veterinary officers, veterinary paraprofessionals and private animal health service providers be sensitized to the need to report through appropriate channels, and that changes to policy regarding surveillance and response be communicated. There were several resolutions regarding laboratories. Firstly, it was decided that FAO should finalize the draft guidelines for laboratory policy-making and explore opportunities to pilot the guidelines in a few countries through the VET GOV programme. Secondly, NAHDIC was to advocate and strengthen its linkage with the national labs in the region in order to provide the expected service. It was to continue to participate in proficiency tests (PTs) organized by international reference laboratories in order for it to organize interlaboratory competency testing (ring trials) for the national laboratories. In this regard, all countries were urged to participate in arranged international PTs and laboratories were to endeavour to attain an international standard on quality management.

Following the successful process of developing and signing of a cross-border memorandum of understanding (MOU) between Kenya and Uganda with support from FAO and IGAD, and subsequent follow-up activities, the meeting recommended that the model be replicated in other cross-border areas, and that the two networks participate in the programming and implementation of the cross-border activities. ³⁶⁰



ADVANCES

FAO supports access to sequencing services for animal health laboratories

Contributors: Gwen Dauphin (FAO), Charles Lamien (FAO/IAEA joint division), Filip Claes (FAO)

Gene sequencing has become an indispensable method for pathogen identification and characterization (i.e. typing/subtyping), and for the detection of specific molecular markers. Sequencing activities and submissions to GenBank have been increasing exponentially over the last 25 years. Currently, almost 400 million sequences are published in GenBank, while around 5 million sequences were published in 2000.

African laboratories often depend on international reference laboratories for pathogen sequencing services, and this may lead to delays in sequence information being available, losses in information related to the submitted samples and sometimes lack of ownership of significant scientific data. For these reasons, the Food and Agricultural Organization of the United Nations (FAO) wants to offer countries more autonomy on animal pathogen characterization and provide incentives to national laboratories to increase the number of characterized animal pathogens and to publish more information on these pathogens. Additionally, the availability of more genetic data will facilitate the design of better assays for routine detection of these pathogens.

It is now very common for scientists in the developed world, as well as the developing world, to delegate their routine sequencing tasks to dedicated companies specialized in this technology. It allows quality data to be readily obtained for a reasonable price and avoids the purchase and maintenance of expensive equipment; a serious limiting factor in some places due to lack of local technical support services, and training and support of staff to the required level of expertise.

The general objective of this FAO initiative is to increase scientific knowledge on animal pathogen genetics. The immediate objective is to enable laboratories to get direct access to reliable sequencing services to generate quality genetic data. The initiative

began with FAO selecting ten African pilot countries known to possess good capacities in molecular biology testing. Three FAO Reference Centres for various diseases that currently collaborate with African countries and have complementary in-house disease expertise, were also selected as technical partners: International Cooperation Centre of Agricultural Research for Development (CIRAD) (France), Istituto Zooprofilattico Sperimentale delle Venezie (IZSVe) (Italy) and Veterinary and Agrochemical Research Centre (VAR) (Belgium). FAO EMPRES lab unit and the joint FAO/IAEA Division collaborated in the design, technical specification, training, tendering and procurement activities necessary to build the programme.

Direct support has been provided sequentially to countries through:

CAPACITY BUILDING

- Epidemiologists and quality assurance managers of vaccine manufacturers were trained in the principles of molecular epidemiology and the use of sequencing information for broadened epidemiological analysis (Nairobi, September 2013 – see EMPRES Bulletin¹). Trainers included FAO, CIRAD and the African Union Pan African Veterinary Vaccine Centre (AU-PANVAC).
- Laboratory staff was trained in how to prepare quality polymerase chain reaction (PCR) products for the sequencing work and on how to analyse sequences with bioinformatics tools and databases (Vienna, December 2012). The principles of sequencing and molecular epidemiology of a selection of animal diseases were also presented.



African countries benefiting from the initiative for direct access to sequencing services

¹ EMPRES Transboundary Animal Diseases Bulletin No. 41–2012. Workshop in Nairobi (Kenya) on the principles of molecular epidemiology (page 25); available at www.fao.org/docrep/017/i2910e/i2910e.pdf.

Box 1: List of beneficiary laboratories in Africa

- Laboratoire National d' Elevage et de Recherches Vétérinaires (LNERV), Senegal
- National Animal Health Diagnostic and Investigation Center (NAHDIC), Ethiopia
- Botswana National Veterinary Laboratory (BNVL), Botswana
- National Veterinary Research Institute (NVRI), Nigeria
- Laboratoire Vétérinaire de Kinshasa (LABOVETKIN), the Democratic Republic of the Congo
- Central Veterinary Laboratory (CVL), United Republic of Tanzania
- National Veterinary Laboratory (LANAVET), Cameroon
- Laboratoire Central Vétérinaire (LCV), Mali
- Central Veterinary Laboratories (CVL), Kenya
- National Animal Disease Diagnosis and Epidemiology Centre (NADDEC), Uganda

During both training workshops, the benefits of generating and publishing pathogen sequence information, and of effectively linking laboratory and field epidemiological data were emphasized. To further develop the practical dimensions of the programme, participants of both workshops were requested to list their priority diseases and an estimate of the tentative number of sequences likely to be required each year.

- E-learning modules on bioinformatics for animal viral pathogens were developed,² publicized and made available through open access on the Internet.

PROVISION OF REAGENTS AND EQUIPMENT

- The ten pilot national laboratories were provided with equipment and reagents for PCR testing and preparation of PCR products for sequencing.

PROVISION OF ACCESS TO SEQUENCING SERVICES AND PROTOCOLS

- In November 2013, FAO signed a contract with a commercial sequencing services provider selected after a tendering process based on detailed specifications. This contract can be applied to any country supported by FAO.
- A handbook was developed with validated protocols for identification, characterization and molecular typing of a list of selected key diseases (Table 1). These protocols were standardized with a unique and harmonized set of commercial diagnostic kits to allow laboratories to test for the key diseases with a standardized selection

of PCR kits and reagents. The three FAO Reference Centres conducted a ring trial among themselves using standardized PCR protocols with the same commercial kits for one pathogen to validate the approach.

Partners for these protocol validations and ring trials were the joint FAO/IAEA Division (Austria), CIRAD (France), IZSve (Italy) and VAR (Belgium). The handbook will evolve over time with the inclusion of additional validated protocols.

Future support will include:

- establishing a moderator platform by FAO in close collaboration with the selected sequencing company;
- exploring good shipment conditions (stability of PCR products for standard shipment) and primer selection;
- developing mentorship between beneficiary laboratories and expert institutions (FAO Reference Centres)

to support the work to be carried out on bioinformatics and phylogeny; it is envisaged that pathogens of scientific interest will be shared with Reference Centres for further analysis and these collaborations could generate potential future technical projects;

- facilitating effective information sharing between laboratories and epidemiology units;
- advocacy for the upload of sequences to appropriate databases within two months of their generation;
- supporting publication of scientific information on molecular epidemiology, disease ecology and disease control;
- providing easy access to the supply of primers and probes for molecular diagnostic work;
- expanding activities to other beneficiary countries.

The remaining challenges include the use of bioinformatic tools for phylogenetic analyses in laboratories that are new users of sequence information, and the cost and practicalities of sample shipment. It is expected that the mentorship with Reference Centres and sustained training in bioinformatics are means to build these capacities. To ensure a cost-effective shipment of samples to the sequencing service provider, the joint FAO/IAEA Division is currently evaluating various options to improve the stability of PCR products for shipment with conventional couriers.

Possible impact indicators for monitoring the programme include the number of samples sent for PCR/sequencing from supported laboratories, the number of sequences in the public domain for priority animal pathogens arising and the accomplishments related to outbreak discovery/control/prevention that are linked to sequence availability. ³⁶⁰

Table 1: List of diseases included in the initiative

Viral diseases	Bacterial diseases	Parasitic diseases
Foot-and-mouth disease (FMD)	Anthrax	Toxoplasmosis
Avian Influenza (H5&H7)	Brucellosis	Trypanosomosis
Newcastle disease	Tuberculosis	
Peste des petits ruminants (PPR)	Leptospirosis	
Rift Valley fever (RVF)	Contagious bovine pleuropneumonia (CBPP)	
Rabies	Contagious caprine pleuropneumonia (CCPP)	
African swine fever (ASF)		
Lumpy skin disease and sheep/goat pox		

² Available at www.fao.org/ag/againfo/programmes/en/empres/news_010313b.html.

ADVANCES

FAO coordinates strategies to respond to the resurgence of contagious bovine pleuropneumonia in Africa

Contributor: Ahmed El Idrissi (FAO)

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Contagious bovine pleuropneumonia (CBPP) is one of the most important livestock diseases within Africa affecting the livelihood and food supply of many livestock-dependent people. CBPP appeared to be under control, but after almost 20 years of respite there has been an alarming resurgence of the disease on the continent. Today, CBPP is regarded as the most serious infectious animal disease threatening cattle populations in Africa.

The impact of CBPP on beef, milk and crop production – the latter through the work of plough oxen – is devastating, and there are particular implications for food security within countries affected by the disease. CBPP has contributed to great economic losses and, therefore, to increased poverty levels in many parts of Africa.

To confront the challenge of the resurgence of CBPP, the Food and Agriculture Organization of the United Nations (FAO) assists affected countries in their efforts to contain disease outbreaks and prevent disease spread within the region. Recently, FAO organized two coordination meetings to promote regional cooperation and information sharing.

REGIONAL CONSULTATION ON CBPP IN AFRICA

FAO Regional Office for Africa, in close coordination with FAO's Animal Health Service (AGAH) and with the support of the regional office of the United States Department of Agriculture (USDA), organized a consultation to develop a **regionally coordinated strategy for the prevention and control of CBPP in Africa**. The Ministry of Livestock and Animal Production of Senegal hosted the regional consultation in Dakar from 19–21 November 2013. The consultation was organized under the umbrella of the Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) in Africa and constituted a follow-up of previous consultations, with the last one being held in November 2006.

Directors and representatives of veterinary services from 12 countries¹ attended the meeting in addition to representatives from the World Organisation for Animal Health (OIE), from FAO headquarters, and from FAO country offices across Africa. Other representatives were from the International Cooperation Centre of Agricultural Research for Development (CIRAD), the Central Veterinary Laboratory

Mali (CVL/Mali), L'Ecole Inter Etats des Sciences et Médecine Vétérinaires de Dakar (EISMV), the Global Alliance for Livestock Veterinary Medicines (GALVmed), the Institut Sénégalais des Recherches Agricoles (ISRA), the African Union Interafrican Bureau for Animal Resources (AU-IBAR), the African Union Pan African Veterinary Vaccine Centre (AU-PANVAC), the USDA regional office and livestock professional organizations.

The meeting was officially opened by Her Excellency Mrs Aminata Mbengue Ndiaye, Minister of Livestock and Animal Production of Senegal in the presence of Dr Vincent Martin, FAO representative in Senegal who was formally working with EMPRES from 1997 to 2013, the regional OIE representative for Africa, the representative of AU-IBAR and the regional representative of USDA in West Africa.

The objectives of the regional consultation were to: (i) review current knowledge on disease prevention and control; (ii) provide an update on CBPP and control measures in the participating countries; and (iii) identify the key elements for a collective strategy for sustainable control of CBPP in Africa using the knowledge and experience of countries.



Regional consultation to develop regional strategy for CBPP prevention and control in Africa (Dakar, Senegal, 19–21 November 2013)

©FAO

¹ Benin, Botswana, Burkina Faso, Cameroon, Chad, the Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Mali, Mauritania, Nigeria, Uganda, Senegal, Sierra Leone and United Republic of Tanzania.



CBPP cross-border meeting between the Gambia, Senegal and neighbouring countries (Dakar, Senegal, 22 November 2013)

During two days of working sessions the participants reviewed the latest developments in CBPP diagnostics and prophylactic tools and discussed different prevention and control strategies in different epidemiological settings. The participants debated the possibility of developing a progressive approach to CBPP control based on a realistic assessment of the disease's impact and of the control options available, similar to the progressive control pathway for foot-and-mouth disease (PCP-FMD). Such a pathway would support countries in attaining higher levels of disease control in the vulnerable sectors. It would also guide them at a national level through achievable steps in the progression toward increased and sustainable disease control. The key elements for CBPP control were identified in three epidemiologically distinct regions (i.e. Sahel, coastal west Africa and eastern and southern Africa) taking into account technical, institutional and financial limitations.

The participants agreed on a number of recommendations, which focused on some of the below-mentioned areas:

- harmonizing national and regional strategies for the progressive control of CBPP and for the coordination of actions at the subregional level;
- strengthening cross-border cooperation through animal health agreements between countries;
- mobilizing funding for research to develop improved vaccines, diagnostics and antibiotics for strategic treatment schemes;
- conducting economic studies on the impact of the disease and cost-benefit analyses of CBPP control programmes;
- ensuring regional economic communities embrace CBPP control initiatives in order to ensure sustainability;

- strengthening the capacity and governance of veterinary services using the OIE Performance of Veterinary Services (PVS) tool;
- reinforcing capacity of veterinary and veterinary paraprofessionals through appropriate training and continuing education programmes;
- developing advocacy initiatives and documents on the socio-economic impact of the disease and the benefits of its control;
- fostering public-private partnerships in the planning and implementation of animal disease policies and strategies;
- lobbying national and regional decision-making bodies with action plans in order to request funds to manage CBPP; and
- seeking support and coordination from international (e.g. FAO and OIE) and African organizations (e.g. AU-IBAR and AU-PANVAC).

CONTAGIOUS BOVINE PLEUROPNEUMONIA IN THE GAMBIA (TCP/GAM/3504 (E)) – CROSS-BORDER MEETING

Following the regional consultation, FAO organized a cross-border meeting on 22 November 2103 between the veterinary services of the Gambia, Guinea, Mali, Mauritania and Senegal as part of a technical cooperation project entitled **Emergency Assistance to Control CBPP Outbreak**, which started in early 2013. The funds for this project were mobilized by FAO when CBPP re-emerged in the Gambia in 2012 after 41 years of absence. Directors and representatives of veterinary services from the five countries attended as well as participants representing FAO and USDA.

The objective of the meeting was to provide a platform for the representatives of the participating countries to agree on coordinated strategies to monitor and control CBPP within the subregion and to strengthen communication between the national veterinary services.

The meeting was chaired by Ms Ada Gaye, Permanent Secretary of the Gambian Ministry of Agriculture and officially opened by Her Excellency Aminata Mbengue Ndiaye, Minister of Livestock and Animal Production of Senegal in the presence of Dr Vincent Martin, FAO representative in Senegal.

Discussions during the meeting resulted in important commitments from the participating countries, which included:

- prioritizing the prevention and control of CBPP in their countries;
- harmonizing and adopting similar approaches to the containment of the current CBPP epidemic in countries within the subregion;
- increasing vaccination coverage to reduce prevalence to levels where alternate strategies become applicable;
- ensuring the use of quality-assured CBPP vaccines within the subregion;
- intensifying surveillance of CBPP to monitor the outbreaks and report new cases;
- improving the management of cross-border livestock movements through measures including issuance of vaccination certificates and movement permits, identification of vaccinated cattle and notification of third parties about the ongoing efforts to control CBPP.

At the end of the meeting the participants drafted a final communiqué with main recommendations agreed upon. 360



ADVANCES

Working towards the next generation of animal health surveillance tools: the RISKSUR project

Contributors: Dirk Pfeiffer (RVC), Jorge Pinto Ferreira (SAFOSO), Katharina Stärk (SAFOSO), Julio Pinto (FAO)

The RISKSUR research project is aimed at developing decision support tools for the design of cost-effective, risk-based animal health surveillance funded under the European Union's Seventh Framework Programme (FP7). The research is being undertaken using surveillance data from animal disease prevention and control programmes implemented in European countries.

The first decade of the twenty-first century was marked by several animal health events of global impact, including outbreaks of influenza H5N1, H1N1 and H7N9. The emergence and spread of these zoonotic diseases were concurrent with increasing globalization and intensification of animal production, in response to increased

demand for animal protein, particularly from emerging economies. Following the global financial crisis in 2007–2008, budgets for government surveillance activities had to be reduced due to widely adopted financial austerity policies. Given this situation, the effectiveness of surveillance has to be urgently improved so that we are able to deal with future disease outbreaks, since it is considered more a matter of when rather than if they will occur. One requirement for achieving improved protection of human health is more effective linking of human and animal health surveillance information consistent with the One Health approach. Given the wider scope of this approach, the RISKSUR research project will make its contribution towards cost-effective

“ One requirement for achieving improved protection of human health is more effective linking of human and animal health surveillance information consistent with the One Health approach ”



The RISKSUR team at the first annual meeting in autumn 2013 in Uppsala, Sweden



©FAO/Asim Hafeez

Dera Ghazi Khan, Pakistan - Flood victims buying and selling livestock at a local animal market. Because of animal feed shortages, loss of livestock and poor access because of flooding attendance and prices are lower than usual.

animal surveillance by utilizing novel scientific methodologies and integrating epidemiological approaches with socio-economic and qualitative methods.

The three-year project led by the Royal Veterinary College (RVC) started in November 2012, and involves a transdisciplinary consortium of 12 partners from 10 different countries with internationally recognized expertise in animal disease surveillance methodologies and economic evaluation. The consortium also has applied experience in delivery of surveillance programmes in a variety of socio-economic contexts from national and global perspectives as well as expertise in the translation of research into practical applications.

The research involves the development of a conceptual evaluation framework that examines the purpose of animal health surveillance from a holistic systems perspective, with a particular emphasis on economic aspects. The epidemiological surveillance methodologies are covered under three categories: 1) detection of exotic, new or re-emerging diseases; 2) demonstration of freedom from disease; and 3) prevalence estimation and case detection for endemic disease. The work under each of the topics will be integrated into a common epidemiological and economic evaluation framework. This framework will

then be translated into a set of practical surveillance decision support tools for policy-makers.

RISKSUR is organized in different work packages (WP). WP 1 will develop a conceptual generic framework for design of

“ The research involves the development of a conceptual evaluation framework that examines the purpose of animal health surveillance from a holistic systems perspective, with a particular emphasis on economic aspects ”

risk-based surveillance systems, including novel scientific methods. These methods will be developed for each of the above three surveillance categories or objectives in WPs 2 to 4. The results of these WPs

will be evaluated for single and multi-objective surveillance systems specifically in relation to their efficiency in WP 5. The transfer of knowledge and technology to key stakeholders from policy and industry is facilitated through the development of tools assisting the implementation of the systems under WP 6 as well as communication and training in WP 7. FAO is contributing to WP 5 (evaluation of epidemiological and economic effectiveness of surveillance systems), WP 6 (decision-making tools for implementing risk-based surveillance) and WP 7 (training, dissemination and communication).

The outputs from the RISKSUR research will integrate epidemiological with economic approaches and through the development of a common evaluation framework will, for the first time, allow their application to a wide range of animal diseases and surveillance goals. As an international organization and partner of RISKSUR, FAO is committed to adapt some of the tools developed for countries in Europe under RISKSUR to the socio-economic context of developing countries and to deliver specific training for veterinary services.

For additional information please visit www.fp7-risksur.eu, where it is possible to also subscribe to the project's newsletter and RSS feeds. For further information and queries, contact info@fp7-risksur.eu. 360



ADVANCES

The Global Platform for African swine fever and other important diseases of swine

Contributor: Daniel Beltrán-Alcrudo (FAO)

BACKGROUND

African swine fever (ASF) represents a severe threat to trade, livelihoods, and food security and nutrition. Able to cause up to 100 percent mortality in pigs, this viral disease can decimate a family's source of income, food and savings as well as cripple international trade. While a vaccine or treatments do not yet exist, effective prevention and control tools are available to help stop the spread of ASF, progressively controlling the disease in affected areas. Past efforts have shown that eradication is feasible, though it may pose many challenges (e.g. Spain and Portugal).

Over the past decade, the world has experienced an unprecedented upsurge of the occurrence of ASF. In Africa, the disease has spread into new areas, driven by the tremendous growth of the swine sector (with some countries more than doubling their pig populations in less than a decade) and the increased movement of people and products. In particular, the informal

movement of infected pork products has allowed the virus to jump across the globe, and the geographic range of ASF is now established beyond Africa, in the Caucasus and the Russian Federation. Any country with a substantial swine sector is at risk from an ASF introduction, as history has repeatedly shown. Prevention and control are further challenged by the lack of coordination around the globe of national and regional programmes and initiatives, as well as the complexities posed by the wide diversity of stakeholders involved.

From a global perspective, transboundary animal diseases (TADs) are controlled most effectively under international frameworks that can coordinate the activities of relevant stakeholders and provide a platform for knowledge exchange that leads to the development of common approaches to sustainable control. Successful examples of such frameworks are those platforms hosted by the Food and Agricultural Organization

of the United Nations (FAO) such as the Global Rinderpest Eradication Programme (GREP), the European Commission for the Control of Foot-and-Mouth Disease (EuFMD), and the Programme Against African Trypanosomiasis (PAAT).

“TADs are controlled most effectively under international frameworks that can coordinate the activities of relevant stakeholders and provide a platform for knowledge exchange”



Group photo at the launch of the Global Platform for African swine fever and other pig diseases at FAO headquarters

THE MEETING

To begin to meet the challenges to confront the global ASF situation, FAO took the initiative to establish an international Platform that coordinates different stakeholders with an active interest in this issue, namely development agencies, regional organizations, governments, research institutions, reference laboratories and the private sector. This Platform will act as a forum for exchange of information, decision-making, identification of priorities and, ultimately, coordination of international early warning, prevention and control efforts. To launch the process more broadly a two-and-a-half day meeting to discuss the creation of a Global Platform for ASF was organized from 5 to 7 November 2013 at FAO headquarters in Rome, with the generous support of the United States Department of Agriculture (USDA).

The objectives of the meeting were to: 1) present the Platform's concept; 2) clarify stakeholder expectations with regard to the Platform; 3) decide on the network's membership, structure, sustainability and governance; and 4) define the Platform's short- and medium-term scope of action.

In total, 52 participants representing 40 institutions were present (see Box 1),

originating from both affected and unaffected regions worldwide, i.e. Africa (10 participants), America (9), Asia (2) and Europe (18), plus international organizations (14).

The meeting was structured in two major blocks. The first day and a half detailed the background for the meeting and allowed the groups of stakeholders to present their concerns, priorities and challenges. An initial technical session – 'Setting the scene' – aimed to provide a general overview on ASF, including a success story on how it was controlled in the Iberian Peninsula, the industry perspective and the challenges posed by low biosecurity settings and wild suids. The different regions' perspectives were presented at a session on ASF status, challenges and priorities around the world. The research session covered the recently established Global ASF Research Alliance (GARA) and the results of the gap analysis conducted on epidemiology, vaccines and diagnostics, plus a brief description of the activities of ASFORCE (an European Commission (EC) research consortium) and the International Atomic Energy Agency (IAEA). During the session on existing international initiatives, the African ASF strategy (being developed by African Union-

“ The ASF Platform will act as a forum for exchange of information, decision-making, identification of priorities and, ultimately, coordination of international early warning, prevention and control efforts ”

Interafrican Bureau for Animal Resources (AU-IBAR) and FAO) was presented, together with the recently established ASF regional subnetworks in Africa (under the regional animal health networks), a general outline of the Global Framework for the progressive control of Transboundary Animal Diseases (GF-TADs) and the EC- and OIE-led activities on ASF. This initial block of the meeting concluded with a session called 'Learning from experience', in which other global initiatives on animal disease control were presented.

The second half of the meeting was dedicated to group discussions aimed at defining/setting the basics of the Platform and exploring its goals and activities, namely: 1) the proposed structure of the Platform; 2) strategies and guidelines for sectors/settings; 3) visibility, awareness, resource mobilization and advocacy; 4) international/cross-border coordination (including laboratory strengthening and networking); and 5) stakeholder engagement, and private and public sector relationships/partnerships.

The meeting also discussed the wider issue that swine viral diseases such as classical swine fever (CSF), parasitic diseases like trichinellosis and cysticercosis, and other threats that spread through the swine value chain are becoming more common in certain parts of the world. It considered that rather than fighting these diseases separately, control efforts should capitalize on the similarities of these threats in order to improve swine health overall in a more cost-effective way.

RESULTS

The plenary decided on the name, vision and mission of the Platform through open discussion. All three will be revised at the next meeting when a wider representation from all stakeholder groups is expected.

Box 1: Major stakeholders at the meeting

Government (12 participants): Veterinary services and other government institutions from Belarus, Cameroon, China, Italy, Japan, the Russian Federation, Uganda and the United States of America;

Swine producers, veterinary associations and industry representatives (7 participants):

- swine multinational companies: Farmers Choice Limited and the Pig Improvement Company (PIC International);
- diagnostic companies: INGENASA;
- professional associations: American Association of Swine Veterinarians (AASV), National Pork Board (NPB), BPEX, World Veterinary Association (WVA) and the International Council for Game and Wildlife Conservation (CIC).

International organizations (17 participants): FAO, the World Organisation for Animal Health (OIE), the African Union-Interafrican Bureau for Animal Resources (AU-IBAR) and the European Commission (EC) Directorate-General for Health and Consumers (DG SANCO);

Non-governmental organizations (NGOs) (1 participant): Veterinarians Without Borders (VWB);

Research institutions and laboratories (15 participants): Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), Centro de Investigación en Sanidad Animal (CISA-INIA), Foreign Animal Disease Diagnostic Laboratory (FADDL), Friedrich-Loeffler-Institut (FLI), Instituto de Investigación en Recursos Cinegéticos (IREC), International Livestock Research Institute (ILRI), Istituto Zooprofilattico dell'Umbria e delle Marche (IZSUM), Mississippi State University (MSU), National Center for Foreign Animal and Zoonotic Disease Defense (FAZD), National Research Institute for Veterinary Virology and Microbiology (VNIIViM), National Veterinary Institute (SVA), Pirbright Institute, Universidad Complutense de Madrid (UCM) and University of Pretoria (see figure 1).



Figure 1: Research institutions and laboratories that attended the meeting

The following *strategic goals* were proposed:

- provide a global multistakeholder platform to shape a joint agenda to reduce the threat of ASF and other TADs on the global swine production, and support coordination of the many ASF activities and networks;
- raise awareness of the impact of ASF and the Platform's activities and outputs by using Web-based technologies and communication for outreach;
- contribute to the provision of adequate tools, guidelines and strategies to improve efficacy and effectiveness of control efforts;
- foster public-private partnerships to facilitate involvement of and investment by producers/stakeholders and create efficient communication channels to establish linkages between various stakeholders;
- support regional and international cooperation for exchange of research outcomes and sharing of expertise;
- monitor progress and showcase best practice examples;
- mobilize appropriate resources;
- facilitate strengthening of the regional implementation of control programmes;
- support needs assessments and targeted capacity development.

RECOMMENDATIONS

- The participants agreed on the importance of creating a Global ASF Platform.
- The vision and mission concepts of the Platform were endorsed by participants under the agreement that both will be revised at the next Platform meeting.
- The Platform will be established under the GF-TADs umbrella, which is a joint FAO/OIE facilitating mechanism to empower regional alliances in the fight against priority TADs.
- All participants of the Platform will be members with the same status within the Platform (one level of membership). Membership will be open, i.e. all

institutions (or individuals) interested in joining can apply for membership.

- The Secretariat will be established at FAO with the task to initiate and coordinate the Platform and, more specifically, to: 1) prepare background documentation for the launch in 2014; 2) prepare membership and governance plans; 3) contact/bring in other potentially interested members; and 4) develop a Web site and logo for the Platform.
- An executive committee will be established.
- Thematic groups will be established based on the five discussion topics.
- GARA will be integrated within the Platform. ³⁶⁰

Box 2: Name, vision and mission of the Platform

Name: Global Platform for ASF and other important swine diseases.

Vision: A global thriving pig sector contributing to global food security through the prevention and control of ASF and other important diseases of swine.

Mission: To catalyse efforts limiting the impact of ASF and extend the lessons learned to other important swine diseases, through a relevant, visible and sustainable global network of all stakeholders.

ADVANCES

African swine fever training activities in Eastern Europe and Central Asia

Contributor: Daniel Beltrán-Alcrudo (FAO)

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In recent years the world has experienced an unprecedented upsurge of the occurrence of African swine fever (ASF). Adding to the worsening situation in Africa, ASF has established in the Caucasus and the Russian Federation, where the disease is now endemic. The geographic range of the virus is, therefore, on the rise, emphasizing the potential of ASF for transboundary incursions, particularly through the informal movement of infected pork products that allow the virus to jump thousands of kilometres from its source. Belarus, Lithuania, Poland and Ukraine are the most recent examples, but any country with a significant pig population is at risk from an ASF introduction. There are effective prevention and control tools to fight ASF. However, countries under the most imminent risk of ASF introduction in Eastern Europe, Central Asia and the Caucasus are not always fully prepared to prevent and to respond effectively to serious animal disease threats. Therefore, increasing awareness and strengthening technical capacity to control ASF are the most urgent needs for already infected and at-risk countries. All involved professionals (field veterinarians, diagnosticians, entomologists, forestry workers, etc.) need to be trained in the range of existing tools to fight ASF. To address the recognized deficiencies in preparedness, the Food and Agriculture Organization of the United Nations (FAO), together with leading institutions, has implemented a set of training exercises.

FAO AND WORLD ORGANISATION FOR ANIMAL HEALTH (OIE) TRAINING ON ASF EPIDEMIOLOGY AND DIAGNOSIS

Prior to 2007, ASF was absent from Eastern Europe, Central Asia and the Caucasus. Therefore, field veterinarians had not experienced the disease, did not know how to recognize it and were often not familiar with its epidemiology and other important aspects related to its control.

To fill this gap, a training exercise was organized by the Istituto Zooprofilattico

Sperimentale dell'Umbria e Marche (IZS-UM) and FAO under the umbrella of the Global Framework for the Progressive control of Transboundary Animal Diseases (GF-TADs). The five-day training (11–15 November 2013) took place at IZS-UM facilities in Perugia and was structured as a combination of hands-on practical training sessions and lectures. Clinical rounds of ASF-infected pigs in a biosecurity level 3 (BSL3) laboratory were organized to allow participants to learn how to recognize the disease through clinical and post-mortem examination of affected animals, and to get experience in collection and shipment of diagnostic samples. Lectures covered differential diagnosis, disease investigation techniques, basic concepts of epidemiology and the tools to prevent and/or control ASF spread, as well as aspects related to *Ornithodoros* ticks, the potential vectors and reservoirs of the disease. In addition, the ASF Matrix, a systematic tool to collect information on ASF-related risk factors

at the national level was presented and discussed with participants.

Staff from IZS-UM (the Italian Reference Centre for ASF and classical swine fever), together with experts from FAO and OIE trained a total of nine participants from the region: Georgia (1), Armenia (1), Belarus (2), the Russian Federation (1), Republic of Moldova (1), Ukraine (2) and Serbia (1). The training was sponsored by the Italian Ministry of Health, FAO Regional Office for Europe and Central Asia (REU) and the United States Department of Agriculture Foreign Agricultural Service (USDA/FAS).

“ There are effective prevention and control tools to fight ASF ”



Training on ASF epidemiology and diagnosis, Perugia, Italy, November 2013

©IZS-UM

ASF LABORATORY DIAGNOSTIC TRAINING IN KAZAKHSTAN

Despite its proximity to ASF outbreaks within the Russian Federation and unlike all other countries bordering the infected territories, Kazakhstan has not benefited from training from the international community on laboratory diagnostic procedures for ASF.

To address this issue, FAO signed a Letter of Agreement with the ASF Reference Laboratory for the European Union and FAO's Reference Centre (Centro de Investigación en Sanidad Animal – CISA-INIA) to conduct a training by two CISA experts at the National Reference Center for Veterinary Medicine in Astana, Kazakhstan. From 2–6 September 2013, eight laboratory staff from four laboratories in the national network were trained on validated ASF serological and virological diagnostic techniques, field disease recognition, and good practices for sampling collection, preparation, storage and shipment. In addition, the national Reference Laboratory was supplied with ASF diagnostic reference material, to allow them to diagnose future samples. The training was sponsored by USDA/FAS funds.

ORNITHODOROS TICK COLLECTION/IDENTIFICATION TRAINING

Although the role of soft ticks in ASF transmission is clearly demonstrated in Africa, their status in the affected and at-risk regions in Eastern Europe and the Caucasus has not been assessed. Their



ASF laboratory diagnostic training in Astana, Kazakhstan, September 2013

©CISA

distribution, species, type of habitat and biological competence to transmit the virus are largely unknown. On top of that, there is a lack of trained specialists in the region with experience to collect and identify ticks in the field.

As part of ASFORCE (a European consortium on ASF research funded under the European Union's Seventh Framework Programme – FP7), a field training exercise for tick collection and identification was organized in Georgia by Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), the National Food Agency (NFA) in

Georgia and FAO, from 3–6 June 2013.

The training, conducted by two CIRAD experts, combined theoretical lectures (on the morphology, biology and ecology of soft ticks, plus tick sampling, identification and breeding techniques) with field activities to test the various sampling methods in areas where ticks were successfully collected in the past.

Participants from Armenia (1), Bulgaria (2), Georgia (2), Kazakhstan (1), the Russian Federation (2) and Ukraine (1) were trained and will continue tick collection efforts in their respective countries. The training was sponsored by CIRAD and FAO. ³⁶⁰



©CIRAD

Manual search for *Ornithodoros lahorensis* attached to sheep



©CIRAD

Ornithodoros tick collection/identification training, Georgia, June 2013



FAO IN ACTION

FAO's contribution to improve rabies control in West and Central Africa

Contributors: Youssouf Kaboré (FAO), Katinka DeBalogh (FAO), Beatrice Mouille (FAO), Gwen Dauphin (FAO), Charles Bebay (FAO)

Rabies is a viral zoonosis affecting humans and other mammals. The World Health Organization (WHO) estimates that 44 percent of the 60 000 human deaths due to rabies each year occur in Africa¹, which leads to the continent being classified as "high risk for rabies". According to the Bureau d'Experts de la Rage du continent Africain (AfroREB) network, 50 to 60 percent of the victims are under 15 years of age.²

Rabies control should be considered as a global public good, eligible for international solidarity and donor support where needed, as well as a priority model for countries and intergovernmental organizations to apply the One Health concept (a recommendation of the World Organisation for Animal Health (OIE) Global Conference on Rabies Control, Seoul, Sept 2011).

The Food and Agriculture Organization of the United Nations (FAO) has been at the forefront of tackling rabies in West and Central Africa in recent years by supporting diagnostic capacities, providing standardized approaches, tools and materials to develop rabies control policies, undertaking public awareness campaigns and contributing to World Rabies Day. In alignment with the One Health approach, efforts have been made towards improvement of cross-sectoral collaboration of veterinary and public health institutions.

ON-SITE TECHNICAL ASSISTANCE TO IMPROVE RABIES LABORATORY DIAGNOSIS

FAO has noted that many African veterinary laboratories require both improved equipment and strengthened skill capacity for rabies laboratory diagnosis. In response to the identified needs, FAO has provided key laboratory equipment³ and reagents

to all nine Central African beneficiary laboratories of the IDENTIFY⁴ project.⁵ Between 2010 and 2013, a total of 64 laboratory staff (including 2 persons from public health laboratories) from 16 countries⁶ of the subregion have been trained under FAO projects (mostly involving the IDENTIFY project) through in-country or regional training courses on standardized rabies laboratory diagnostic techniques, including good sampling practices. The main partner for this on-site training was Istituto Zooprofilattico Sperimentale delle Venezie (IZSve) (Padova, Italy), a FAO Reference Centre for rabies. FAO's support also includes preventive vaccination against rabies for all laboratory staff involved in rabies activities in these countries.

NETWORKING FOR SUSTAINABILITY AND CONTINUOUS CAPACITY BUILDING

The establishment of a rabies subnetwork within the West and Central Africa Veterinary Laboratory Network for Avian Influenza and other Transboundary Diseases (RESOLAB) has been instrumental in operationalizing rabies diagnostic objectives as defined by RESOLAB members in 2010. These objectives included: i) identification of priority gaps for rabies surveillance; ii) creation of awareness and advocacy campaigns addressed at national authorities and other key stakeholders; iii) organization of training on laboratory diagnostic procedures; iv) resource mobilization to conduct massive dog



Waiting for a rabies shot – Sierra Leone Animal Welfare Society (SLAWS) mobile clinic

¹ www.who.int/rabies/en/index.html.

² www.afroreb.info/la-rage-en-afrique.

³ Nine immuno-fluorescence microscopes were provided to nine countries in 2012.

⁴ IDENTIFY is a project funded by USAID and is part of the Emerging Pandemic Threats (EPT) programme.

⁵ www.fao.org/ag/againfo/home/en/news_archive/AGA_in_action/2012_Emerging_Infectious_Diseases.html.

⁶ Botswana, Burkina Faso, Cameroon, Central African Republic, the Congo, the Democratic Republic of the Congo, Equatorial Guinea, Ethiopia, Gabon, Kenya, Mali, Mozambique, Rwanda, Senegal, Uganda, United Republic of Tanzania.

vaccination campaigns and dog population management; and v) improvement of cross-sector collaboration between public and animal health sectors.

The RESOLAB rabies subnetwork has contributed to a better understanding of the regional rabies situation through the mapping of animal rabies diagnostic capacities in each RESOLAB member country, identification of laboratory needs for rabies diagnosis, preparation of quarterly reports on the prevailing rabies situation and rabies laboratory activities (including the number of samples submitted for rabies testing in RESOLAB laboratories) and participation in international conferences including AfroREB⁷ and Rabies in the Americas (RITA).⁸ Each of the 23 RESOLAB members has designated national rabies focal points that allow for better coordination of activities and circulation of information. IZSvE provides the technical support to this subnetwork. Among other activities, this partner has proposed a harmonized fluorescent-antibody technique (FAT) protocol for RESOLAB⁹ and prepared the inventory of minimum diagnostic equipment for the FAT in laboratories.

A STEPWISE APPROACH AND RABIES SEMINARS TO SET RABIES CONTROL STRATEGIES/ PROGRAMMES

Together with the Global Alliance for Rabies Control (GARC), FAO coordinated the development of a stepwise approach towards rabies elimination that envisages providing countries with practical guidance to build up rabies control programmes. The proposed approach takes into account the usually very scarce resources and capacities at the beginning of the programme and provides guidance on how a country can slowly, but surely get rabies under control or even eliminate it in humans and domestic animals. It is composed of six stages as depicted in Figure 1 leading to the freedom of dog and dog-transmitted human rabies.

Parallel activities of all sectors involved, including public health, are incorporated into the stepwise approach, creating incremental synergies through linking activities where appropriate.

Preliminary outcomes of this innovative approach were presented in the Democratic Republic of the Congo (May 2012), Cameroon (June 2012) and the Congo (June 2013) during rabies consultations that were organized under the IDENTIFY

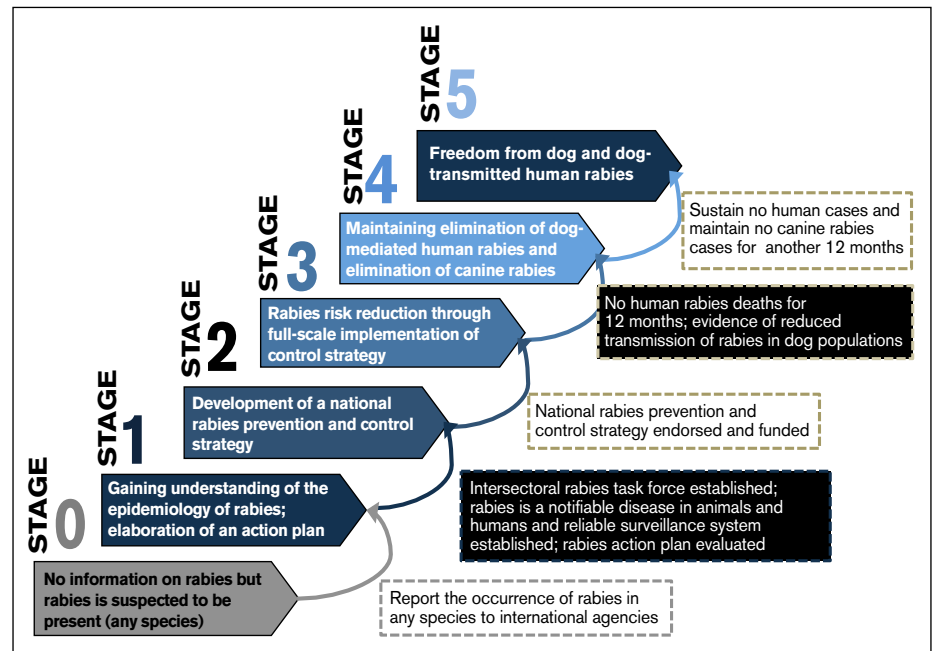


Figure 1: Proposed stages for a stepwise approach for rabies control (version July 2013)

project by FAO to strengthen cross-sectoral collaboration between sectors and ministries.¹⁰ The rabies consultations usually gathered participants from the Ministry of Agriculture and Livestock, Ministry of Health, Ministry of Environment, Ministry of Scientific Research, local government, private veterinarians, animal welfare organizations, experts from IZSvE, FAO ECTAD Bamako and key national stakeholders of public and veterinary health sectors. The meetings allowed participants to: i) exchange and share information, practices and opportunities in rabies prevention and control; ii) identify, assess and align services (i.e. diagnosis, expertise) and information that veterinary and human laboratories deliver or can deliver to public and private actors on the prevention and control of rabies; and iii) identify the difficulties of collaboration and functional mechanisms for strengthening collaboration between human and veterinary, as well as public and private sectors to formulate realistic short- and medium-term goals to improve and/or promote the prevention and control of rabies in the country. The stakeholder consultations also addressed country specificities and challenges that need to be considered when implementing the stepwise approach.

The events also specifically considered approaches to deal with very low vaccination coverage against rabies and the high costs of post-exposure prophylaxis, which is prohibitive

for many people at risk. Practical mechanisms to improve cross-sectoral investigation for bite case management, public awareness and advocacy, and rabies reporting were also addressed.

FAO is working closely together with the national Veterinary Services and the World Health Organization - Regional Office for Africa (WHO/AFRO) to provide technical assistance to the Democratic Republic of the Congo to deal with rabies in the country.³⁶⁰

Box 1: Canine rabies diagnosed by a national laboratory in the Congo

Support provided by FAO through the IDENTIFY project was instrumental in the detection of and the response to the rabies outbreak that occurred in September 2013 in Pointe Noire (the Congo). This was the first case of canine rabies diagnosed by a national laboratory in the Congo and represented the first ever confirmed case of rabies notified to the World Organisation for Animal Health (OIE) by national authorities.* It was diagnosed on 29 October 2013 by the Laboratoire de Diagnostic Vétérinaire de Brazzaville (LDVB) which had received the support of the FAO/IDENTIFY rabies programme five months earlier. The sample analysed originated from the head of a dog.

* www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=14438&newlang=fr.

⁷ AfroREB meeting, Dakar, 8–9 October 2013.

⁸ Rencontre internationale sur la Rage en Amérique. Toronto, 28 October 2013.

⁹ www.fao-ectad-bamako.org/fr/IMG/pdf/Rabies_diagnostic_protocol_EN.pdf.

¹⁰ Links to access the proceedings of the seminars (www.fao-ectad-bamako.org/fr/IMG/pdf/Atelier_rage_Yde_rapport_final2.pdf; www.fao-ectad-bamako.org/fr/IMG/pdf/Atelier_rage_Brazza_rapport.pdf; www.fao-ectad-bamako.org/fr/Rapport-de-l-atelier-Contrôle-et).

NEWS



Launching LinkTADs

Contributor: Daniel Beltrán-Alcrudo (FAO)

Launched in December 2013, LinkTADs (linktads.com) is a €1 million and three-year initiative funded by the European Union's (EU) Seventh Framework Programme (FP7) to coordinate research on animal disease prevention and control between the EU and China.

China's exponential economic growth over the last decade has been accompanied by progressive urbanization and a sharp increase in consumption of animal products. This growing demand for animal protein is being met through changes in livestock production (e.g. intensive farming), increased international trade of animals and animal products, and the expansion of agricultural areas at the expense of wild habitats. Today, China is the world's largest livestock producer and consumer.

These economic, social and demographic shifts increase the potential for new pathogens to emerge, grow and spread on a global scale, sometimes affecting human health as well. The resulting diseases can spread over long distances and have an enormous impact on trade. Therefore, the effective prevention, control and elimination of these infectious transboundary animal diseases (TADs) is crucial for safeguarding and securing national and international food supplies, local livelihoods and human health.

The fight against animal diseases relies heavily on research for the development of new tools and strategies. These could be in



LinkTADs Kick-off Meeting, Rome, Italy, December 2013

the shape of new vaccines and diagnostics, or through the use of epidemiology to better understand disease spread and to develop more effective approaches to surveillance, prevention and control.

International collaboration between animal health researchers can speed up these advances by bringing together new ideas, technologies, funds and expertise to solve livestock health challenges, thus optimizing the use of research resources. However, there are also many barriers that challenge joint projects, including regulations, policies, politics and language. Over the past decade, a number of initiatives have been developed to assist in the coordination and facilitation of research between the EU and China.

LinkTADs is a significant new programme that aims to: (i) coordinate research across

borders; (ii) aid in finding common research goals; (iii) guide partners along the process; and (iv) create sustainable and simple mechanisms to preserve collaborations in the future. Under the LinkTADs umbrella, scientists from the EU and China will benefit from each other's knowledge, skills, facilities and equipment. Most importantly, they will share a wider pool of funding programmes.

Focusing on epidemiology and laboratory diagnostics, the broad objectives of the initiative are: (i) to identify priority areas for joint action; (ii) to link European and Chinese animal health research, training programmes and innovation projects; (iii) to ensure a wide-ranging network of scientific communities and stakeholders; (iv) to provide a long-term vision and achieve coordinated planning on future common research; (v) to contribute to the international policies related to EU animal health and trade; (vi) to support young researchers through exchange programmes and training; and (vii) to share the results and methodologies within and outside the consortium.

The LinkTADs consortium incorporates some of the major scientific players in the animal health field in the EU and China, i.e. five European and five Chinese partners, plus the Food and Agriculture Organization of the United Nations (FAO) in the coordinating role. The first meeting of the LinkTADs consortium took place on 9–10 December 2013 at FAO headquarters in Rome and was an opportunity for the partners to get to know one another and to clarify the work plan for the coming months.

Table 1: LinkTADs' partners

Organization	Country
Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD)	France
China Animal Disease Control Center (CADC)	China
China Animal Health and Epidemiology Center (CAHEC)	China
Europa Media Non-profit Limited (EM)	Hungary
Food and Agriculture Organization of the United Nations (FAO)	Italy
Harbin Veterinary Research Institute (HVRI)	China
Huazhong Agricultural University (HZAU)	China
Royal Veterinary College (RVC)	United Kingdom
Shanghai Veterinary Research Institute (SHVRI)	China
Sociedade Portuguesa de Inovação (SPI)	Portugal
Staten Veterinärmedicinska Anstalt (SVA)	Sweden

NEWS

FAO launches emergency projects to fight H7N9 avian influenza

Contributors: Carlene Trevennec (FAO), Astrid Tripodi (FAO), Sophie VonDobschuetz (FAO)

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Since H7N9 emerged in China in March 2013, there have been over 300 human cases and 70 deaths (update on January 2014). According to viral genetic analysis and experimental infection studies, H7N9 can infect mammalian hosts more easily than human H5N1 AI infection. This analysis suggests the H7N9 virus has substantial potential to cause a pandemic.

The continuous presence of H7N9 in China and China's strong trading links within Asia raise the possibility of the virus being introduced to a number of surrounding countries, most of which are members of either the Association of the Southeast Asian Nations (ASEAN) or the South Asian Association for Regional Cooperation (SAARC). In addition, a significant number of countries in Africa are linked with China through direct daily flights that carry thousands of passengers and exchange large volumes of various commodities, representing a potential risk of H7N9 introduction.

Working in coordination with development partners such as the United States Agency

for International Development (USAID), the World Organisation for Animal Health (OIE) and the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO) recently launched three technical cooperation programme (TCP) projects to promote subregional preparedness, facilitate risk-based, targeted surveillance and coordinate response to A(H7N9) in Asian and African countries at risk:

- Emergency assistance for surveillance of influenza A(H7N9) virus in poultry and animal populations in Southeast Asia – TCP/RAS/3406(E);
- Emergency assistance for surveillance of influenza A(H7N9) virus in poultry and animal populations in South Asia – TCP/RAS/3407(E);
- Emergency assistance for surveillance of influenza A(H7N9) virus in poultry and other animal populations in low- to moderate-risk countries in Africa – TCP/RAF/3408(E).

The two regional emergency projects for ASEAN and SAARC, respectively, were

launched by the FAO Regional Office for Asia and the Pacific (RAP) at a three-day inception workshop from 18–20 September 2013 in Bangkok, Thailand. Staff from national veterinary services of countries in the subregions of Southeast and South Asia as well as experts from a number of international organizations and development partners attended the meeting. In Africa, the regional emergency project will be launched by FAO jointly with the African Union Interafrican Bureau for Animal Resources (AU-IBAR) on the 21–22 January 2014 in Nairobi, Kenya.

The projects will assist countries in the different regions to better detect, control and respond to the virus in a coordinated manner. These initiatives will generate knowledge on H7N9 epidemiology through data gathering and analysis, while building national and regional capacities in risk-based surveillance and laboratory diagnosis. Participating countries will be assisted in updating their contingency plans, including preparedness, response, risk management and risk communication. Existing coordination

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Launching of the regional emergency assistance project for surveillance of influenza virus in poultry and animal populations for ASEAN and SAARC

mechanisms and networks, as developed by FAO's Emergency Centre for Transboundary Animal Diseases (ECTAD) over the past six years, will be used to facilitate collaboration and information sharing among countries and between animal and human health authorities.

Since H7N9 does not cause illness in poultry, it is much more difficult to detect in birds than H5N1 highly pathogenic avian influenza (HPAI), which is predominantly a poultry disease. Therefore, the need for collaboration and information sharing between animal and human health sectors within and among countries is critical to improve the global understanding of H7N9 epidemiology. This outcome is necessary to plan appropriate interventions necessary to mitigate risks for virus introduction and spread, and to ensure timely detection of the introduction of this new virus into human and animal populations that have been free of the virus. The Bangkok and Nairobi meetings were among a number of important initiatives undertaken by FAO, in its ongoing role of promoting international collaboration to help maintain vigilance and increase preparedness in the face of this serious regional and global threat. ³⁶⁰



Launching of the regional emergency assistance project for surveillance of influenza virus in poultry and animal populations for Africa

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Ashley Robinson tribute

Doctor Robert Ashley Robinson, an internationally recognized expert in veterinary public health and preventive medicine, died at home in New Zealand on 20 May 2013. Dr Robinson retired from a 20-year faculty career in veterinary epidemiology and public health at the University of Minnesota, College of Veterinary Medicine in 1997.

In 1999, he joined the College of Veterinary Medicine at Western University of Health Sciences as associate dean for preclinical affairs, where he developed a framework for the college's problem-based learning curriculum, which emphasized student-centred learning, interpersonal communications skills and teamwork.

He worked for Tufts University and lived in Jordan as a liaison for the United States Agency for International Development (USAID) Middle East Regional Cooperation Project. The project was part of the peace process, involving veterinarians from Egypt, Israel, Jordan and the Palestinian authority who worked together on regional animal disease problems.

"While humans understand lines in the sand, unfortunately animals don't recognize those international barriers," he said.

He was one of the actors in the 20-year USAID partnership programme between the University of Minnesota and Morocco. His active participation and dedication to this programme played an important role in the development of postgraduate veterinary education in Morocco.

He worked on several missions around the world for the Food and Agriculture Organization of the United Nations (FAO). He also participated in several expert consultations for FAO and edited

a number of important documents and reports including *Guidelines for coordinated human and animal brucellosis surveillance* (2003), FAO Animal Production and Health Paper No.156 and *Brucella melitensis in Eurasia and the Middle East* (2009), FAO Animal Production and Health Proceedings No. 10.

Dr Robinson will be remembered for his total dedication to the prevention and control of zoonotic diseases particularly at the community level, to promote the cause of rural and urban poor populations suffering from and at risk of these diseases. Many of us working in this field have benefited from his inspiration and continuous support and encouragement.

A native of New Zealand, Ashley earned his bachelor's degree in veterinary science from the University of Sydney in Australia, and his master's degree in public health and doctorate in veterinary microbiology from the University of Minnesota. He was very active in graduate education and influenced the lives of many graduate students and colleagues around the world. He lectured at universities, symposiums and conferences in Thailand, Morocco, Italy, Vietnam, Kenya and Trinidad. He was also involved in Habitat For Humanity and Heifer International, an organization dedicated to ending hunger and poverty by providing food- and income-providing animals to families. He is survived by his wife, Stella, their two children and five grandchildren. ³⁶⁰



Joseph Litamoi tribute

On Wednesday, 8 January 2014 in the evening, Dr Joseph Litamoi died at a Nairobi hospital after a short illness borne with dignity, without much noise, in keeping with the image of what he was in his life – a humble man. It is very difficult to summarize his life in a few lines.

He graduated from the University of Nairobi, Kabete Veterinary College, Nairobi, Kenya among the top ten in a class of 86, worked briefly as a tutorial fellow in the University of Nairobi, Chiromo Campus before joining the National Veterinary Research Centre (NVRC) at the Kenya Agriculture Research Institute (KARI) as a Veterinary Research Officer (VRO). In 1982, he proceeded to Brunel University in the United Kingdom of Great Britain and Northern Ireland for a postgraduate degree in applied immunology. Upon his return to Kenya in 1984, he continued to work at KARI as a VRO. At KARI, Joseph was among a group of eminent pioneer scientists that developed a vaccine for the management of mycoplasma (contagious caprine pleuropneumonia), an outstanding professional achievement for which he will forever be remembered by the Kenyan veterinary community and the world at large. Between 1991 and 1992, Joseph worked at the Kenya Veterinary Vaccines Production Institute (KEVEVAPI) as an assistant production manager in charge of the Kabete and Muguga Vaccine Production Laboratories. From 1992 to 2003, he worked at the Food and Agriculture Organization of the United Nations (FAO) and at the PanAfrican Veterinary Vaccine Centre (PANVAC), based in Debre Zeit, Ethiopia, as a vaccine expert. During his time at PANVAC under FAO technical supervision, Dr Litamoi worked with his colleagues to publish significant findings on the application of the Xerovac vaccine technology to the development of thermo-tolerant contagious bovine pleuropneumonia (CBPP) and peste des petits ruminants (PPR) vaccines. These findings he later rolled out in projects in Bangladesh, Botswana and Mali. He served on many missions in various countries including those in Bangladesh, Botswana, India, Mali, the Sudan, Syria and Turkey. In 2004, he was appointed by the International Atomic Energy Agency/ African Union Interafrican Bureau for Animal Resources (IAEA/ AU-IBAR) as a consultant on animal health and economics. In 2006, he relocated to Nairobi, Kenya where he served at the FAO Emergency Centre on Transboundary Diseases (ECTAD) as a Regional Veterinary Laboratory specialist until December 2012. As one of the initial staff of ECTAD Nairobi, Joseph, together with his colleagues, piloted the deployment of the digital pen technology (DPT) for animal disease surveillance in Kenya and elsewhere.

In recognition of his exemplary professional acumen, he was appointed and served as the technical director of the Kenyan Veterinary Vaccines Production Institute (KEVEVAPI) Board of Management, a position he held to the end of his life.

Joseph has published extensively in international and refereed journals, conference proceedings and books. He was soft-spoken and hilarious and in our veterinary world was credited as one of the most brilliant minds of our times. We have evidence of the great contributions he has made wherever he worked. He will be remembered as an extremely creative



and thoughtful scientist, drawing upon his broad background in immunology, vaccinology, microbiology, epidemiology, diagnostics, wildlife surveillance and international veterinary governance to cope with an enormous diversity of technical questions. His contributions to the veterinary profession and livestock development are unquestioned and are reflected in his exceptional international reputation and by the many awards and honours that he received. To his colleagues, he was an outstanding laboratory specialist and vaccinologist. He was a quiet, humble, warm and caring friend and a dedicated mentor to the many young, budding scientists who always brought credit to his team. A wonderful colleague who gave freely of his time, advice and expertise, he will be remembered as serving FAO with great distinction in many capacities.

He lived and worked in a period of great change in Africa and through dark days and better ones remained a beacon of hope to colleagues and family, and a monument to what can be achieved through the humility of dedicated service. He has left behind an inconsolable family of relatives, friends and colleagues. To summarize this unique and exceptional man, we say that Dr Litamoi lived fully, efficiently and effectively. At the announcement of his death, a tsunami of sympathy and initiatives to honour his memory has been received from around the world including Africa, Europe, Asia, Australia and the Americas. This was a man who was highly esteemed and regarded; well decorated at home among family as well as on national and global stages.

A page has turned, but the book has been written, and written well. We are confident that Dr Litamoi will continue to remain with us and in all of us through his mentorship and magnificent achievements. Let us continue with the work that he did with such zeal to ensure that his legacy will be seen through our work and in our institutions. He was an inspiration we should seek to emulate, extrapolating the lessons he left us for the sake of future generations. This is the main tribute that we can pay to him, appropriate to the dimension of the man.

As father, husband, brother, colleague and friend, Dr Litamoi, we miss you already and it is certain that you shall never fade from our memories. ³⁶⁰

NEWS

Publications

GUIDING DOCUMENTS ON SURVEILLANCE, PREVENTION AND CONTROL OF AVIAN INFLUENZA A(H7N9)

Following the emergence of avian influenza A(H7N9) in China in February 2013, the Food and Agriculture Organization of the United Nations's (FAO's) Emergency Prevention System (EMPRES), with the active collaboration of FAO field officers and international experts, developed six guiding documents to assist member countries in meeting the challenges to surveillance, prevention and control posed by the this new virus strain.

The Emergency risk assessment summary¹ (Issue no. 1) assesses identified risk factors for potential introduction and spread of the virus, as well as the likelihood of human exposure.

The risk assessment is periodically updated as new epidemiological, laboratory or socio-economic information becomes available; the **Qualitative risk assessment update² (Issue no. 2)** is based on data available as of 20 January 2014.

Risk management along the food chain³ provides guidance on control measures to be implemented along the poultry value

chain in order to mitigate health risks and prevent further spread of H7N9 in poultry. The importance of interventions in live bird markets as well as poultry farms is stressed. The document also looks at wild bird trade, promotion of public awareness, and the importance of understanding the social and economic incentives that drive human behaviour.

The guidelines for emergency risk-based surveillance⁴ (Issue no. 1) aims to assist national authorities in the implementation of an efficient surveillance strategy to allow rapid detection of virus incursion or spread. This risk-based strategy relies on the identification of high-risk poultry trade nodes and probable points of virus entry.

A second issue was published in November 2013: **Surveillance guidelines for uninfected countries in Southeast Asia and South Asia⁵ (Issue no. 2)** which describes a detailed short-term risk-based surveillance strategy based on the current understanding of H7N9 epidemiology, identified modes of spread and the predicted risk of infection for non-infected areas or countries.

Laboratory protocols and algorithms⁶ offers guidance on experimental protocols shown to be highly sensitive in detecting H7N9 viruses in surveillance samples. It includes an overview of primers and probes to test for H7 and N9 as well as validated RT-PCR protocols. The need for oropharyngeal and environmental sampling and the importance and appropriate application of serological surveillance are stressed.



¹ available at www.fao.org/docrep/018/i3598e/i3598e.pdf.

² available at www.fao.org/docrep/019/i3631e/i3631e.pdf.

³ available at www.fao.org/docrep/018/i3609e/i3609e.pdf.

⁴ available at www.fao.org/docrep/019/i3608e/i3608e.pdf.

⁵ available at www.fao.org/docrep/019/i3601e/i3601e.pdf.

⁶ available at www.fao.org/docrep/019/i3596e/i3596e.pdf.

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The Emergency Prevention System (EMPRES) is an FAO programme, founded in 1994, with the goal of enhancing world food security, fighting transboundary animal and plant pests and diseases and reducing the adverse impact of food safety threats. EMPRES-Animal Health is the component dealing with the prevention and control of transboundary animal diseases (TADs).

To subscribe or to ask for information about EMPRES-Animal Health send an e-mail to: empres-animal-health@fao.org or a fax to (+39) 06 57053023

For more information visit us at <http://www.fao.org/ag/empres.html>

EMPRES-Animal Health can assist countries in the shipment of samples for TAD diagnostic testing at a FAO Reference Laboratory and Reference Centre. Please contact Empres-Shipping-Service@fao.org for information prior to sampling or shipment. Please note that sending samples out of a country requires an export permit from the Chief Veterinarian's Office of the country and an import permit from the receiving country.



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