



Avian Influenza & Wild Birds Bulletin

A summary report of the Scientific Seminar on Avian Influenza, the Environment and Migratory Birds

Published by the International Institute for Sustainable Development (IISD)

ONLINE AT [HTTP://WWW.IISD.CA/YIMB/AIS/](http://www.iisd.ca/yimb/ais/)
VOLUME 123, No. 1, FRIDAY, 14 APRIL 2006



SCIENTIFIC SEMINAR ON AVIAN INFLUENZA, THE ENVIRONMENT AND MIGRATORY BIRDS: 10-11 APRIL 2006

The Scientific Seminar on Avian Influenza, the Environment and Migratory Birds met from 10-11 April 2006 at UN Office in Nairobi, Kenya. The Seminar was organized by the United Nations Environment Programme (UNEP) Division of Early Warning and Assessment (DEWA) in cooperation with the Convention on Migratory Species of Wild Animals (CMS) and its Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA). Around 25 invited experts from relevant disciplines attended the Seminar, including scientists and representatives from various organizations. Invited observers included UNEP Country Permanent Representatives and representatives from other UN organizations. A total of 55 participants were in attendance.

The Seminar aimed to review the latest scientific studies concerning the evolution and spread of Highly Pathogenic Avian Influenza (HPAI), subtype H5N1, and its impact on wild birds and the wider environment, including assessing risks of transmission and identifying optimal mitigation measures.

The Seminar's output included a press release and a summary document with recommendations for decision makers, the media and other stakeholders on action to be taken in light of the latest scientific findings on HPAI and in the context of conservation and the environment. These recommendations address: surveillance, early warning and risk assessment; priority short-term needs; longer-term needs; collaboration and cooperation; and next steps.

A BRIEF HISTORY OF AVIAN INFLUENZA IN THE CONTEXT OF MULTILATERAL ENVIRONMENTAL AGREEMENTS

HPAI, subtype H5N1, is an influenza A virus very similar to the "ordinary" influenza that has always affected human beings. Avian influenza viruses are classified according to the composition of two surface proteins, hemagglutinin (H) and neuraminidase (N). Currently there are 16 known H-subtypes (H1 through H16) and nine known N-subtypes (N1 through N9). Avian influenza viruses originate in wild birds, particularly waterbirds, and are usually not dangerous to their hosts. However, after transfer to a new type of host, either avian or mammalian, influenza viruses sometimes undergo rapid evolution and may develop into new, highly pathogenic strains that pose serious threats to humans, poultry and wild bird populations. The infamous Spanish flu pandemic, which killed between 40 and 100 million people in 1918, was a highly pathogenic H1N1 strain that originated in birds.

The current highly pathogenic avian influenza (HPAI) strain, subtype H5N1, is believed to have emerged in 2002. To date, over 200 million domesticated birds have been killed by the virus or culled to stem its spread. This strain has acquired the capability to infect humans: the World Health Organization (WHO) reports that more than 190 people have been infected, over 100 of whom have died, predominantly in South-East Asia. Currently, the virus does not spread from human to human, but it is feared that only a minor adaptation is needed for it to develop the necessary characteristics. Such an adaptation would allow the virus to become pandemic.

HPAI was recently found to affect felid species, including domestic cats, as well as ferrets, mice, badgers and otters. It also re-infects populations of wild birds, particularly waterbirds. As of March 2006, HPAI has caused die-offs of waterbirds in 30 countries in Asia, Europe and Africa, and may threaten endangered populations as well as contribute to the spread of the virus along migratory routes.

Scientific information on HPAI remains scarce. Details, including information on its virulence, adaptability, contagiousness, and dissemination through wild birds, are lacking. Conservation organizations and multilateral environmental agreements such as CMS, AEWA and the Ramsar Convention on Wetlands of International Importance caution against a biased public perception of the role of waterbirds in

IN THIS ISSUE

A Brief History of Avian Influenza in the Context of Multilateral Environmental Agreements	1
Report of the Seminar	2
Formal Opening and Introduction	3
Epidemiology and Human Aspects of Avian Influenza	3
Avian Influenza and Wild Birds	4
Early Warning Systems and Development of Risk Assessment Models	5
Outcomes of Recent Initiatives and National and Regional Case Studies	5
Roundtable Discussion	7
Final Conclusions and Recommendations	7
Closing of the Seminar	8
Upcoming Meetings	8

The *Avian Influenza & Wild Birds Bulletin* is a publication of the International Institute for Sustainable Development (IISD) <info@iisd.ca>, publishers of the *Earth Negotiations Bulletin* <enb@iisd.org>. This issue was written and edited by Asheline Appleton and Nienke Beintema. The editor is Peter Doran, Ph.D. <peter@iisd.org>. The Director of IISD Reporting Services is Langston James "Kimo" Goree VI <kimo@iisd.org>. Funding for coverage of this meeting has been provided by UNEP – Division of Environmental Conventions. IISD can be contacted at 161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba R3B 0Y4, Canada; tel: +1-204-958-7700; fax: +1-204-958-7710. The opinions expressed in the *Bulletin* are those of the authors and do not necessarily reflect the views of IISD. Excerpts from the *Bulletin* may be used in other publications with appropriate academic citation. Electronic versions of the *Bulletin* are sent to e-mail distribution lists (ASCII and PDF format) and can be found on the Linkages WWW-server at <<http://www.iisd.ca/>>. For information on the *Bulletin*, including requests to provide reporting services, contact the Director of IISD Reporting Services at <kimo@iisd.org>, +1-646-536-7556 or 212 East 47th St. #21F, New York, NY 10017, USA.

spreading the virus. Advocating enhanced scientific cooperation and awareness campaigns, they encourage the international community to focus on the ecological, social and economic causes of spreading such as the drastic reduction of wildlife habitats and unsustainable farming practices, arguing that these have led to an unnatural proximity of migratory birds and domesticated animals.

SCIENTIFIC TASK FORCE: CMS, in close cooperation with AEWAW, initiated a Scientific Task Force on Avian Influenza and Wild Birds in August 2005. This Task Force aims to ensure that international efforts to contain HPAI do not overlook vital information concerning migratory species and other environmental considerations. The Task Force is comprised of representatives from UNEP, CMS, AEWAW, Ramsar, BirdLife International, the International Council for Game and Wildlife Conservation (CIC), Wetlands International, the Wildlife Conservation Society and the Zoological Society of London, with the UN Food and Agriculture Organization (FAO), WHO and the World Organization for Animal Health (OIE) participating as observers. The Convention on Biological Diversity (CBD) joined the Task Force in March 2006. The Task Force has produced advice, widely circulated in the form of press releases, to raise the awareness of the international community on HPAI's effects on wildlife, and to stress how this phenomenon is both a human health concern and a conservation issue.

AEWAW MOP-3: The third Meeting of the Parties to AEWAW met from 23-27 October 2005 in Dakar, Senegal. Participants adopted Resolution 3.18, which calls for, *inter alia*: urgent responses to the spread of HPAI including the development of national surveillance schemes and contingency planning, involving immediate and long-term measures; increased focus on education and awareness programmes and capacity building, particularly in Africa; increased cooperation between relevant bodies; and additional scientific research.

MEETING ON AVIAN INFLUENZA AND HUMAN PANDEMIC INFLUENZA: This meeting was held from 7-9 November 2005 in Geneva, Switzerland and was co-sponsored by WHO, FAO and OIE. Participants identified key steps to be taken to contain the spread of HPAI, including source control, surveillance, rapid containment, pandemic preparedness, integrated country plans, and communications.

RAMSAR COP-9: The ninth Conference of the Parties to the Ramsar Convention was held from 8-15 November 2005 in Kampala, Uganda. Participants adopted Resolution IX.23, which calls for fully integrated approaches, at both national and international levels, to address HPAI by bringing ornithological, wildlife, and wetland management expertise together with those traditionally responsible for public health and zoonoses. It emphasizes that destruction or substantive modification of wetland habitats with the objective of reducing contact between domesticated and wild birds may exacerbate the problem by causing further dispersal of infected birds.

CMS COP-8: The eighth Conference of the Parties to CMS convened from 20-25 November 2005 in Nairobi, Kenya. Participants adopted Resolution 8.27, which calls for support and capacity building for research related to disease processes in migratory bird species, long-term monitoring of their movements and populations, and rapid development of surveillance programmes for HPAI in populations of wild birds. An Annex to the Resolution lists key research needs related to the spread of HPAI in relation to migratory birds and their habitats.

The AEWAW, Ramsar and CMS Resolutions all support the conclusions of the WHO, FAO and OIE that attempts to eliminate HPAI in wild bird populations through lethal responses such as culling are not feasible and may exacerbate the problem by causing further dispersal of infected birds.

INTERNATIONAL PLEDGING CONFERENCE ON AVIAN AND HUMAN INFLUENZA: This event, held from 17-18 January 2006 in Beijing, China, was co-sponsored by the Government of China, the European Commission and the World Bank. During this event the international community pledged US\$ 1.9 billion in financial support and discussed coordination mechanisms. Participants adopted the Beijing Declaration, in which they commit themselves to effective development and implementation of integrated national action plans, long-term strategic partnerships, information sharing, increased cooperation on global research, and periodic evaluation of national pandemic influenza preparedness and action plans.

CBD COP-8: The eighth Conference of the Parties to the Convention on Biological Diversity (CBD) was held in Curitiba, Brazil from 20-31 March 2006. A brainstorming session on HPAI preceded the meeting. Participants at this session: highlighted threats to migratory species and wetlands, knowledge gaps and the need for capacity building; welcomed the participation of the CBD in the Scientific Task Force on Avian Influenza; and suggested that CBD's Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) further assess the interlinkages between ecosystems and health on matters including climate change and avian flu. Participants adopted a Decision on Avian Flu (UNEP/CBD/COP/8/L.35), in which they take note of the brainstorming meeting report and encourage similar consultations as and when emerging issues that may impact CBD implementation arise.

6TH INTERNATIONAL SYMPOSIUM ON AVIAN INFLUENZA: This event was held from 3-6 April 2006 in Cambridge, UK. Participants addressed lessons learned from recent outbreaks in Asia, Africa and Europe and recent epidemiological and virological information. They identified short- and long-term needs, including enhanced scientific information, cross-sectoral and international cooperation, and improved awareness among decision makers and the general public.

REPORT OF THE SEMINAR

The two-day Scientific Seminar on Avian Influenza, the Environment and Migratory Birds opened on Monday 10 April 2006 at UN Office in Nairobi, Kenya. The Seminar was chaired by Peter Schei, Director of the Norwegian Fridtjof Nansen Institute and Chair of BirdLife International.

Delegates heard 21 expert presentations on issues relating to avian influenza, which were addressed during four sessions: epidemiology and human aspects of avian influenza; avian influenza and wild birds; early warning systems and development of risk assessment models; and outcomes of recent initiatives and national and regional case studies. On Monday and Tuesday, discussions were held to formulate the Seminar's conclusions and recommendations. These were finalized during a roundtable on Tuesday afternoon.

Consensus was achieved on a large number of recommendations, including on: surveillance, early warning and risk assessment; priority short-term needs; longer-term needs; collaboration and cooperation; and next steps. Delegates

expressed strong commitment to work cooperatively towards developing effective mechanisms to contain the spread of highly pathogenic avian influenza (HPAI).

FORMAL OPENING AND INTRODUCTION

Seminar Chair Schei opened the meeting on Monday morning.

Robert Hepworth, Executive Secretary of the Convention on Migratory Species of Wild Animals (CMS), outlined the work of the CMS-led Scientific Task Force on Avian Influenza and Wild Birds, which was established in August 2005 to address the emerging issue of highly pathogenic avian influenza (HPAI) in relation to wild birds. Noting that the Task Force currently unites 13 UN bodies, wildlife treaties and specialist non-governmental organizations (NGOs), he said its aims are to generate advice on the root causes and conservation impacts of HPAI, assess the role of migratory birds as vectors of the virus, and develop early warning systems and expertise.

Hepworth called for a balanced, science-based approach that takes into account the potential role of human movements and unsustainable and unhygienic poultry husbandry practices and trade. He drew attention to resolutions recently adopted by the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA), the Ramsar Convention on Wetlands of International Importance, CMS and the Convention on Biological Diversity (CBD), noting that these recommend: higher standards and biosecurity measures in poultry; integration of expertise on wild birds and conservation into animal and human health considerations; national contingency plans and public awareness campaigns; and avoidance of ineffective or counter-productive "quick fixes," such as culling wild birds and destroying their habitat, which may induce the spreading of infected birds and thus exacerbate the problem.

Hepworth identified the Seminar's objectives to: stimulate debate on the role of wild birds in transmitting the virus; provide up-to-date status reports and advice for decision-makers; increase awareness of the recent multilateral environmental agreement (MEA) resolutions among all governments; promote further research on virus behavior and transmission; and encourage international technical cooperation and risk mitigation.

Bert Lenten, AEW Executive Secretary, said when H5N1 spread into the AEW region in 2005, HPAI became a top priority for AEW. Noting that AEW was the first MEA to adopt a resolution on HPAI, he said the main challenge is to disseminate more balanced information to all relevant stakeholders. He expressed hope that the Seminar would strengthen cooperation between the main players, gather the latest scientific information and communicate it to the outside world through concrete recommendations, including on an early warning system.

Marion Cheatle, UN Environment Programme (UNEP) Division of Early Warning (DEWA), observed that her Division's early warning system raises awareness of emerging long-term environmental threats and facilitates the development of early warning measures. She stated that DEWA bridges the gap between science and policy by providing an understanding for decision makers of issues emanating from the science domain.

Chair Schei highlighted different dimensions of the HPAI issue, including the human health, animal health, agricultural, trade, and ecological dimensions. He expressed hope that the Seminar would produce up-to-date scientific information and underscored the need to identify knowledge gaps. Calling for short-term surveillance mechanisms to identify the species that contribute to the spread of HPAI and trade impacts, he called for an enhanced cooperation system.

EPIDEMIOLOGY AND HUMAN ASPECTS OF AVIAN INFLUENZA

Addressing the epidemiology of avian influenza viruses, Anja Globig, German Federal Research Institute for Animal Health, said avian influenza viruses are highly adaptable and genetically labile. Noting that simultaneous infection with two or more virus subtypes can lead to genetic reassortment, and thus to new strains, she said wild birds constitute a large pool of virus subtypes that are usually low-pathogenic. She noted that wild birds infected with low-pathogenic avian influenza (LPAI) transport and excrete the virus, and thus may infect poultry. Upon infection of new hosts, particularly those housed in high densities, the virus may evolve rapidly and mutate into highly pathogenic viruses such as H5N1.

Noting that susceptibility to H5N1 differs among bird species, Globig said ducks may excrete HPAI without showing symptoms. She said the current outbreak of HPAI, subtype H5N1, differs from that of earlier HPAI outbreaks with respect to the first-time persistence of HPAI in wild birds, its wide geographic distribution, and its tendency to cross the species-to-species barrier. Globig concluded that H5N1 might be widely distributed in waterbirds, but that prevalence, mortality and contagiousness seem to be low.

Vincent Martin, UN Food and Agriculture Organization (FAO), addressed the role of poultry production systems in the spread of H5N1 and cultural and trade practices that influence the emergence of HPAI. He explained that the emergence of HPAI in Asia resulted from the convergence of different risk factors, such as the increasing intensity of poultry production systems, low biosecurity, and the absence of effective veterinary services.

Martin highlighted the role of free-ranging duck farming systems in Vietnam in spreading the virus, noting that ducks foraging in paddy fields during the rice harvest regularly come into contact with wild birds and thus constitute a biosecurity risk. He also addressed the risk posed by backyard poultry systems. Highlighting that mixing of domestic species enables virus genetic reassortment, and thus the emergence of more virulent viruses, he underscored the need to improve biosecurity.

Martin identified legal and illegal international trade in poultry and poultry products as important risk factors for spreading the virus. Addressing "wet markets," where live animals are often sold in conditions offering low biosecurity in addition to close contact between species, and highlighting the high risk of infection from slaughtering and consuming blood products, Martin called for improved risk strategies. Addressing cultural practices that facilitate the spread of the virus, he underscored the need for education in the safe handling of poultry and for strengthening and empowerment of veterinary services.

Christianne Brusckke, World Organization for Animal Health (OIE), discussed measures to eradicate HPAI at its source. She highlighted the significant social and economic consequences of the current outbreak, including the culling of over 200 million domestic birds. As prerequisites for effective early warning she identified: early detection through broad awareness and high-quality veterinary services; rapid and transparent notification through an appropriate national chain of command combined with compensation for farmers; and rapid response through confirmation of suspects, confinement, humane culling, and the use of high-quality vaccination when available and appropriate.

Highlighting cooperation between OIE, FAO and the World Health Organization (WHO), Brusckke called for: support for affected countries unable to mobilize the necessary resources;

restructuring of livestock sectors and veterinary services, particularly in developing countries; and capacity building, including for policy makers and the private sector. She concluded that HPAI control should focus on poultry rather than wildlife.

Addressing the human health dimension of HPAI, subtype H5N1, Honoré Meda, WHO, explained that co-circulation of human and avian viruses may result in virus reassortment, mutation, and ultimately a pandemic resulting from humans' lack of immunity to new viruses. He said that of the 160 human H5N1 infections to date, 85 had resulted in fatalities, and clarified that human infections may occur through: contact with respiratory secretions, faeces, contaminated feathers or blood; environmental contamination; and consumption of raw poultry.

Meda elaborated on the WHO alert phase approach to the pandemic threat, which follows epidemiological triggers, noting that human-to-human transmission is an important trigger. He also said that subsequent phases are associated with progressively higher levels of alertness and that recommended actions vary according to the phase. He explained that the current pandemic alert phase is characterized by no or very limited human-to-human transmission.

Discussion: During the ensuing discussion, participants addressed the risks related to farming methods whereby domestic birds forage on agricultural land. They noted difficulties in establishing exact statistics on prevalence of the virus in living birds, as well as on mortality.

Noting that livestock sector structure and veterinary practices differ between countries, one participant enquired whether to favor a standard or a case-by-case approach. FAO and OIE both supported tailor-made solutions in combination with general guidelines.

Addressing a question on preventive measures, Bruschke highlighted the importance of preparedness, establishing compensation mechanisms and upgrading veterinary services and laboratory facilities, and stressed that OIE's current early warning system addresses all important zoonoses, not only HPAI. She said OIE standards recommend trade restrictions only in case of domestic bird infection, noting that individual countries may impose stricter regulations.

On intra-species virus transmission, Chair Schei stressed the need for species-specific information and responses. Several organizations called for concrete steps to incorporate wildlife early warning systems into the Global Livestock Early Warning and Response System (GLEWS) operated by WHO, OIE and FAO, noting that effective reporting on wild birds is currently lacking in many countries. Martin called for an information system, building upon GLEWS, that integrates data from different sources, including wild bird monitoring institutions. He proposed a signed agreement between relevant organizations, including conservation organizations, to integrate efforts regarding risk assessment and early warning.

On the likelihood of HPAI being transported by wild birds, participants named examples of outbreaks that were definitely related to bird migration, highlighting geographic and genetic evidence. Chair Schei noted that genetic information could play an important role in identifying potential roots of and linkages between outbreaks. One participant said the recent outbreak in Nigeria had been traced back to illegal poultry imports and called for technical and material support for developing countries.

On human infection, participants discussed contamination of water as one of the mechanisms of transmission and called for guidelines to prevent infection. On the virus' ability to survive

in the environment, Globig said information is inconsistent, but noted that H5N1 is believed to be able to survive in cold water for up to a month.

AVIAN INFLUENZA AND WILD BIRDS

Taej Mundkur, Wetlands International, gave an overview of the chronology of the H5N1 epidemic in birds since its emergence in Hong Kong in 1996. Recalling that 6500 birds died in Qinghai Lake, Central China, in May 2005, he highlighted the difficulty in gathering information in this remote region. He explained that with regard to HPAI outbreaks, three types of wild birds can be classified according to their feeding habits: scavenging species, such as crows, magpies and raptors, that are likely to forage around poultry farms; species such as herons, egrets and gulls, that often feed and scavenge solitarily in polluted water bodies near towns and farms; and colonially-nesting or flocking waterbirds that feed in farmlands or adjacent water bodies.

Noting the lack of information regarding the susceptibility of species to H5N1, he called for additional research, including on non-waterbirds. Lamenting the lack of information about the ability of birds to carry the virus over long distances, Mundkur noted that none of the five species found infected in Qinghai Lake were found dead outside their breeding grounds and stressed that only six out of 13,000 apparently healthy waterbirds that were tested in China were found positive for H5N1.

David Stroud, UK Joint Nature Conservation Committee (JNCC), presented on the complexity of bird migration systems and resulting problems with regard to prediction. He explained that public perception of wild bird migration movements has been confused by the simplistic representation of flyway maps in the media. Stroud elaborated on factors such as "leapfrog migration," moult migration and the fact that species' migration strategies can vary according to age, sex, weather and season, noting that these factors hamper prediction. He also highlighted the high degree of individual migration variation within bird species, but noted that some birds travel along defined paths and can be easily tracked using satellite systems. He called for enhanced communication with decision makers, accessible information resulting from ringing data, particularly regarding high-risk species, and efforts to conduct waterbird counts in months other than January.

Jan Veen, Wetlands International, presented on his organization's preliminary assessment of ornithological data relevant to the spread of HPAI in Europe. Noting that criteria for identifying high-risk species include the occurrence of LPAI, contact with domestic birds and species occurrence, he said categorization is arbitrary and country-specific, but identified the Mallard and Black-headed Gull as high-risk species throughout Europe. Stressing that data on high-risk species' migration routes and concentration and mixing sites are scarce, Veen said the Baltic, Black and Caspian Seas are main gathering sites. He elaborated on a wetland-specific rapid assessment planning format, developed in cooperation with wetland managers, that describes: wetlands' topography; occurrence of vulnerable species; local and large-scale waterbird movements; human activities; proximity of poultry farms; and measures to be taken in case of an outbreak.

Leon Bennun, BirdLife International, said HPAI outbreaks have largely been scattered and self-limiting. He stressed that the direct impact of HPAI on bird populations is much smaller than the indirect impact, which mainly results from negative public perception. Highlighting flawed risk assessment, panic and misperception induced by media and authorities, and confusion between HPAI and a human pandemic, he said counter-productive responses include culling, wetland destruction, nest destruction,

and dumping of pets. He said some authorities are encouraging hunting to combat HPAI while others ban it for the same reason, and noted that the potential effects of banning hunting and wild bird trade are unclear. He said NGOs can play an important role through their surveillance networks and by providing data and expertise, disseminating information on sites and species, providing access to a network of expertise, and dealing with public misperceptions.

EARLY WARNING SYSTEMS AND DEVELOPMENT OF RISK ASSESSMENT MODELS

Marion Cheatle, UNEP-DEWA, said the Third International Conference on Early Warning, held from 27-29 March 2006 in Bonn, Germany, had identified HPAI as an emerging hazard that requires immediate attention. Identifying risk awareness, monitoring, information dissemination and capacity as essential elements of early warnings, she highlighted UNEP's activities with regard to monitoring of, and issuing warning on, emerging threats, and said human-induced environmental change is a root cause of increasing human vulnerability to hazards. Recalling the UNEP Governing Council's call for improved cooperation between health and environment organizations, she underlined UNEP's role in catalyzing early warning processes, filling data gaps, coordinating data from global earth observing systems, building capacity for surveillance, and raising public awareness.

William Karesh, Wildlife Conservation Society (WCS), addressed early warning systems for animal-transmissible diseases, highlighting the Global Avian Influenza Network for Surveillance (GAINS), the WCS Field Veterinary Programme, and the WCS initiative "Animal Health for Environment and Development" (AHEAD). Stressing the need to avoid speculation on cause-and-effect relationships with regard to HPAI outbreaks, he elaborated on the risks of species mixing at markets, cock fighting, and global trade in wildlife, which he said is still poorly monitored. Commending the concept of "one world, one health," he encouraged MEAs to contribute, and human, wildlife and livestock health organizations to work together to link field and laboratory work, create accessible databases, and disseminate information.

Ward Hagemeijer, Wetlands International, presented options for an early warning system for HPAI in wild birds. He stated that an early warning system should function as a strategic tool to avoid dramatic impacts and elaborated on different components of early warning, including sampling. He said the cost implications of sampling are high in situations where prevalence is low, highlighting that only six out of 13,000 birds tested positive for the virus in China. He underscored the importance of establishing baseline data and the possibility of using sentinel birds – virus-negative birds that are closely monitored – to ascertain the prevalence of the virus. Stressing the need for capacity building for sampling, he called for enhanced cooperation between existing initiatives.

Hagemeijer mentioned constraints relating to transporting samples and acquiring permits to take samples across borders. He called for enhanced strategies to facilitate the exchange of samples and highlighted the importance of reporting as a component of an early warning system to trigger actions and allow effective decisions and responses. He described follow-up actions such as rapid assessment missions to enable local authorities to coordinate an effective response. He elaborated on NEWFLUBIRD, a potential early warning system model for western Eurasia and Africa, which could also function as a regional component of GAINS.

Addressing risk assessment models for the spread of HPAI, Katharina Stärk, Swiss Federal Veterinary Office, gave an overview of international standards in risk assessment and the current status of risk assessment in relation to H5N1. She explained that risk analysis offers a structured approach to synthesizing all available information to support objective, science-based decision making, and comprises of risk management, risk assessment and risk communication. She added that risk management is the driving force. Calling for a global framework for HPAI-related risk assessment, Stärk noted that knowledge gaps hamper risk assessment and called for a focus on relative risk rather than on absolute risk. She affirmed risk assessment as an effective approach and added that global risk assessment requires information sharing and consideration of incentives rather than penalties.

Discussion: In the ensuing discussion, participants addressed options for the management of HPAI in wild birds after an outbreak. They stressed the need to avoid panic, considering that most outbreaks are minor and self limiting. Calling for a long-term, globally coordinated approach, participants recognized that other communicative diseases should be addressed simultaneously.

Participants expressed concern about government policies that promote culling of wild birds, including in Russia and the Philippines, and called upon the CMS-led Scientific Task Force to send appropriate signals to governments.

Participants called on UNEP to liaise with the Convention on the International Trade in Endangered Species (CITES) to address transboundary transportation of wildlife samples, as well as possible sanctions for killing migratory species or for allowing poultry diseases to contaminate the environment.

On Tuesday morning, participants were invited to comment on the Seminar's draft outcome document and propose amendments. One participant highlighted the need to address national-level reporting in the context of a global-level early warning system. Discussing the issue of compensation, participants highlighted developing country constraints, expressed the urgent need to encourage farmers to report outbreaks in a timely manner, and called on donors to compensate farmers directly. Compensation was also proposed for national parks that lose revenue due to HPAI control measures, with one participant noting that protected areas in Asia have already been affected. Martin clarified that FAO is currently examining the compensation issue.

OUTCOMES OF RECENT INITIATIVES AND NATIONAL AND REGIONAL CASE STUDIES

On Tuesday, David Rapport, EcoHealth Consulting, addressed linkages between the threat of an HPAI pandemic and the environment. He noted increasing evidence that many human health crises, including the HPAI pandemic threat, are related to human-induced ecosystem degradation. Describing human health as a function of ecosystem health, he said the "ecohealth perspective" is gaining wide acceptance, noting that it recognizes that: indicators of ecosystem health include functionality, vitality and resilience; deterioration of ecosystem health results from chronic exposure to anthropogenic stresses; highly degraded ecosystems may not recover, even if stress loads are lessened; loss of ecosystem health places humans at risk; and addressing these issues is a matter of politics rather than science.

To reduce cumulative stresses, Rapport advocated an upstream approach through: adopting a mixed strategy that addresses both human health and ecosystem functioning; phasing out existing,

high-risk farming practices; reducing close contact between humans, poultry and wildlife; maintaining and restoring wetlands; and protecting flyways from conflicting land uses.

Reinhard Lentner, Directorate-General (DG) Environment, European Commission (EC), described his DG's actions regarding HPAI. Describing the collaboration between different EU bodies involved with HPAI, he advocated multidisciplinary problem-solving and strong involvement of ornithological experts. He said the EC works closely with the European Member States to develop an EU-wide response and biosecurity strategies. On implications for wild bird conservation, Lentner highlighted the EU Birds Directive, which provides for protection of wild birds and regulation of hunting. He underscored the EC's position on culling, which is that it is neither advisable nor justifiable, has little scientific support, and may facilitate the spread of the virus. He said hunting is now prohibited in areas of outbreaks and live decoys are banned in high-risk areas.

Lentner said his DG and conservation authorities cooperate closely to generate advice and ensure sufficient monitoring and surveillance of wild birds, and identified future needs, including increased understanding of virus behavior in wild birds and improved wild bird surveillance and information and awareness strategies.

Addressing FAO's activities on wild bird surveillance in Africa, Vincent Martin, FAO, said that FAO, with support from other partners, initiated five regional technical cooperation programmes (TCPs) in November 2005 as a proactive response to HPAI. He noted that these programmes aim to enhance local knowledge and capacity with regard to epidemiology, wildlife surveillance and laboratory diagnostics.

Martin discussed the West African TCP, which focuses on the Senegal, Niger and Chad River basins for active surveillance using a quick risk assessment process. He noted that as these river basins are significant wetlands with large congregations of wild birds in proximity to poultry, they are potential sites for the introduction of the H5N1 virus into West Africa.

Observing that H5N1 was not detected in 3500 samples taken in Chad, Mali, Ethiopia and Morocco, Martin highlighted the constraints of wild bird surveillance noting that it is resource intensive. He called for training in capture and sampling techniques in addition to collaboration within different government departments.

Martin emphasized the need to analyze surveillance results, review surveillance protocols and enhance understanding of migratory patterns within Africa, including through ringing and examining wetlands dynamics as environmental triggers for migration.

Ahmed Djoghlaif, CBD Executive Secretary, presented the outcomes of the CBD brainstorming meeting on HPAI held prior to the eighth Conference of the Parties (COP-8) to CBD in March 2006, and the resulting COP-8 Decision on Avian Flu (UNEP/CBD/COP/8/L.35). He addressed the impact of HPAI on wildlife and lamented the lack of knowledge on the issues, particularly in Africa. With regard to the impact of HPAI on livelihoods and development, he highlighted the implications of HPAI for attaining the Millennium Development Goals. Stressing that it is fundamental to examine HPAI in relation to both wildlife and livelihoods, he underscored the close relationship between ecosystem health and human health. He called for capacity building in Africa, enhanced public awareness and education, and inter-agency cooperation, including through the potential establishment of a broader task force.

David Stroud, JNCC, presented outcomes of the 6th International Symposium on Avian Influenza, held from 3-6 April 2006 in Cambridge, UK. Highlighting Asian experiences, he reported that vaccination in parallel with other control measures has proven to be effective. Addressing the current situation in Nigeria, Stroud noted the conclusions that: the poultry sector is Nigeria's second largest industry after oil; genetic evidence reveals separate H5N1 introductions; and laboratory work has shown that the vulnerability of ducks to H5N1 is age- and strain-dependent. Addressing experimental infections of different wild bird species, Stroud noted varying vulnerabilities and added that the level of an initial viral challenge is critical to whether or not a bird develops symptoms. He highlighted a European response task force that was established in response to previous outbreaks of H7 subtypes in Europe.

Stroud drew attention to reports that H5N1 survival in the environment depends on salinity and temperature and is lower than that of other H5 and H7 subtypes. He concluded that the Symposium acknowledged: the enormous social and economic impact of poultry outbreaks and the importance of prevention; the frightening pathology of H5N1, including rapid neurological effects; the dangers of asymptomatic virus carriage by ducks; and the need for better information on the virus' environmental persistence.

Evgeny Kuznetsov, all-Russia Research Institute for Nature Protection, addressed the recent spread of H5N1 in Russia. He said initial patterns suggested a relationship with bird migration from China, while recent developments revealed a significant contribution by human traffic along roads and railroads. Noting that his Government's official report on the initial outbreak in July 2005 lacks sound data, he said authorities are promoting culling of wild birds as a viable option to contain the outbreak. He described how special forces kill wild birds around villages and poultry farms, which he said is leading to increased bird dispersal and an added risk of local infections. Kuznetsov said regular hunting has now been banned, which stimulates poaching and results in food scarcity among subsistence hunters, and highlighted attempts to poison birds, including non-waterbirds. Proposing ways to improve monitoring, he recommended increased ringing activities and following individual birds along flyways to study patterns in virus prevalence, virulence and survival.

Richard Kock, Zoological Society of London, addressed the notable absence of HPAI in the East-African Great Rift Valley. He stated that the occurrence of outbreaks is related to epidemiology and geography rather than to human control efforts, noting that the deserts of Northern Africa and the Middle East seem to constitute effective barriers to virus dispersal. He said the risk of spreading of HPAI into the Great Rift Valley is extremely low, given the small percentage of waterbirds that migrate to this region and the limited chance of infected birds being able to cross the desert barrier. Stressing the importance of establishing baselines and conducting longitudinal studies, Kock recommended establishing monitoring stations in the main flyway corridors and linking such efforts with current ringing activities and long-term ornithological studies.

Discussion: During the ensuing discussion, one participant suggested extending TCP activity to South-East Asia, considering the urgent need to improve surveillance of wild birds in this region.

Participants discussed ecological sanitation of wetlands and methodologies for designing surveillance schemes and the parameters required. Underlining the role of protected areas in public awareness and education, one participant called for government action to avoid socio-economic consequences of HPAI control measures in protected areas.

Discussion also focused on follow-up strategies regarding the Seminar's outputs, with the CMS-led Scientific Task Force being suggested as the most suitable mechanism for coordinating activities. Some participants urged further examining the relationship between trade and HPAI, suggesting the expansion of the Task Force with a commodity specialist to study the relevant market implications.

ROUNDTABLE DISCUSSION

A roundtable session was held on Tuesday afternoon, bringing together Seminar participants, UNEP Country Permanent Representatives and the media. David Stroud, JNCC, presented an introduction to the issue and a preliminary overview of the Seminar's outcomes and recommendations, addressing: surveillance, early warning and risk assessments; priority short-term needs; longer-term needs; collaboration and cooperation; and next steps.

One participant stressed the need for a holistic perspective taking into account issues relating to improving livelihoods and eradicating poverty. He stressed the need for capacity building in all sectors, particularly in Africa. Another participant called for political will to integrate ecosystem and human health concerns, lamenting the prevailing focus on economic growth as a prerequisite for human well-being.

Several participants described national experiences with HPAI contingency plans, noting the importance of effective coordination between different government departments and between governments and NGOs. There was a general call for improved coordination between neighboring countries to enable transboundary contingency planning.

Participants addressed the need to assign national lead agencies for coordinating contingency planning, concluding that each country should decide individually which lead agency to appoint. They stressed the need for long-term surveillance schemes.

Vincent Martin, FAO, observed that Niger had taken limited control measures to contain HPAI and had only just begun to cull poultry, but clarified that the virus is not spreading as quickly in Africa as it has in Asia. He attributed this restrained progression to the dry and hot Sahel climate, but cautioned that this situation could change during the raining season. He also highlighted the Pan African Programme for the Control of Epizootics (PACE), an early warning and control system which also addresses HPAI, noting that FAO works in close collaboration with this Programme and provides assistance. He added that rapid assessment teams would be established to help countries strengthen their surveillance capacities.

Christianne Brusckke, OIE, reaffirmed that HPAI is only a "notifiable disease" in poultry, not in wildlife. Noting factors that prevent some countries from fulfilling their notification requirements, she elaborated on a joint mechanism with FAO to pool all reported information and input from rapid assessment teams to inform other countries about the risk of contracting HPAI.

With regard to UNEP's role in the Scientific Task Force, Norberto Fernandez, UNEP-DEWA, and Robert Hepworth, CMS Executive Secretary, highlighted UNEP's experience in assessing the state of the environment as well as its extensive network

and expertise. They also highlighted UNEP's role in facilitating meetings, providing scientific information, and disseminating advice relating to culling and wetland destruction.

Participants also addressed the feasibility of using regional economic organizations such as the Economic Community Organization of West African States (ECOWAS) to facilitate workshops and seminars for public awareness raising. Vincent Martin, FAO, highlighted three awareness-raising workshops held in Africa.

Participants then discussed the draft conclusions and recommendations of the Seminar. Discussions focused on the need to: develop, in collaboration with FAO, mechanisms to restructure agricultural production systems with the goal of reducing stresses on ecosystems and risks to human health; strengthen the Scientific Task Force through additional financial resources and the appointment of a full-time Scientific Task Force Coordinator; and review the terms of reference and membership of the Scientific Task Force, consider its future priorities, and examine potential cooperation with and support from other bodies.

FINAL CONCLUSIONS AND RECOMMENDATIONS

On Tuesday afternoon, participants reached consensus on and finalized the Seminar's conclusions and recommendations. The following is a brief summary of this outcome document.

In an introductory section, participants recall the establishment of the CMS-led Scientific Task Force on Avian Influenza and Wild Birds. They also recall the recent conclusions of the Contracting Parties to AWEA, Ramsar and CMS, which state that HPAI, subtype H5N1, is considered to have spread between countries by many different vectors, including through the movement of avian livestock and migrating waterbirds, and that evidence of causal links is often lacking. Participants stress that the establishment and maintenance of high standards of poultry biosecurity remains central to the reduction of infection risk, and that national veterinary services should be upgraded to OIE standards.

In a section on surveillance, early warning and risk assessments, participants state that early detection is essential for the control or eradication of HPAI, subtype H5N1. They note the considerable efforts of FAO, WHO and OIE to develop an integrated early warning system and underline the need to build upon existing initiatives. They stress the importance of ensuring adequate surveillance and rapid reporting and data-sharing systems, and specify that surveillance programmes should: be web-based; facilitate integrated responses and risk management; report associated meta-data that allow full analysis of the results; and facilitate timely and effective risk management. Participants state that the development of GAINS as an international initiative, and NEWFLUBIRD in western Eurasia and Africa as a possible regional component of GAINS, would fully incorporate these requirements and their development should be encouraged.

Participants call for standardization of national-level reporting. On risk assessments, they state that all countries should undertake transparent, structured and science-based risk assessments and make use of all available knowledge. They recognize the general need for strengthening HPAI field surveillance, especially in developing countries, and for developing the capacity of veterinary services worldwide. On data and information needs, participants call for improved, contemporary and international analysis of existing waterbird ringing and count data at the

species level and also in months other than January. They also identify the need for better consolidated information on national trade in poultry and poultry products.

In a section on priority short-term needs, participants recognize the importance of: rapid reporting and control measures; data collection on trade issues, the development of compensation policies for agricultural losses and impacts on protected areas; and effective communication with the media, the public and policy makers using scientific facts. They call for additional research on: the prevalence of H5N1 in wild bird populations; existing ringing data to assess migratory systems; the ecology of the virus in the environment; natural mortality levels in wild bird populations; wild bird susceptibility to H5N1; and effective measures to reduce transmission of H5N1 between wild birds and poultry.

In a section on longer-term needs, participants recognize the need to build programmes of sustainable financial measures and other support to ensure the sustainability of short-term measures. They recognize that ecosystem degradation has played a role in the evolution and spread of H5N1, and urge the development, in collaboration with FAO, of mechanisms to restructure agricultural production systems with the goal of reducing stresses on ecosystems and risks to human health. Participants call for better information on cultural practices that have the potential to either help or hinder the control of H5N1.

In a section on collaboration and cooperation, participants stress the need to develop and maintain collaborative approaches and partnerships that integrate wetland and wildlife management expertise with expertise on human health and zoonoses. They reaffirm the important role of the Scientific Task Force on Avian Influenza and Wild Birds. On data and information needs, they call for better integration of existing data on trade in poultry and other birds and the establishment of a web-based clearing-house mechanism on the spread of H5N1.

In a section on next steps, participants ask the Scientific Task Force, as a matter of urgency, to promote the implementation of the Seminar's conclusions and recommendations both within participating organizations and among others. They suggest that a review of the work of the Task Force, including the Seminar's conclusions and recommendations, be communicated to the UN Special Coordinator for Avian Influenza. They state that to maintain the Task Force's professional approach, additional financial resources are urgently needed, and suggest the appointment of a full-time Scientific Task Force Coordinator. Participants ask CMS to review the terms of reference and membership of the Scientific Task Force, consider its future priorities, and examine potential cooperation with and support from other bodies.

CLOSING OF THE SEMINAR

Shafqat Kakakhel, Acting Executive Director of UNEP, expressed his appreciation to the Seminar's co-sponsors, including the UK Department of Environment, Food and Rural Affairs (DEFRA), FAO and the Netherlands' BirdLife partner, Vogelbescherming Nederland. He stressed that environmental change in combination with the emergence of infectious diseases is one of the greatest challenges of our time, noting the significant negative impacts of a degraded environment. He reaffirmed the need to effectively follow up on the Seminar's conclusions and recommendations through tangible and measurable actions and called for enhanced inter-agency cooperation. He also reaffirmed UNEP's commitment to disseminating the Seminar's findings and managing the risks associated with HPAI.

Seminar Chair Schei commended participants for their constructive engagement and expressed satisfaction with the Seminar's outcomes. He said proceedings of the Seminar, including summaries of all expert presentations, will be circulated among participants and become available through the CMS website. He closed the meeting at 6:30 pm.

UPCOMING MEETINGS

INTERNATIONAL SCIENTIFIC CONFERENCE ON AVIAN INFLUENZA AND WILD BIRDS: This meeting, organized by FAO and OIE, will take place from 30-31 May 2006 in Rome, Italy. The meeting aims to exchange scientific information on AI and the role of wild birds, to assess the risk of the introduction of the HPAI virus to as yet uninfected areas as well as to propose mitigation and preventive measures. For more information, contact: Maria Zampaglione, OIE; tel: +33 (0) 1 44 15 18 88; fax: 33 (0) 1 42 67 09 87; e-mail: m.zampaglione@oie.int; internet: <http://www.oie.int> or http://www.fao.org/AG/AGAInfo/subjects/en/health/diseases-cards/special_avian.html

2ND BIRD FLU SUMMIT: During this meeting, which will be held from 28-29 June 2006 in Washington DC, USA, business, government, public and private sector leaders interact with avian influenza experts from around the world to address the issues of pandemic prevention, preparedness, response and recovery. For more information, contact: Nancy Lane, New Fields; tel: +1-202-536-5850; fax: +1-202-478-2989; e-mail: nancy@new-fields.com; internet: <http://www.new-fields.com/birdflu2/index.asp>

FIRST INTERNATIONAL CONFERENCE ON AVIAN INFLUENZA IN HUMANS: This conference will take place from 29-30 June 2006 in Paris, France and is organized by the International Society of Antioxydants in Nutrition and Health. For more information, contact: Sandra Huguenin, French Society of Antioxydants (SFA); tel: + 33 (0) 1-55047755; fax: +33 (0) 1-55047757; e-mail: influenza2006@wanadoo.fr; internet: <http://www.isanh.com/avian-influenza/>

BIOSAFETY PROTOCOL COP/MOP-4 AND CBD COP-9: The fourth Meeting of the Parties to the Cartagena Protocol on Biosafety and the ninth Conference of the Parties to CBD are expected to be held back-to-back in 2008, in Germany. For more information, contact: CBD Secretariat; tel: +1-514-288-2220; fax: +1-514-288-6588; e-mail: secretariat@biodiv.org; internet: <http://www.biodiv.org>

FOURTH WORLD CONSERVATION CONGRESS: This meeting will be held in 2008. The dates and venue for the meeting will be determined at the next IUCN Council meeting, which will take place from 20-24 May 2006. For more information, contact: Ursula Hiltbrunner, IUCN; tel: +41-22-999-0000; fax: +41-22-999-0002; e-mail: urh@iucn.org; internet: http://www.iucn.org/members/council_64/#wcc

RAMSAR COP-10: The tenth Conference of the Parties to the Ramsar Convention will be held in 2008 in Changwon, South Korea. For more information, contact: Ramsar Secretariat; tel: +41-22-999-0170; fax: +41-22-999-0169; e-mail: ramsar@ramsar.org; internet: <http://www.ramsar.org>

CMS COP-9: The ninth Conference of the Parties to CMS will take place in 2008, with the date and venue to be set. For more information, contact: UNEP/CMS Secretariat; tel: +49-228-815-2401/02; fax: +49-228-815-2449; e-mail: secretariat@cms.int; internet: <http://www.cms.int/>

AEWA MOP-4: The fourth Meeting of the Parties to AEWa will take place in 2008 in Madagascar. For more information, contact: AEWa Secretariat; tel: +49-228-815-2414; fax: +49-228-815-2450; e-mail: aewa@unep.de; internet: <http://www.unep-aewa.org>