

Report of the Expert Mission  
to Support the Development of a  
National Action Plan to Prevent and  
Control the Avian Influenza Virus in  
Live Animal Markets or "Wet Markets"  
in Indonesia

*Jakarta, Indonesia, 23<sup>rd</sup> to 28<sup>th</sup> January 2006*

*March 2006*



**World Health  
Organization**

Regional Office for South-East Asia  
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# CONTENTS

<i>Executive Summary</i>	v
1. OBJECTIVES OF THE MISSION, LIST OF EXPERT TEAM MEMBERS	1
2. MAIN FINDINGS	2
3. RECOMMENDATIONS	6

## Annexes

1. Programme of the Mission, List of Stakeholders Met and Places Visited	10
2. Outcomes from the Risk Assessment Based Visits to Some Wet Markets in Jakarta Municipality	13
3. Draft Proposal for a National Programme to Promote and Implement Healthy Food Markets (HMF) in Indonesia	26
4. Suggestions for Strengthening Prevention Aspects in the "National Strategic Plan for Avian Influenza Control and Pandemic Influenza Preparedness 2006-2008"	41
5. Proposals for Capacity Building to Promote the Implementation of Healthy Food Markets	44
6. Samples of Communication Materials to Prevent and Control AI Spread	48
7. Sample Photos from Wet Markets in Indonesia, 01.2006	49



## Executive Summary

The unprecedented widespread outbreaks of avian influenza in many countries in Asia, including Indonesia, and the demonstrated capacity of the avian influenza H5N1 strain to directly infect humans and cause death, have together significantly increased the risk of the emergence of a human influenza pandemic.

To date there have been 165 cases of infected humans reported across 7 countries with 88 deaths. It has been reported that 83% of the human influenza cases around the world have had exposure to ill poultry, thereby leading to an understanding that mitigating the pandemic threat effectively is also dependent on controlling the disease at source that is in poultry farms and at live animal markets or “wet markets” A wet market is a place where members of the public go to buy small animals and birds that are: (a) live and slaughtered there (b) live and taken home to be slaughtered, or (c) already slaughtered and sold as meat.

In Indonesia, by early February 2006, 23 cases of human H5N1 infections had been reported in the country, of which 16 had been fatal.

The mission members visited the main stakeholders during the week of 23<sup>rd</sup> to 28<sup>th</sup> January 2006 and had opportunity to assess the biosecurity situation in four wet markets. A detailed overview of the mission’s programme is annexed to this report (**Annex 1**)

The mission members had ample opportunity to study the “National Preparedness Strategic Plan for Avian Influenza Control and Pandemic Influenza Preparedness, 2006-2008”, Version December 2005. It is highly appreciated as it is an integrated plan, bringing together both main sectors – agriculture and health – agreeing on what needs to be done, who will do it and at what cost. The goals and targets, along with the detailed activities, address all the relevant aspects

A risk assessment focusing on biosecurity and food safety was undertaken in four wet markets in Jakarta. According to the current understanding of Avian Influenza transmission, the Mission concluded that wet markets present a high risk for potential Avian Influenza transmission from animals to animals and from animals to humans.

If infected birds are received in wet markets there are a myriad of possibilities of how the transmission could occur. Some of these risk factors can be controlled quickly with limited investment, others require major financial investment.

All the controls identified necessary to help prevent Avian Influenza in the wet markets also help prevent other food borne diseases.

Ducks and vaccinated poultry can be asymptomatic carriers of the AI virus. Both can be available in markets and therefore, the current slaughtering and eviscerating practices of these birds should be considered high risk practices. It is recommended that protective measures to minimize the exposure of slaughterers and poultry workers be implemented.

Currently bird storage, slaughtering and further processing are undertaken in public areas. If an infected bird is present, then many people may be exposed to the bird, blood and secretions. Re-zoning is necessary to limit the potential public exposure.

Market stall owners, slaughterers, poultry workers and customers have limited access to water, soap and hand towels to wash and dry their hands. Frequent hand-washing and hand-washing after risk activities is recommended to reduce the likelihood of transfer of the virus from contaminated poultry and/or surfaces to the mouth, eyes and/or nose via hands.

The majority of cages are not cleaned. Since the virus can be present in faecal matter and the potential for exposure to the faecal matter is great, adequate cleaning and safe disposal of waste is necessary. Furthermore, regular closure periods of the wet markets are recommended to ensure that cleaning throughout the market occurs (this process has been referred to as "Rest days").

The exposure to poultry by market stall owners, slaughters, poultry workers and the customer in the wet market place demonstrated that the awareness of Avian Influenza, transmission routes and methods of preventing transmission is limited. Education regarding these issues in the market place is necessary.

In the same manner, the mission members met with wide agreement among the different national and international stakeholders – such as FAO –

that they were able to meet during this period, that actions aiming at increasing hygiene, better sanitation, access to safe water and waste management in wet markets would be one of the urgent task to implement as soon as possible, not only in terms of contributing to prevent and control the spread of the avian influenza virus, but also because its other public health benefits and opportunities for community participation.

The framework proposed to address the need to improve the conditions in wet markets, "Healthy Food Markets" or "HFM", was presented and discussed. The vast majority of stakeholders met, agreed on prioritizing action, requesting WHO to prepare clear and practical guidance on how to promote the set up and functioning of Healthy Food Markets.

The mission recommendations focus on strengthening and expanding the existing initiatives aimed at preventing and controlling AI spread mentioned in the "National Preparedness Strategic Plan for Avian Influenza Control and Pandemic Influenza Preparedness, 2006-2008" and specially targeting wet markets, on launching of a national programme to promote Healthy Food Markets, and on the organization of a national capacity building programme and on the initiation of an awareness campaign on how to improve the wet markets.

Several Annexes, attached to the report, propose concrete guidance for the implementation of the recommendations.



## **1. OBJECTIVES OF THE MISSION, LIST OF EXPERT TEAM MEMBERS**

**Aim: To support the development of a national action plan to prevent and control avian influenza in live animal markets or “wet markets” in Indonesia**

**Mission Period: 23<sup>rd</sup> to 28<sup>th</sup> January 2006**

### **Objectives**

- (1) Jointly with national authorities, provide support in assessing the national avian influenza preparedness plans
- (2) Review the current biosecurity level of the country’s live animal markets, assessing possible their roles in the current outbreak of avian influenza in Indonesia.
- (3) Devise an adapted “Healthy Food Markets” Programme (HFMP) for Indonesian wet markets, including monitoring and evaluation tools for capturing the learning to later adapt the approach for effective replication in other settings in Indonesia and other SEAR countries.
- (4) Cost the HFMP with the aim to present it to potential donors
- (5) Identify the salient “wet markets” that require implementation and facilitate the launch of pilot “Healthy Food Markets”, in first phase.
- (6) Develop draft FOS material for “Healthy Food Markets” advocacy.

### **List of Expert Team Members**

- (1) Dr Steven Bjorge, Technical Officer, Emerging Diseases, WHO Indonesia
- (2) Miss Susan Loo, Technical Officer, Communication, WHO Indonesia
- (3) Dr Roy Sparringa, Head of Sub Directorate for Food Safety Surveillance, National Agency for Drug and Food Control, Jakarta, Indonesia
- (4) Ms Napapan Nanthapong, Water & Food Sanitation Division, Ministry of Public Health, Thailand

- (5) Miss Jenny Bishop, Technical Officer, Food Safety, Regional Office of Western Pacific (WPRO), WHO, Manila, Philippines.
- (6) Dr Peter Karim Ben Embarek, Scientist, Department of Food Safety, Zoonosis and Foodborne Diseases, WHO Geneva, Switzerland.
- (7) Mr Sanjay Chaudhary, Consultant in Food Safety, New Delhi, India
- (8) **Team leader:** Mr Alexander von Hildebrand, Regional Adviser, Environmental Health, Regional Office for South-East Asia (SEARO), WHO, New Delhi, India.

**Note:** A detailed overview of the mission's programme and a sample of photos taken, are annexed to this report (**Annex 1 and Annex 6**)

## **2. MAIN FINDINGS**

### **2.1 Review of the current biosecurity situation in 4 wet markets, Jakarta**

A Hazard Analysis Critical Control Point (HACCP) based assessment was undertaken in four wet markets in Jakarta Municipality to identify areas where transmission could occur to assess the likelihood of the transmission occurring. The scope of these assessments was from delivery of the birds to sale of poultry meat to consumers.

Transmission of Avian Influenza from animals to humans is thought to occur via direct contact with infected poultry, including both the live and slaughtered bird, or surfaces and objects contaminated by their faeces, blood, feathers and/or meat. In all markets visited, it is clear that there is no awareness among poultry handlers about the disease, its mode of transmissions, the survival of the virus in poultry environment, faeces and by-products, the risks associated with handling and slaughtering of poultry and on ways to protect them.

The lack of basic hygiene and the promiscuity under which live poultry are stored and slaughtered as well as the lack of proper waste management, provide ample opportunities for transmission of the disease to humans should diseased birds be processed in the markets.

In summary, the hazards identified with regards to animal to human potential AI transmission include:

- **A:** Direct exposure to the virus via an infected animal (feathers, secretions, blood, faecal matter, meat, bones, intestines, feet,

beak which can all carry the virus) during handling, slaughtering and processing.

- **B:** Indirect exposure via the environment, where any of the sources above contaminate a surface and then a human touches the contaminated surface. This would also include inhalation of contaminated dust heavily present in these environments.
- **C:** Contamination spread from one carcass (and other poultry products) to another, leading to an increase of infected carcasses that humans are exposed to.

Animal to animal transmission and spread into the environment is also of concern as the more the virus spreads throughout the bird population, the possible exposure of humans to the virus increases and therefore the possibility of transmission increases.

A further issue with animal-to-animal transmission is the possibility of the transfer of the virus to another species that can then further spread the virus to the environment or directly to humans. In particular domestic cats and pigeons were often seen in the markets scavenging on dead poultry and/or poultry offal. These inter species links could be 'a mixing vessel, enhancing virus mutations.

In summary, the hazards identified with regards to animal-to-animal potential AI transmission include:

- **D:** Direct exposure to the virus (feathers, secretions, blood, faecal matter, meat, bones, intestines, feet, beak which can all carry the virus).
- **E:** Indirect exposure via the environment, where any of the sources above contaminate a surface and an animal touches the contaminated surface.

Detailed information from these assessments is attached in **Annex 2**. The codes **A, B, C, D and E** are used in the table to identify the relevant hazard.

## **2.2 AI transmission and Wet markets in Indonesia**

The current existing information on the bird flu outbreak and in particular the investigations related to human cases are still inconclusive in terms of clearly defining the risk factors. However, poultry trading, home slaughtering, defeathering and eviscerating of deceased or dead poultry have

been linked to a number of the reported human cases. In a large number of cases, “close contacts” with deceased or dead poultry has been identified as the most probable source of infection in particular in backyard settings where people and poultry often lives in close contacts.

Live animal markets or wet markets are notorious for providing another setting where opportunities for close contacts between humans and poultry occur in large numbers. These markets have not, yet, been identified as being the source of infection of specific human cases.

Nevertheless, based on observations of four wet markets visited in the Municipality of Jakarta and the current understanding of Avian Influenza transmission, the mission considered that wet markets effectively do present a potential high risk for bacteria and virus transmission, including Avian Influenza, between both animals to humans and animals to animals.

Transmission of Avian Influenza from animals to humans is thought to occur via direct contact with infected poultry including both the live and slaughtered bird, or surfaces and objects contaminated by their faeces, blood, feathers and/or meat.

Key features observed in traditional markets that will increase this risk include high density of poultry from multiple geographic origins in close contact with humans; and high exposure of humans to poultry body fluids, blood and faeces during slaughtering and subsequent processing and handling.

### **2.3 “Healthy Food Markets” (HFM), a viable approach to prevent and control AI virus spread**

Among the various food markets prevalent in Indonesia, it is the live animal or ‘wet markets’<sup>1</sup> that offer an environment and work practices conducive for potential transmission of avian influenza. Wet markets in Indonesia are characterized by the existence of a large number of small-scale slaughterhouses. Latter supply to more than 80% of the consumer poultry demand (*Personal communication, National Poultry Association Coordinator*). In Jakarta itself, it is reported that there are 1,200 small-scale slaughter houses, many of them within the wet markets.

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<sup>1</sup> Live animal market or “Wet market” is a place where members of the public go to buy small animals and birds that are live and slaughtered there; live and taken home to be slaughtered, or already slaughtered and sold as meat.

All the stakeholders consulted and interviewed, such as the private National Poultry Association, the para-governmental market Association "Pasar Jaya", national provincial and municipal health, veterinary and agricultural authorities, as well as individual market managers, bird collectors, stall owners and poultry sellers., all expressed their keen interest in engaging for concrete action to invest in measures that would better the safety and quality of food and general hygiene in wet markets and secure consumer trust in the traditional markets.

A Healthy Food Market is a setting in which all stakeholders collaborate to provide safe and nutritious food for the community. In such a setting, the stakeholders (viz. local authorities, market managers, suppliers, stall operators, food market workers and consumers) combine resources and work together to implement incremental changes to improve the market, health and well being of the community.

Implementing the principles of a Healthy Food Market would definitely improve the general hygiene and sanitation levels in wet markets and thus significantly contribute to reduce the risk of AI transmission in those settings.

#### **2.4 The National Preparedness Strategic Plan for Avian Influenza Control and Pandemic Influenza Preparedness, 2006-2008**

The mission members had ample opportunity to study the "National Preparedness Strategic Plan for Avian Influenza Control and Pandemic Influenza Preparedness, 2006-2008" Version December 2005. It is highly appreciated as it is an integrated plan, bringing together both main sectors – agriculture and health – agreeing on what needs to be done, who will do it and at what cost. The goals and targets, along with the detailed activities address all the relevant aspects.

The mission members noted that the "National Preparedness Strategic Plan for Avian Influenza Control and Pandemic Influenza Preparedness, 2006-2008" does mention the need to be proactive at the level of wet markets in terms of reducing the chances for virus transmission from animals to animals and from animals to humans. It is recognized that the presence of the H5N1 virus is widespread in the poultry population across the country and its control will take time and efforts. In the meantime,

reducing the opportunity for further human cases remains an important goal.

However, the document could better reflect this preventative approach as an important element of preventing further human cases and thereby reducing the risk of a pandemic.

### **3. RECOMMENDATIONS**

#### **3.1 Launching a National Healthy Food Markets Programme (HFMP)**

The mission members suggest that Indonesia would benefit in terms of preventing and controlling the spread of AI virus by taking action in wet markets to reduce unnecessary exposure to sick and dead animals specifically, but to all birds in general as some may be sick but not show symptoms. By improving hygiene and sanitation as well as waste management and changing key high-risk behaviours, markets would become less susceptible to infection transmission amongst animals and between animals and humans.

The national HFM programme would start with several pilot markets, the mission members proposed 10 pilots HFM to be set up in 2006, 30 in 2007 and another 60 in 2008. **Annex 3** gives an overview of proposed steps and concrete measures to implement a HFM Programme.

Four basic principles would characterize the national Healthy Food Markets Programme:

- Provision of safe and nutritious food in a healthy environment
- Promotion of food safety from production to consumption, all along the food chain
- Foster of partnerships between market communities, food suppliers, and consumers
- Opportunity for awareness and education for vendors and consumers (for example better understanding food safety risks such as cross contamination, transmission mode of AI and foodborne diseases as well as high risk behaviours in terms of transmission of diseased).

To ensure a successful the implementation of HFMP, the following operational steps would be of help (see more in Annex 3):

- (1) Ensure broad political and stakeholder participation
- (2) Capacity building in understanding the HFM concept
- (3) Conduct local participatory situation analysis of the state of the existing market conditions
- (4) Identify major food safety risks and the reasons behind and from there prioritize actions
- (5) Draw an action plans with budgets and start implementation
- (6) Monitor implementation and conduct periodic evaluations and draw lessons learnt

### **3.2 The National Strategic Plan for Avian Influenza Control and Pandemic Influenza Preparedness 2006-2008: Suggestions for Strengthening Prevention Aspects Aimed at Reducing the Opportunities for Further Human Cases**

The strategic document focuses on developing strategies to controlling the existing outbreaks of AI in animals and humans and on preparing for a human influenza pandemic. As long as the virus circulates in the poultry population, there is a risk of new human cases appearing. Each additional animal to human transmission increases the risk of the emergence of a pandemic strain. Therefore, there is a need to also prevent further human cases in the current outbreak situation and develop strategies towards this goal as each additional animal to human transmission increase the risk of the emergence of a pandemic strain. The Strategy should be renamed to better reflect this need to prevent the occurrence of further human cases. I.e. "National Strategic Plan for Avian Influenza Prevention and Control and Pandemic Influenza Preparedness 2006-2008".

To reflect this strategic move, some changes have been proposed to the common goals and basic principles underpinning the Strategy. These include introducing interventions along the food chain continuum from the farm to the consumer, aimed at minimizing contacts between humans and sick poultry.

Recognizing that the need to improve the current state of traditional wet markets is included in the current document, additional or reworded specific targets and activities have been suggested in the different individual 10 strategies of the National Avian Influenza Prevention and Control Strategy. These will enable major improvements in the wet markets based on an assessment of risks associated with the current situation in the markets.

The detailed list of these suggested amendments to the strategic document are presented in **Annex 4**.

### **3.3 Capacity Building to Promote the Implementation of Healthy Food Markets**

The mission recommends the **launching of a national HFM Training of Trainers (ToT)** capacity building programme for local authorities and members of market and consumer associations and in particular for market managers.

The mission also considers that there is a unique opportunity to organize a **regional workshop to facilitate an exchange of experiences**. Indeed, Thailand, Vietnam, Cambodia, Hong Kong and Indonesia in the development or implementation of Healthy Food Markets. Thailand has a robust Healthy Food Markets programme with over 50% of the over 1600 markets in Thailand already officially certified as such. This capacity building programme would facilitate the immediate setting up of pilot Healthy Food Markets.

More details on these proposals are found in **Annex 5**.

### **3.4 National Campaign to Raise Public Awareness on Avian Influenza Risk Factors and How to Reduce Exposure**

As stated earlier, one of the clear conclusions of the visit of the markets was the need to raise awareness about AI, its mode of transmission and ways to prevent further human cases. This involves the development and dissemination of information and key messages for the public to facilitate better understanding of high-risk practices along the entire food chain leading to behaviour changes. Many risk-based messages have already been developed locally with the support of many agencies such as FAO, UNICEF, Red Cross and others bilateral and multilateral agencies.

Some examples of such material are included in **Annex 6**. More communication materials need to be developed for use in national social mobilization and educational campaigns .

## Annex 1

### PROGRAMME OF THE MISSION, LIST OF STAKEHOLDERS MET AND PLACES VISITED

Mission period 23<sup>rd</sup> January to 27<sup>th</sup> January 2006

#### Day 1 (23 January 2006)

- WHO office Indonesia: Introductions and briefing with Acting WHO Representative, Dr Frits R. de Haan and Dr Steven Bjorge, Ms Gina Samaan, and Dr Malinggom Silitonga, Mr Shamsul Huda
- Ministry of Agriculture, Directorate General of Livestock: Dr. Syamsul Bakhri, Director for Animal Health; Dr Akhmad Junaidi (staff of Directorate for Veterinary Public Health); and Mr Adnan Ahmad (Head of Animal Health and Veterinary Public Health, Jakarta Municipality).
- Ministry of Health, DG DC&EH (Disease Control and Environmental Health): Dr Yusarmen, Director for Surveillance; Dr Runizar and Dr Wilfried H. Purba and other members of the national Task Force Team of Avian Influenza

#### Day 2 (24 January 2006)

- Provincial Health Authority for Animal Health: Dr Edy Setiarto, staff, and key stakeholders in animal health, veterinary public health, inspectors, slaughter house and market associations.
- Live bird Market Pasar Pramuka (wet market)
- Live bird Market Pasar Cempaka Putih (wet market and bird collectors).
- Food and Agriculture Organisation (FAO), Indonesia: Dr Peter Roeder, Technical Officer

#### Day 3 (25 January 2006)

- Market Association Company Pasar Jaya: Mr Y. Joko Setyanto and key staffs; staffs of Environmental Health, DG DC&EH, MoH; staff of Jakarta Municipalities.
- Live bird Market Pasar Pramuka (Pet Birds)
- Media: Interview to several journalists (news agencies, newspaper and TV).
- Live bird Market Pasar Jatinegara (wet market)
- Indonesian Poultry Association Forum: Mr H. Don P. Utoyo, National Coordinator

#### **Day 4 (26 January 2006)**

- National Development of Planning Agency – BAPPENAS: Dr Arum Atmawikarta, Deputy Director
- Coordinating Ministry for People's Welfare: Dr Emil Agustino, MPH, Senior Advisor for the Coordinating Minister in Technology, Clean Water and People's Housing; Mr Maurice Knight, USAID/Chemonics, Advisor
- USAID: Mr Mark Lediard, Senior Technical Advisor Avian Influenza Communication.

#### **Day 5 (27 January 2006)**

- Live bird Market Pasar Mampang (wet market).
- Ministry of Health, DG DC&EH (Disease Control and Environmental Health): Debriefing Meeting with Dr Nyoman Kandun, Director General for DC&EH and key staff
- WHO office Indonesia: Debriefing Meeting with acting WR Dr Frits R. de Haan, Dr Steven Bjorge, Ms Gina Samaan, and Dr Malinggom Silitonga, Mr Shamsul Huda.
- Press Conference: WHO Office Indonesia.
- Ministry of Agriculture, Directorate General of Livestock: Debriefing Meeting with Dr Bagus, staff of Directorate of Animal Health.

**Note:** The National Agency for Drug and Food Control (NADFC) was involved in all activities (Dr Roy Sparringa was part of the mission team).

## Annex 2

### OUTCOMES FROM THE RISK ASSESSMENT BASED VISITS TO SOME WET MARKETS IN JAKARTA MUNICIPALITY

A Hazard Analysis Critical Control Point (HACCP) based assessment was undertaken in four wet markets in Jakarta Municipality to identify areas where transmission could occur and assess the likelihood of the transmission occurring. The scope of these assessments was from delivery of the birds to sale of poultry meat to consumers.

Transmission of Avian Influenza from animals to humans is thought to occur via direct contact with infected poultry including both the live and slaughtered bird, or surfaces and objects contaminated by their faeces, blood, feathers and/or meat. In all markets visited, it is clear that there is no awareness among poultry handlers about the disease, its mode of transmission, the survival of the virus in poultry environment, faeces and by-products, the risks associated with handling and slaughtering of poultry and on ways to protect themselves.

The lack of basic hygiene and the promiscuity under which live poultry are stored and slaughtered as well as the lack of proper waste management, provide ample opportunities for transmission of the disease to humans should diseased birds be processed in the markets.

In summary, the hazards identified with regards to animal to human potential transmission include:

- **A:** Direct exposure to the virus via an infected animal (feathers, secretions, blood, faecal matter, meat, bones, intestines, feet, beak which can all carry the virus) during handling, slaughtering and processing.
- **B:** Indirect exposure via the environment, where any of the sources above contaminate a surface and then a human touches the contaminated surface. This would also include inhalation of contaminated dust heavily present in these environments.

- **C:** Contamination spread from one carcass (and other poultry products) to another, leading to an increase of infected carcasses that humans are exposed to.

Animal to animal transmission and spread into the environment is also of concern as the more the virus spreads throughout the bird population, the possible exposure of humans to the virus increases and therefore the possibility of transmission increases.

A further issue with animal-to-animal transmission is the possibility of the transfer of the virus to another species that can then further spread the virus to the environment or directly to humans. In particular domestic cats and pigeons were often seen in the markets scavenging on dead poultry and/or poultry offal.

In summary, the hazards identified with regards to animal-to-animal potential transmission include:

- **D:** Direct exposure to the virus (feathers, secretions, blood, faecal matter, meat, bones, intestines, feet, beak which can all carry the virus).
- **E:** Indirect exposure via the environment, where any of the sources above contaminate a surface and an animal touches the contaminated surface.

The codes **A, B, C, D, and E** are used in the following table to identify the relevant hazard.

Risk assessment of wet markets in Jakarta Municipality - 1			
Process step and description:			
<u>Trucks and motorbikes used for transport</u> of poultry to and from wet market. Poultry are contained in crates (made from both plastic and bamboo) during transportation. On the motorcycles, the poultry are bound together with string via the legs and tied onto the back of the motorcycle.			
Hazard sources and identification of uncontrolled hazards that may lead to AI	Likelihood <sup>2</sup>	Controls and discussion on their application <sup>3</sup>	Cost Estimate <sup>4</sup>

<sup>2</sup> Likelihood of issue identified leading to AI transmission

<sup>3</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>4</sup> Cost estimate (per market)– L – Low – less than US\$ 500. H – High (more than US\$ 500)

transmission			
A,B,D,E - No practice of cleaning and sanitation of trucks or motorcycles observed.	High	<ul style="list-style-type: none"> <li>Ensure main surface areas (i.e. truck floor) are cleaned (sweep and dispose safely, then wash and sanitize) and prevent public contact.</li> </ul>	L
A,B,D,E- Design of trucks, motorcycles and crates (bamboo and plastic) does not facilitate cleaning.	High	<ul style="list-style-type: none"> <li>Redesign of plastic crates to allow adequate cleaning. Use bamboo cages for single use.</li> <li>Maintain metal cages better.</li> </ul>	L and H L
D, E - No separation of 'batches' of poultry by geographic origin (farm origin) – no traceability?	High	<ul style="list-style-type: none"> <li>Trucks and motorcycles to only transport birds from one farm at a time or arrange a separation method – if at all possible.</li> <li>Stalls to separate species and 'batches' of chickens via cages.</li> <li>Market manager to monitor species separation.</li> </ul>	L and H L and H L
D,E - Separation of species during transport? (Team was not able to assess).	High		
<b>Occupational Health</b> A, B, E - Motorcyclists and truck drivers do not wear masks or gloves and access to hand-washing facilities is poor.	High	<ul style="list-style-type: none"> <li>Supply PPE to people in contact with trucks and motorcycles (including cleaners).</li> <li>Supply hand washing facilities or equivalent.</li> </ul>	H L and H

## Risk assessment of wet markets in Jakarta Municipality - 2

### Process step and description:

#### Receiving of poultry - Transport driver delivers birds to stall owner

Hazard sources and identification of	Likelihood <sup>5</sup>	Controls and discussion on their application <sup>6</sup>	Cost Estimate <sup>7</sup>
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<sup>5</sup> Likelihood of issue identified leading to AI transmission

<sup>6</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>7</sup> Cost estimate (per market)– L – Low – less than US\$ 500. H – High (more than US\$ 500)

uncontrolled hazards that may lead to AI transmission			
A, B, C, D, E - No inspection certification by veterinary official <sup>8</sup> .	Medium	<ul style="list-style-type: none"> <li>Requirement of certification.</li> </ul>	H
A, B, C, D, E - No visual assessment undertaken <sup>9</sup> .	Medium	<ul style="list-style-type: none"> <li>Educate transporters and stall owners to under visual checks and associated corrective actions.</li> <li>Market manager to monitor.</li> <li>Presence of dead bird to be recorded and in case of unusual number of dead birds, sampling and analyses.</li> </ul>	L L L
A, B, C, D, E - Poultry delivered in public area.	Medium	<ul style="list-style-type: none"> <li>Redesign of market, providing a specific area for this activity. (Delivery and visual checks done in a separate no access to public zone).</li> </ul>	H
<p><b>Occupational Health</b></p> <p>A, B - Delivers and receivers (market-stall owners) do not wear masks or gloves.</p> <p>A,B,D,E - Access to hand-washing facilities is poor.</p>	High  High	<ul style="list-style-type: none"> <li>Supply PPE to people in contact with trucks and motorcycles and prevent public contact and supply hand washing facilities or equivalent.</li> </ul>	L and H

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<sup>8.4</sup> Now that vaccination of Kampung chickens is undertaken it is possible that these chickens can be infected without symptoms. Therefore this control measure is not effective for Kampung chickens.

### Risk assessment of wet markets in Jakarta Municipality -3

#### Process step and description:

**Caging of poultry** : Market stall owners put birds into cages. In some places poultry are kept in cages they are delivered in. Cages are made of bamboo, metal and plastic. No poultry was observed to be wandering around markets.

Hazard sources and identification of uncontrolled hazards that may lead to AI transmission	Likelihood <sup>10</sup>	Controls and discussion on their application <sup>11</sup>	Cost Estimate <sup>12</sup>
B,E - Cages not cleaned regularly and not between batches.	High	<ul style="list-style-type: none"> <li>Implementation of rest day (complete absence of birds for specific time (e.g. one day) at regular period (e.g. each month) to allow total cleaning and disinfection of wet market.</li> </ul>	L – but many reduce market profit
B,E - Some cages not possible to clean effectively. Design of plastic cages does not allow cleaning. Bamboo is impervious, therefore preventing cleaning. Some of the metal cages were not maintained and rusting which makes the cleaning difficult.	High	<ul style="list-style-type: none"> <li>Redesign of plastic crates to allow adequate cleaning. Use bamboo cages for single use. Maintain metal cages.</li> <li>Institute one Rest day to clean up thoroughly.</li> </ul>	H  H
D, E - No separation of ‘batches’ of poultry.	High	<ul style="list-style-type: none"> <li>Separate batches via cages</li> </ul>	H
D,E – No separation between species. Ducks below chickens, cat eating dead chickens and poultry products. Ducks can be asymptomatic carriers and should therefore be handled as potentially infected. Cats can catch the disease and transmit it as well as shedding viruses in	High	<ul style="list-style-type: none"> <li>Separate species by zoning.</li> <li>Prevent cats (and other animals to chickens).</li> <li>Report and dispose safely of dead poultry.</li> </ul>	H

<sup>10</sup> Likelihood of issue identified leading to AI transmission

<sup>11</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>12</sup> Cost estimate (per market)– L – Low – less than US\$ 500. H – High (more than US\$ 500)

faeces and respiratory secretions			
D, E - Faecal matter drops onto cages under other cages.	High	<ul style="list-style-type: none"> <li>• Cages to be redesigned to prevent faecal matter dropping onto cages below.</li> </ul>	L and H
A,B,D,E - Cages are in public areas.	Medium	<ul style="list-style-type: none"> <li>• Redesign of market, providing a specific area for the cages.</li> </ul>	H
<b>Occupational Health</b> A,B,D,E - Market stall owners do not wear masks or gloves. Access to hand-washing facilities is poor.	High	<ul style="list-style-type: none"> <li>• Supply PPE and supply hand washing facilities or equivalent.</li> </ul>	H

## Risk assessment of wet markets in Jakarta Municipality -4

### Process step and description:

**Customer selection** Stall owners pull birds out of cages to present to the customer. The owner will hold the bird by the legs and press on the bird's chest and show anus. Customers were seen to touch the bird's chest, anus and head areas.

Hazard sources and identification of uncontrolled hazards that may lead to AI transmission	Likelihood <sup>13</sup>	Controls and discussion on their application <sup>14</sup>	Cost Estimate <sup>15</sup>
A, E- Direct contact during bird selection.	High	- Educate consumers of the risk in doing this. Supply hand-washing facilities and promote the use to those who wish to handle birds.	L
A - Access to hand washing facilities for the customer is poor.	High	Provide facilities.	L and H
<b>Occupational health</b> A,E - Direct contact while showing customer the bird  A - Access to hand washing facilities is poor.	High  High	Supply PPE to stall owners and supply hand washing facilities or equivalent.	L and H

<sup>13</sup> Likelihood of issue identified leading to AI transmission

<sup>14</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>15</sup> Cost estimate (per market) – L – Low – less than US\$ 500. H – High (more than US\$ 500)

## Risk assessment of wet markets in Jakarta Municipality -5

### Process step and description:

**Processing** Chickens are removed from the cage, throat is slit and then the bird is left to die in either a cage (bamboo observed) or plastic tank. One dead the bird is either cut or skinned (i.e skin with feathers intact is ripped off) or put in hot water and then placed in a de-featherer. Intestines and organs are removed and separated into groups and cut. Beaks and feet are removed (feet are kept for consumption also). The carcass may be kept whole or cut into pieces.

Hazard sources and identification of uncontrolled hazards that may lead to AI transmission	Likelihood <sup>16</sup>	Controls and discussion on their application <sup>17</sup>	Cost Estimate <sup>18</sup>
A/B- Processing areas are in public areas. (Exposure to blood and secretions during slaughtering skinning, cutting and intestine preparation, feathers via aerosols produced during de-feathering.	High	Redesign of market, providing a specific area for this activity, preventing access to public.	L and H
C - Unhygienic work surfaces (floors, benches) and equipment used (plastic bins for bleeding, scalding tank, chopping boards, knives).	High	Install and maintain easy to clean surfaces.	H
C - Scalding tank water not changed regularly or heated to boiling prior to use.	High	Ensure water is rapidly boiling before processing batch.	L
C - Not clear if processing is done in batches.	High	Implement batch processing and clean between batches.	L
A - Ante mortem, post mortem inspection by regulatory officials not undertaken	High	Train market stall owners to undertake visual check on organs, meat etc.	L
<b>Occupational health</b> A, B - Direct contact during all processing steps.	High	Supply PPE to workers and hand-washing facilities	L and H

<sup>16</sup> Likelihood of issue identified leading to AI transmission

<sup>17</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>18</sup> Cost estimate (per market)- L - Low - less than US\$ 500. H - High (more than US\$ 500)

A – Smoking during processing is common, allowing hand to mouth contamination.	High	Education – do not smoke during processing. Manager to monitor and act	H
A, B and C - Access to hand washing facilities is poor.	High	Supply hand-washing facilities.	L and H
B - Partial access to shower and clean up area in some markets.	Med	Ensure access to showers and clean clothes.	H
B - Workers clothes hung above processing areas.	Med	Supply store area for personal affects away from processing area.	L
B - Clothes washed on floor that is used as poultry preparation surface.	Med	Supply separate area for clothes washing.	L and H

### Risk assessment of wet markets in Jakarta Municipality -6

#### Process step and description:

#### Sale of prepared meat

Hazard sources and identification of uncontrolled hazards that may lead to AI transmission	Likelihood <sup>19</sup>	Controls and discussion on their application <sup>20</sup>	Cost Estimate <sup>21</sup>
C – Potential for transfer of virus from poultry to other foods as other food products are sold next to the poultry.  Customers may also cause this transfer during touching and selecting various foods during shopping.	High	Zoning of market.  Education of consumers not to cross contaminate.	H  L and H
C – No evidence of FIFO or batching.	High	Separation of batches of meat.	
<b>Occupational health</b> A- Direct contact while weighing,	High	Supply PPE to workers and hand-washing facilities (or equivalent).	L and H

<sup>19</sup> Likelihood of issue identified leading to AI transmission

<sup>20</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>21</sup> Cost estimate (per market)– L – Low – less than US\$ 500. H – High (more than US\$ 500)

bagging meat. A- Access to hand washing facilities is poor.			
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## Risk assessment of wet markets in Jakarta Municipality -7

### INFRASTRUCTURE : External environment

Hazard sources and identification of uncontrolled hazards that may lead to AI transmission	Likelihood <sup>22</sup>	Controls and discussion on their application <sup>23</sup>	Cost Estimate <sup>24</sup>
B – Public is exposed to waster water drain. Water from washing and de-feathering birds may contain the virus. Feathers are also in the drain. There is a potential of splashing.	Med	Cover drains	H
B – Feathers were piled up for disposal. However, it seems unlikely that a person would come into contact with them.	Low	Ensure frequent rubbish disposal. Contain and prevent public access at collection area.	L
<b>Occupational Health</b> B – Employees unclogging drain and water disposal (not observed)	High	Supply PPE to workers and hand-washing facilities (or equivalent).	L and H

### INFRASTRUCTURE: Internal Environment

Hazard sources and identification of uncontrolled hazards that may lead to AI transmission	Likelihood <sup>25</sup>	Controls and discussion on their application <sup>26</sup>	Cost Estimate <sup>27</sup>
B, C – Floor – pitted and cracked preventing inadequate cleaning, floor sloping incorrectly (potentially contaminated water	Med	Install and maintain easy to clean surfaces. Ensure drainage slope prevents drainage to other areas of the	H

<sup>22</sup> Likelihood of issue identified leading to AI transmission

<sup>23</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>24</sup> Cost estimate (per market)– L – Low – less than US\$ 500. H – High (more than US\$ 500)

<sup>25</sup> Likelihood of issue identified leading to AI transmission

<sup>26</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>27</sup> Cost estimate (per market)– L – Low – less than US\$ 500. H – High (more than US\$ 500)

leading to other areas of the market, drains open.		market. It must go straight into drain.	
B – Ceiling - Not clean, feather and debris identified.	Low	Install and maintain easy to clean surfaces.	H
B, C – Display table- Broken tiles preventing adequate cleaning.	Med	Install and maintain easy to clean surfaces.	H
A,B, C – Zoning – Poor separation of different food processes (addressed in sections above).	High	Develop zones for various food processes/food types. Market manager to monitor.	L

### Risk assessment of wet markets in Jakarta Municipality -8

#### INFRASTRUCTURE: Utilities

Hazard sources and identification of uncontrolled hazards that may lead to AI transmission	Likelihood <sup>28</sup>	Controls and discussion on their application <sup>29</sup>	Cost Estimate <sup>30</sup>
A, B, C – Water - No access to potable water for hand-washing and cleaning.	High	Water must be potable. Install on-site treatment.	L
B, C – Ventilation – Ventilation is poor viral load can increase –	Low	Market redesign to allow ventilation (either natural or mechanical (include maintenance)	H
B, C – Lighting – Inadequate lighting preventing adequate cleaning.	Low	Install adequate lighting	L and H

#### All process steps: PERSONAL HYGIENE

Hazard sources and identification of uncontrolled	Likelihood <sup>31</sup>	Controls and discussion on their application <sup>32</sup>	Cost Estimate <sup>33</sup>
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<sup>28</sup> Likelihood of issue identified leading to AI transmission

<sup>29</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>30</sup> Cost estimate (per market)– L – Low – less than US\$ 500. H – High (more than US\$ 500)

<sup>31</sup> Likelihood of issue identified leading to AI transmission

<b>hazards that may lead to AI transmission</b>			
Addressed in sections above.	High	Addressed in sections above	L and H
<b>All process steps: CLEANING</b>			
<b>Hazard sources and identification of uncontrolled hazards that may lead to AI transmission</b>	<b>Likelihood<sup>34</sup></b>	<b>Controls and discussion on their application<sup>35</sup></b>	<b>Cost Estimate<sup>36</sup></b>
Addressed in sections above.	High	Ensure adequate cleaning and sanitation of work surfaces. Market manager to monitor.	H

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<sup>32</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>33</sup> Cost estimate (per market)– L – Low – less than US\$ 500. H – High (more than US\$ 500)

<sup>34</sup> Likelihood of issue identified leading to AI transmission

<sup>35</sup> Education for the consumers, stall owners and marketplace managers is a critical part of each of the controls identified. How and why to implement the control needs to be included.

<sup>36</sup> Cost estimate (per market)– L – Low – less than US\$ 500. H – High (more than US\$ 500)

## Annex 3

### DRAFT PROPOSAL FOR A NATIONAL PROGRAMME TO PROMOTE AND IMPLEMENT HEALTHY FOOD MARKETS (HMF) IN INDONESIA

#### Introduction

Ideally, one control that would mitigate the majority of sources of Avian Influenza transmission hazards in the wet market is the removal of live poultry and the prevention of slaughtering in the marketplace, as has been done in Thailand for instance. This would mean that slaughtering takes place in a specific facility for slaughtering. From a purely food safety public health perspective, this would be an effective control. But other issues must be considered when considering this risk management strategy. The removal of live poultry and slaughtering processes out of the market premises would have major impacts on the public, market stall owners, the wet market and the poultry industry. The use of a specific slaughtering facility instead of the wet marketplace may increase the cost of the poultry, which will not be affordable for all sectors in the community. Such a drastic measure would imply the loss of jobs in a number of areas and impact significantly the sustenance of traditional markets.

As with all changes in regulations, national governments are recommended to consider these risk management options in wide consultation with stakeholders

#### **1. Promoting the upgrading of existing traditional markets to officially recognized and certified healthy markets seems a more viable solution.**

A Healthy Food Market<sup>37</sup> is a setting in which all stakeholders collaborate to provide safe and nutritious food for the community. In such a setting, the stakeholders (viz. local authorities, market community, suppliers, food market workers and consumers) combine resources and work together to implement incremental changes to improve the market, health and well being of the community.

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<sup>37</sup> A guide to Healthy Food Markets, WHO 2006

Four basic principles would characterize the national Healthy Food Markets Programme:

- Provision of safe and nutritious food in a healthy environment
- Promotion of food safety from production to consumption, all along the food chain
- Foster of partnerships between market communities, food suppliers, and consumers
- Opportunity for awareness and education for vendors and consumers (for example better understanding food safety risks such as cross contamination, transmission mode of AI and foodborne diseases as well as high risk behaviours in terms of transmission of diseased).

A Healthy Food Marketplace would thus have:

- Improved biosecurity to reduce risks for spread of AI virus
- Access to safe and sufficient water
- Facilities for personal hygiene and sanitation
- Functioning safe management of liquid and solid waste

Within the current Avian Influenza context, the healthy food market will be a more secure place with much higher levels of biosecurity in terms of preventing and controlling the potential spread of the Avian Influenza virus.

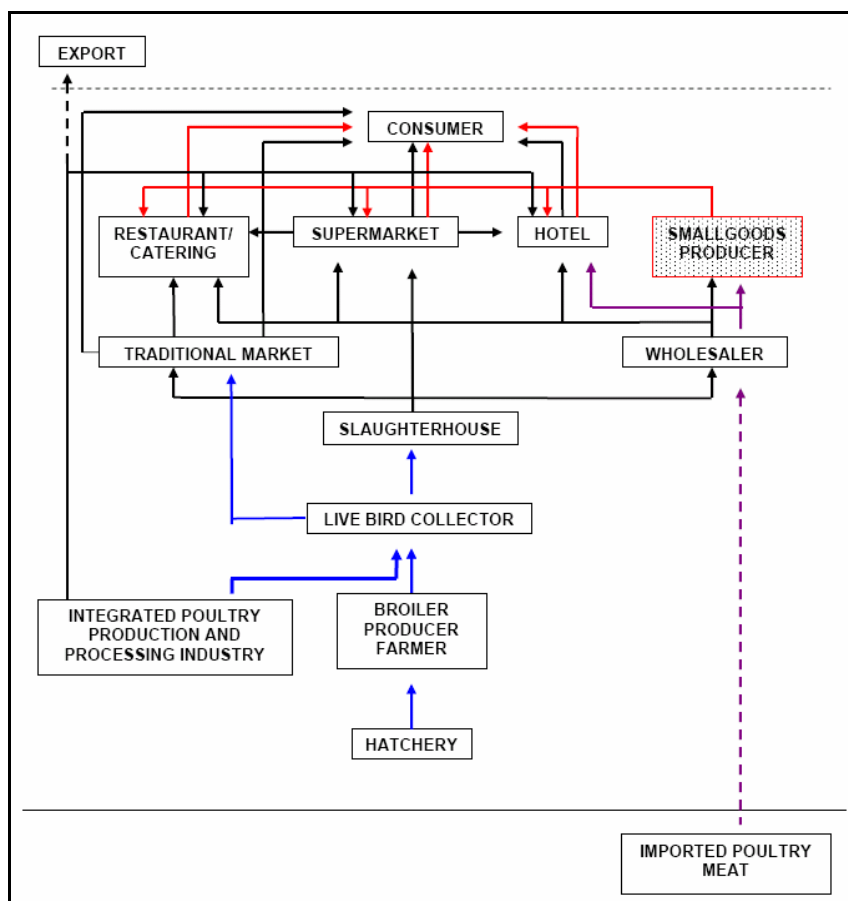
## 2. Wet markets – A Biosecurity Challenge

Among the various food markets prevalent in Indonesia, it is the live animal or 'wet markets'<sup>38</sup> that offers the environment and work practices conducive for potential transmission of avian influenza. The 'wet markets' in Indonesia typically have a large number of small-scale slaughterhouses, which contribute more than 80% demand for poultry/ products. In Jakarta itself, it is reported that there are 1,200 small-scale slaughter houses. The supply chain of poultry and its products in Indonesia as reported by Veterinary Public Health is given in Figure 1 below.

### ***Figure 1: Supply chain of poultry and poultry product in Indonesia***

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<sup>38</sup> Live animal market or "Wet market" is a place where members of the public go to buy small animals and birds that are live and slaughtered there; live and taken home to be slaughtered, or already slaughtered and sold as meat.



(Source: Veterinary Public Health, *Personal communication*)

To effectively combat the risks from avian influenza, the biosecurity along the entire supply chain depicted above needs to be strengthened. While the Indonesia's National Strategic Plan for Avian Influenza Control and Pandemic Influenza Preparedness 2006-2008 indicates strengthening of biosecurity, the modalities of doing the same at various steps in the supply chain, particularly the market place, is not completely established.

### 3. Biosecurity Measures for Healthy Food Market and the Associated Food Chain

Keeping in view the efforts underway by FAO and other agencies in improving biosecurity measures at the primary production viz. hatchery, broiler and layer producing farms in organized and unorganized sectors, the mission restricted its scope primarily to the wet markets, collection center and transport used for live animals.

Accordingly, two type of measures are being recommended; one in relation to human health for mitigating transmission of virus and pathogens

from animals to humans and the second in relation to animal health for mitigating transmission of virus and pathogens from animals to animals.

#### **4. Core Public Health Measures**

It is stressed that all those handling poultry and/or having close contact with poultry or poultry products/wastes should be provided with Personal Protective Equipment (PPE) (masks, gloves, goggles and footwear coverings), notably people undertaking the following tasks:

- During transportation.
- Visual checks of birds during delivery.
- Cleaning of cages.
- Slaughtering (including de-feathering and removal of skin).
- Processing of meat, carcass, intestines and other raw poultry products.
- Removal of feathers from drains.
- Disposal of feathers, faecal matter and dead birds. **(See more details in tables below)**

This control represents a major behavioral change and its implementation is expected to be difficult. However, since we can no longer rely on visual inspection of a bird's health status (see visual inspection below) as a control that will eliminate the hazard, there is no other effective method to protect the poultry processors health against Avian Influenza transmission.

Access to washing and shower facilities is a key element as is the provision of an area to store clean clothes for people undertaking the above tasks or disposable suits to be worn during the above activities.

Prevent smoking during poultry and poultry products processing.

**More on preventive measures, see more details in tables below.**

## **5. Proposed Steps for a National Healthy Food Markets Programme (HFMP) for Indonesian Wet Markets and Overview of Concrete Measures**

To launch a HMFP in Indonesia, the Mission recommends the following steps:

### **STEP 1: Familiarize Stakeholders with the Healthy Food Markets Concept and Ensure Broad Political Commitment and Active Stakeholder Participation**

A. It is envisaged to hold first a two / three day meeting / workshop of all stakeholders to familiarize them with the Healthy Food Markets concept and harness their commitment and actively support in developing a National Healthy Food Market Programme (HFMP). The participation of following stakeholders is recommended:

- (1) Menko Kesra (Coordinating Ministry for Health & Social Welfare, Republic of Indonesia)
- (2) BAPPENAS (National Development Planning Agency, Republic of Indonesia)
- (3) Directorate General of Disease Control and Environmental Health, Ministry of Health
- (4) Directorate General of Livestock Services, Ministry of Agriculture
- (5) National Agency for Drug and Food Control
- (6) Provincial Government of Jakarta
- (7) Regional Company of Pasarjaya, Jakarta
- (8) Indonesian Poultry Association Forum
- (9) GAPPI (Association of Poultry Producers of Indonesia)
- (10) Collection Center suppliers
- (11) Market stall owners
- (12) Consumers Representative / Associations
- (13) FAO
- (14) WHO

B. WHO Indonesia to initiate the communication with all the stakeholders and facilitate holding of stakeholders meeting / workshop, to deliberate and decide on following agenda points among other issues:

- Consider WHO mission recommendations and develop National Action Plan for the HFMP;
- Identification of 10 HFM Pilot Projects for 2006;
- Constitution and empowerment of a National Multisectoral HFM Task Force for initiation, coordination and monitoring of the HFMP;
- Constitution and empowerment of Core Groups for regular oversight of respective HFM Pilot Projects at 10 places.
- Finalization of Terms of Reference of the Task Force.
- Discuss and finalize the costs involved for national HFMP and pilot HFM projects and provision of funds from private sector and donors.

## **STEP 2: Raising Public Awareness for Preventing and Controlling Avian Influenza**

Based on WHO mission's advice on prevention and control of avian influenza, the HFMP task force to develop risk based messages in local / regional languages for different target segments viz. consumers, live or wet animal market personnel and authorities (national, provincial and local). The risk communication strategy for advocacy of avian influenza prevention messages needs to be worked out by the task force, keeping in view, the priorities and the funds availability.

## **STEP 3: Capacity Building of Wet Market Place Stakeholders in Healthy Food Market Concept**

The Multisectoral HFMP Task Force, in close association with WHO and FAO, to organize a 'Training of Trainers' programme to familiarize stakeholders including consumer representatives / consumer associations with Healthy Food Markets concept, with emphasis on following aspects:

- Healthy settings (Hygiene & Sanitation, Food Safety, Occupational Health and Waste Management).
- Work habits and behaviours amenable for HFMP success
- Case Studies – Thailand; Vietnam; Lao (DPR); Papua N.G.; Fiji, other.

#### **Step 4: Conduct Local Participatory Situation Analysis of the Existing Market Conditions and Identify Gaps.**

In order to plan activities in the identified Healthy Food Market Place Projects, the respective core group of pilot projects should conduct a detailed situational analysis to identify the needs of the market partners. The core group should conduct a survey among the 'wet market' community members, consumers and live animal suppliers to identify health and safety concerns and possible solutions from their point of view. Complete the list of concerns and solutions based on the elements from the tables below and contents in annex 2).

Based on the survey, the core group is required to identify the gaps in the physical and operational environment of the market setting.

#### **Step 5: Prioritize the actions and develop work plans with budgets for respective pilot projects.**

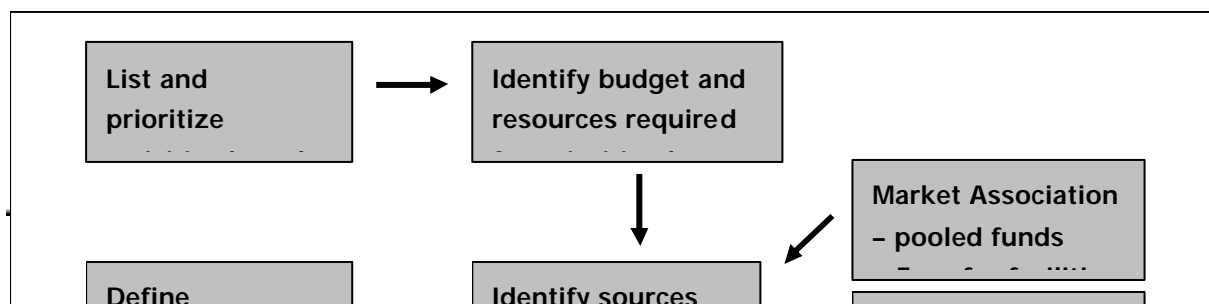
Based on the identified gaps, the respective core groups to prioritize actions based on risk and develop work plans in association with the HFMP task force.

#### **Step 6: Implement the Work Plans**

Keeping in view the priorities, the work plans require to be implemented by the empowered core groups for the respective pilot project in a participatory way. Before and during the implementation process it is utmost essential that the ownership of the stakeholders is ensured. The wet market community and live animal suppliers should definitely be actively involved throughout all stages of the planning process, as many changes and improvements in the market's physical and operational environment will require their cooperation as well as resources.

Relocation decisions, if necessitated, should be taken only with involvement of market community.

The key processes involved in developing the work plan are depicted as under:



### **Step 7: Monitor implementation and conduct periodic evaluation**

With a view to make the Healthy Food Market projects success and sustainable, it is imperative that regular monitoring and periodic evaluation are undertaken. Therefore, it is important that the HFMP task force and core group together establish milestones to be achieved in the short, medium and long run. Consequently, it is also important that appropriate and measurable indicators are identified and incorporated in the work plans.

The marketplace managers needs to be empowered to monitor the implementation of all controls and have corrective actions in place for when the initial or on-going implementation has not occurred. Corrective actions for when implementation has not occurred or has not occurred correctly need to be developed for each control in conjunction with the person undertaking the control.

### **Step 8: Draw lessons learnt**

The evaluation process comprising collation of data and analysis would reveal the milestones achieved and the shortfalls. It is important to find out which activities did not succeed and for what reasons so that the lessons learnt can be incorporated into the National Healthy Food Market Programme timely. This would facilitate effective and efficient replication of the project in other places.

## **6. Concrete Measures to Implement HFM**

## Summary of measures to prevent and control potential AI transmission

### Step in the Food Chain: Live animal collection center

Measures related to Animal Health	Measures related to Human Health
<p><b>a) Operational aspects</b></p> <ul style="list-style-type: none"> <li>– <b>Separate species</b> by zoning to prevent virus transmission through faecal matter and secretions from a possible diseased animal coming into contact with healthy animals of other species – cages with ducks to be kept separate from chicken ones. If unavoidable, keep duck cages below chicken.</li> <li>– <b>Separate flocks</b> from different farms, as far as possible, by using cages with suitable identification or colour coded cages.</li> <li>– <b>Ensure All in, All out system</b> – Avoid returning unsold birds back to the collection center, as they may be infected and may carry back the virus.</li> <li>– <b>Undertake inspection of flocks</b> by a veterinarian and culling of AI suspected birds to be undertaken if necessitated.</li> <li>– <b>Ensure compulsory rest days</b> (complete absence of live animals for one day) every fortnight / month to facilitate total cleaning and disinfections of collection center.</li> <li>– <b>Carry out disease surveillance</b>, monitoring, notification and ensure traceability.</li> </ul> <p><b>b) Physical aspects</b></p> <ul style="list-style-type: none"> <li>– <b>Redesign cages</b>, incorporating removable trays to prevent faecal matter dropping onto cages below and also to facilitate easy cleaning.</li> </ul>	<p><b>a) Operational aspects</b></p> <ul style="list-style-type: none"> <li>– <b>Recommend use of prophylaxis with antivirals<sup>3</sup></b> for persons at specific risk of inhaling possible infected material (e.g. personnel handling live animals, cages, inspection).</li> <li>– <b>Vaccinate such persons with seasonal influenza vaccine</b> to avoid simultaneous infection by human influenza and avian influenza and to minimize the possibility of a re-assortment of the virus's genes.</li> <li>– <b>Persons at high risk for severe complications of influenza</b> (e.g. immunocompromised, over 60 years old, or with known chronic heart or lung disease) <b>should be encouraged to discontinue working in this activity.</b></li> </ul> <p><b>b) Physical aspects</b></p> <ul style="list-style-type: none"> <li>– <b>Provide sanitary and hand washing facilities</b> with adequate supply of potable water. It is understood that the city water supply for Jakarta is not potable. However, on-site treatments are both possible and affordable. Soap and towels are also to be made available (Ensure acceptance!).</li> <li>– <b>Clean</b> the premises and cages frequently.</li> <li>– Provide <b>Personal Protective Equipment (PPE)</b>, where feasible, to personnel engaged in handling of live animals and disposal of hazardous waste, note the high risk activities and <b>educate them</b> in their appropriate use.</li> <li>– <b>Ensure proper segregation, treatment and disposal of hazardous wastes</b> such as dead animals. E.g. <ul style="list-style-type: none"> <li>▪ <b>Burying</b> – Dig a hole (far from the collection center and residential areas, <u>away from water sources</u>) add quicklime at</li> </ul> </li> </ul>

<ul style="list-style-type: none"> <li>- <b>Use suitable cage material</b>, that is amenable for easy cleaning e.g. plastic. Bamboo cages if used should be for one time use, as they cannot be cleaned easily.</li> <li>- <b>Ensure proper segregation, treatment and disposal of hazardous wastes</b> such as dead animals - Control scavenging cats.</li> </ul>	<p>the bottom and on the borders of the hole; put all the birds and objects in the hole; cover with quicklime; cover with earth.</p> <ul style="list-style-type: none"> <li>▪ <b>Incineration: Incinerators should be placed away from residential areas in a secured site, separate <u>PLASTICS</u>. <u>Do not burn PLASTICS</u>.</b></li> </ul>
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<b>Summary of measures to prevent and control potential AI transmission</b>	
<b>Step in the Food Chain: Transportation</b>	
<b>Measures related to Animal Health</b>	<b>Measures related to Human Health</b>
<p><b>a) Operational aspects</b></p> <ul style="list-style-type: none"> <li>- <b>Maintain zoning</b> – Preferably transport different live animal species separately; cages with ducks to be kept separate from chicken ones. If unavoidable, keep duck cages below chicken ones.</li> <li>- <b>Avoid collecting and transporting birds from different farms / collection centers in the same vehicle</b> and avoid transportation of birds from one farm to another or from market back to farm, as HPAI infected birds from a farm or a market may transmit the virus to other healthy flocks</li> <li>- <b>Avoid caging live animals beyond the cage capacity and avoid over stacking</b> of live animals on two wheelers as they get distressed and defecate, whereby the faecal matter and secretions from a possible diseased animal may contaminate other healthy animals.</li> </ul> <p><b>b) Physical aspects</b></p> <ul style="list-style-type: none"> <li>- <b>Redesign cages</b>, incorporating removable trays to prevent faecal matter dropping onto the floor of the vehicle or on cages below.</li> <li>- <b>Use suitable cage material</b>, that is</li> </ul>	<p><b>a) Operational aspects</b></p> <ul style="list-style-type: none"> <li>- <b>Educate vehicle drivers and helpers to wash hands with soap</b> and potable water after loading or unloading of vehicles.</li> <li>- <b>Educate transporters to undertake visual checks</b> on the health status (i.e. comb not swollen, feathers not overly ruffled, no major secretions from eyes and beak) of the birds and associated corrective actions. Transporters must refuse to transport any unhealthy birds. Stall owners must not accept any unhealthy birds. Visual checks should continue throughout the bird's life at the wet market.</li> <li>- <b>Require of certification of health</b> status of birds during delivery.</li> <li>- <b>Develop agreed actions for what to do when the AI signs are identified</b> (actions should include safe disposal, notification and trace-back)</li> </ul> <p>These controls are only partially effective now that some birds can be infected but show no symptoms. However, it is still important control as some infected birds can be stopped from entering the market this way.</p> <p><b>b) Physical aspects</b></p> <ul style="list-style-type: none"> <li>- <b>Provide sanitary and hand washing</b></li> </ul>

<p>amenable for easy cleaning e.g. plastic. Bamboo cages if used, should be for one time use, as they cannot be cleaned easily.</p> <ul style="list-style-type: none"><li>– <b>Ensure thorough cleaning</b> (complete removal of faecal and other waste matter) followed by disinfection of vehicles (including two wheelers, cycles) and also the cages after every use</li></ul>	<p><b>facilities</b> with adequate supply of potable water.</p> <ul style="list-style-type: none"><li>– Provide <b>Personal Protective Equipment (PPE)</b>, where feasible, to personnel engaged in transportation and handling of live animals and disposal of hazardous waste and <b>educate them</b> in their appropriate use.</li></ul>
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## Summary of measures to prevent and control potential AI transmission

### Step in the Food Chain: Market Place / Slaughter house - 1

Measures related to Animal Health	Measures related to Human Health
<p><b>a) Operational aspects</b></p> <ul style="list-style-type: none"> <li>- <b>Ensure effective zoning across key market processes</b> <ul style="list-style-type: none"> <li>▪ <b>Separate different animal species</b></li> <li>▪ <b>Physically separate slaughtering</b> (entailing processes of bleeding, scalding, de-feathering); <b>processing</b> (entailing evisceration, de-boning, cuts etc), <b>selling and cage/ dirty equipment cleaning areas</b></li> </ul> </li> <li>- <b>Ensure All in, All out system</b> - Avoid returning unsold birds back to the farm / collection center, as they may be infected and may carry back the virus.</li> <li>- <b>Ensure compulsory rest days</b> (complete absence of live animals for one day) every fortnight / month to facilitate total cleaning and disinfections of the market / slaughterhouse.</li> <li>- <b>Undertake inspection of live animals</b> by a veterinarian before receiving and procurement.</li> </ul>	<p><b>a) Operational aspects</b></p> <ul style="list-style-type: none"> <li>- <b>Recommend use of prophylaxis with antivirals<sup>3</sup></b> for persons at specific risk of inhaling possible infected material (e.g. personnel handling slaughtering and processing, inspection).</li> <li>- <b>Vaccinate such persons with influenza vaccine</b> to avoid simultaneous infection by human influenza and avian influenza and to minimize the possibility of a re-assortment of the virus's genes.</li> <li>- <b>Persons at high risk for severe complications of influenza</b> (e.g. immunocompromised, over 60 years old, or with known chronic heart or lung disease) <b>should be encouraged to discontinue working in this activity</b></li> <li>- <b>Customer orientation</b> - Discourage customers from touching and inspecting live animals before purchase; Consumers need to be educated on the prevention of cross contamination (i.e. handling of poultry and then apples).</li> <li>- <b>Discourage selling of live animals to customers for slaughtering at home.</b></li> <li>- <b>Maintain personal hygiene</b> - Hands should be washed frequently with soap and potable water and particularly after change of processes (e.g. deboning after evisceration). Following slaughter and processing the workers should preferably take a bath at the market personnel facilities or change into clean clothes and shoes after washing hands, arms and feet thoroughly with soap and potable water and drying with clean towel / cloth.</li> <li>- <b>Stall owners to ensure proper scalding of poultry before de-feathering.</b> Use hot potable water for scalding and change the scalding water frequently.</li> <li>- <b>Stall owners to avoid cross contamination</b> of cooked products with raw meat by effective segregation during storage and display.</li> <li>- Educate stall owners and wet market managers to undertake visual checks on the health status (i.e. comb</li> </ul>

	<p>not swollen, feathers not overly ruffled, no major secretions from eyes and beak) of the birds and associated corrective actions. Transporters must refuse to transport any unhealthy birds. Stall owners must not accept any unhealthy birds. Visual checks should continue throughout the bird's life at the wet market</p> <ul style="list-style-type: none"> <li>- Require of certification of health status of birds during delivery</li> <li>- Train market stall owners to undertake visual check on organs, meat to look for signs of Avian Influenza infection and develop agreed actions for what to do when the signs are identified (actions should include safe disposal, notification and trace-back). <i>These controls are only partially effective now that some birds can be infected but show no symptoms. However, it is still important control – as some infected birds can be stopped from entering the market this way.</i></li> </ul>
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**Summary of measures to prevent and control potential AI transmission**  
**Step in the Food Chain: Market Place / Slaughter house -2**

Measures related to Animal Health	Measures related to Human Health
<p><b>b) Physical aspects</b></p> <ul style="list-style-type: none"> <li>- <b>Redesign cages</b> , incorporating removable trays to prevent faecal matter dropping onto cages below and also to facilitate easy cleaning.</li> <li>- <b>Use suitable cage material</b> , that is amenable for easy cleaning e.g. plastic. Bamboo cages if used should be for one time use, as they cannot be cleaned easily.</li> <li>- <b>Ensure proper segregation, treatment and disposal of hazardous wastes</b> such as dead animals, potentially contaminated bird</li> </ul>	<p><b>b) Physical aspects -1</b></p> <ul style="list-style-type: none"> <li>- <b>Recommend use of prophylaxis with antivirals<sup>3</sup></b> for persons at specific risk of inhaling possible infected material (e.g. personnel handling slaughtering and processing, inspection).</li> <li>- <b>Implement strict zoning:</b> Separate areas should be formed in the marketplace to prevent general public access to the following processes: <ul style="list-style-type: none"> <li>• Delivery of poultry to market.</li> <li>• Live birds stored in cages reserved only for potential buyers, not for general public.</li> <li>• Slaughtering (including de-feathering and removal of skin). * Processing of meat, carcass, intestines and other raw poultry products.</li> <li>• Cleaning of cages.</li> <li>• Zones in the marketplace to be established to prevent cross contamination between foods.</li> </ul> </li> <li>- <b>Segregate poultry from other birds/ animals:</b> Species should be separated via cages and be stored separately to prevent faecal matter from one species to another (wild birds to chickens, chickens to monkeys etc).</li> <li>- <b>Pest control:</b> Cats and other scavenging animals should be</li> </ul>

<p>parts (blood, feathers, etc).</p>	<p>prevented from eating dead chickens.</p> <ul style="list-style-type: none"> <li>- <b>Cage redesign and bird containment:</b> <ul style="list-style-type: none"> <li>• Cages in market stalls to be redesigned to prevent faecal matter dropping on to cages below (i.e. trays underneath cages).</li> <li>• Redesign of plastic crates to allow adequate cleaning. Bamboo cages should only be used for single use. Maintain metal cages to allow effective cleaning.</li> </ul> </li> <li>- <b>Provide non-toxic, impervious work surfaces (e.g. chopping boards, S.S. work tables).</b> Prefer plastic to wooden surfaces, wooden knives as plastic can be cleaned easily (to reduce cross contamination). <b>Encourage carrying out the slaughtering/ deboning and other operations on an elevated surface rather than on the floor.</b></li> <li>- <b>Clean and disinfect premises and equipment</b> – Following slaughtering operations, clean and disinfect premises (floor, walls work tables, slabs, racks etc.) and equipment (knives, hooks, killing cones, defeatherer, scalding etc.) frequently. Just spraying disinfectant on the dirty surface is ineffective.</li> <li>- <b>Cold Chain facilities</b> - Though the virus survives low temperatures, adherence to cold chain is vital from food safety perspective. Ensure chillers and chilled display cabinets are used with back up power supply.</li> <li>- <b>Provide clean, light coloured protected clothing</b>, including clean washable aprons and rubber boots everyday to workers undertaking slaughtering and selling operations.</li> <li>- <b>Provide Personal Protective Equipment (PPE)</b>, where feasible, to personnel engaged in handling of live animals, disposal of hazardous waste and <b>educate them</b> in their appropriate use.</li> </ul>
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**Summary of measures to prevent and control potential AI transmission  
Step in the Food Chain: Market Place / Slaughter house -3**

Measures related to Animal Health	Measures related to Human Health
	<p><b>b) Physical aspects -2</b></p> <ul style="list-style-type: none"> <li>- <b>Ensure drains are covered, sloped well and facilitate flow of effluent in a direction opposite to the process flow</b> (e.g. blood and scalding water from slaughtering area should not flow towards the forward process flow areas like selling area). Drainage system must also allow easy removal of feathers and be covered to prevent aerosols</li> <li>- <b>No return:</b> Once birds have been delivered into a wet market, they</li> </ul>

	<p>cannot taken out alive to be returned to a farm or any similar place away from the market. They should be slaughtered and sold as processed.</p> <ul style="list-style-type: none"> <li>- <b>Ensure proper segregation, treatment and daily disposal of potentially infectious/hazardous wastes</b> such as dead animals, potentially contaminated bird parts (blood, feathers, etc). Contain and prevent public access at waste collection area. <ul style="list-style-type: none"> <li>▪ <b>Burying</b> - Dig a hole (far from the collection center and residential areas) in the ground, put some quicklime at the bottom and on the borders of the hole; put all the birds and objects in the hole; cover with quicklime; cover with earth.</li> <li>▪ <b>Incineration</b>, if suitable incineration facility available.</li> </ul> </li> </ul>
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**Summary of measures to prevent and control potential AI transmission**  
**Step in the Food Chain: Final Consumption**

- **Avoid buying live animals (poultry birds) and then slaughtering at home / food service establishments.** Slaughtering, de-feathering and degutting poultry birds can be risky if the poultry bird is infected.
- **Keep Clean** - When preparing food, practice good hygiene. Clean and sanitize work surface, equipment and utensils and do hand wash frequently.
- **Separate raw and cooked** – Separate raw meat from cooked meat and other cooked food. Use separate equipment and utensils such as knives and chopping boards for raw foods.
- **Cook thoroughly** - For cooked meat and poultry to be safe their juices must run clear and no parts of the meat should be red or pink. Ensure thorough boiling / roasting / frying (**core temperature of food should be more than 70 °C**) as this kills the virus and other pathogens too.
  - **Cook eggs well** – Eggs from infected birds can harbour the virus both outside and within the shell and should therefore be cooked well (with no “runny” yolks) before consumption. Raw eggs should not be used in foods that will not be further heat-treated as, for example by cooking or baking.
  - **Do not prepare and consume raw dishes** made from birds or poultry raw meat and blood.
  - **Keep food at safe temperatures** – From food safety perspective (and not AI), eat cooked food immediately and do not leave cooked food at room temperature longer than 2 hours. Keep cooked food steaming hot (more than 60°C) prior to service

## Annex 4

### SUGGESTIONS FOR STRENGTHENING PREVENTION ASPECTS IN THE "NATIONAL STRATEGIC PLAN FOR AVIAN INFLUENZA CONTROL AND PANDEMIC INFLUENZA PREPAREDNESS 2006-2008"

Suggested changes are bolded; Additions and replacements are in *italics*; Deletions are in underlined.

Page 7, Chapter 2: **Problems and obstacles** ,.: Problems and obstacles faced by Indonesia in the efforts to ***prevent*** and control bird flu and prepare for ...:

Page 7, Chapter 2: 1. : replace "***planning***" by "preventing".

Page 8, point 6.: Lack of understanding and awareness of AI and HPAI, ***its routes of transmission*** and its potential risks in all layers of society.

Page 8, point 9. : replace by: ***Inadequate quantity and quality of avian influenza communication to the public.***

Chapter 3: Common goals: Point 2: add: ***Most human cases have been linked to close contacts with diseased or dead poultry. Therefore, it is crucial that a National Strategic plan for avian influenza prevention and control includes interventions aimed at minimizing contacts between humans and sick poultry.***

Page 10, chapter 4 Basic Principles: point 3: Emphasizing integrated efforts of ***all concerned stakeholders - notably health and agriculture sectors***, Government, private sector, community...

This strategic plan will in the end be ***implemented*** at the community level, farming and farm product companies as well as human healthcare ***providers including both the public and*** the private sector. ... In the era of decentralization, the role of local governments as the main actor of this strategic plan is vital ***with central government providing guidance and coordination.***

Page 12: Box on Common goals, point 2: after "animals" add ***and prevention of further cases***".

Page 13: chapter 2 Targets:, point 2c : need to include a level to which reduction will aim at.

Page 14: chapter 4: Interrelationship among strategies : first line after" effort to", change to: "***prevent*** and control disease in ***humans and animals***".

Page 15: Strategy 1: main activities: 1. add " <b><i>with compensation schemes in place</i></b> ".
Page 15: Strategy 1: main activities: 6. add " <b><i>with appropriate surveillance and monitoring systems in place</i></b> ".
Page 16: Strategy 3: Goals: Add: <b><i>high-risks groups are people in close contacts with poultry along the entire food chain from farm to table (i.e. backyard farmers, poultry workers, slaughterers, waste handlers, by-product processors (e.g. feathers, manure for fertilizers...)</i></b>
Page 16: Strategy 3: Main activities: 1. add " <b><i>and empowering for self protection people working with or handling poultry</i></b> ".
Page 16: Strategy 3: Main activities Add a new Activity: <b><i>Improving the infrastructure of wet markets to facilitate healthy markets settings.</i></b>
Page 17: Strategy 4: Main activities: 7: add. " <b><i>along the different stages of the food chain continuum (e.g. poultry raisin, egg producers, broiler producers, wet markets, poultry waste,...)</i></b>
Page 18: Strategy 6: Goals: add a new goal: " <b><i>To formulate, develop and implement preventative AI measures to reduce human exposure to the virus at farm and at market levels.</i></b> ".
Page 18: Strategy 7: Goals: change in 1: "Strengthening laws on AI <b><i>prevention and</i></b> control."
Page 19: Add a new Goal: " <b><i>Strengthening food safety systems and related regulations towards the development of an integrated multisectoral food safety system</i></b> ".
Page 19: Strategy 8: Goals: change 1 : "Improving national system for AI <b><i>prevention and</i></b> control."
Page 19: Strategy 8: Goals Add a new goal: " <b><i>Strengthening local authorities in charge of environmental and food control.</i></b> "
Page 19: Strategy 8: Target: change 1: "Establishment and functioning of an AI <b><i>prevention and</i></b> control system by 2006."
Page 20 : Add new Target: " <b><i>Functioning of 100 healthy food markets by 2008</i></b> ".
Page 20: Add new Activity: " <b><i>Training of local authorities and market managers to set up healthy food markets</i></b> ".
Page 20: Add new Activity: " <b><i>Provision of facilities and infrastructure to local authorities and market associations to implement healthy markets.</i></b> "
Page 21: Strategy 9: add new Goal: " <b><i>Understanding the ecology and dynamic of AI virus in the environment, poultry, birds and humans.</i></b> "

**Page 21: Strategy 9:** Add new Target: "*Development of an evidence based prevention, control and eradication plan for AI by 2008.*"

**Page 21: Strategy 9:** Add to activity 1: "*including identification of risk factors for AI transmission.*"

**Page 32 :** Add the *National Agency for Drug and Food Control* in the organogram

## Annex 5

### PROPOSALS FOR CAPACITY BUILDING TO PROMOTE THE IMPLEMENTATION OF HEALTHY FOOD MARKETS

#### 1. Regional Meeting to share experiences in the development and implementation of Healthy Food Markets in Asia

##### *Justification*

Food markets, and specially live animal markets, in Asia are quite similar in nature, ie. Type of goods traded, vending settings and hygienic challenges are common to many marketplaces in Vietnam, Cambodia, Laos, Thailand and Indonesia.

With the outbreak of bird flu and the public concern for healthy food, the setting up of healthy food markets has attracted an increasing interest in the countries concerned. The very significant experience in Thailand – “Healthy Food Markets” have been implemented since 2002 over 55% of the over 1620 markets are officially certified as such, offers a unique possibility for other countries to share and learn.

In early 2006, The Indonesian Government, via its Ministry of Health requested WHO Indonesia to facilitate a mission to study then situation of live animal markets in Jakarta, in view of preparing a national action plans to reduce the potential transmission of AI virus in such marketplaces.

The mission team concluded that effectively, wet markets do represent a high risk for potential AI transmission amongst animals and between animals and humans. The mission recommended inter alia to encourage the AI affected countries to share their experience sin this area, looking towards implementing action that would reduce existing risks, proposing to adopt the concept of “Healthy Food Markets”.

A Healthy Food Market is a setting in which all stakeholders collaborate to provide safe and nutritious food for the community. In such a setting, the stakeholders (viz. local authorities, market community,

suppliers, food market workers and consumers) combine resources and work together to implement incremental changes to improve the market, health and well being of the community.

### ***Proposed action***

A regional workshop will be organized to allow a group of 40 governmental and non governmental delegates playing key roles in the provision, trading and general management in and of food markets, at the municipal, district and provincial levels from Vietnam, Cambodia, Laos, Thailand and Indonesia, to meet with the following objectives:

- Share experiences in the development and implementation of healthier marketplaces in their countries.
- Agree on joint action to monitor the development and impacts of Healthy Food Markets in terms of preventing and controlling the spread of AI virus

Main outcomes of this gathering will be:

Contribute to the reduction of bird flu transmission and also to improve food safety in a general manner.

- (1) Strengthened the links between local and national alliances of public, market and business, consumer and other community oriented associations in promoting healthier marketplaces;
- (2) Enhanced cooperation among Asian countries, specially at Municipal, provincial and district level;
- (3) Strengthened existing Asian "Healthy Cities" network, increasing the scope of work

**Venue and dates:** Bangkok, as early as possible; **Participants:** delegates from Vietnam, Cambodia, Laos, Thailand and Indonesia. FAO, OIE and WHO;

## 2. Framework for a National Training for Trainers (ToT) Capacity Building Programme for Local Authorities and Members of Market and Consumer Associations

### **Overall objective**

To minimize health risks of the population threatened by the potential transmission of the AI virus at critical stages of the food supply chain in general, and in wet markets in particular

### **Risks and Assumptions**

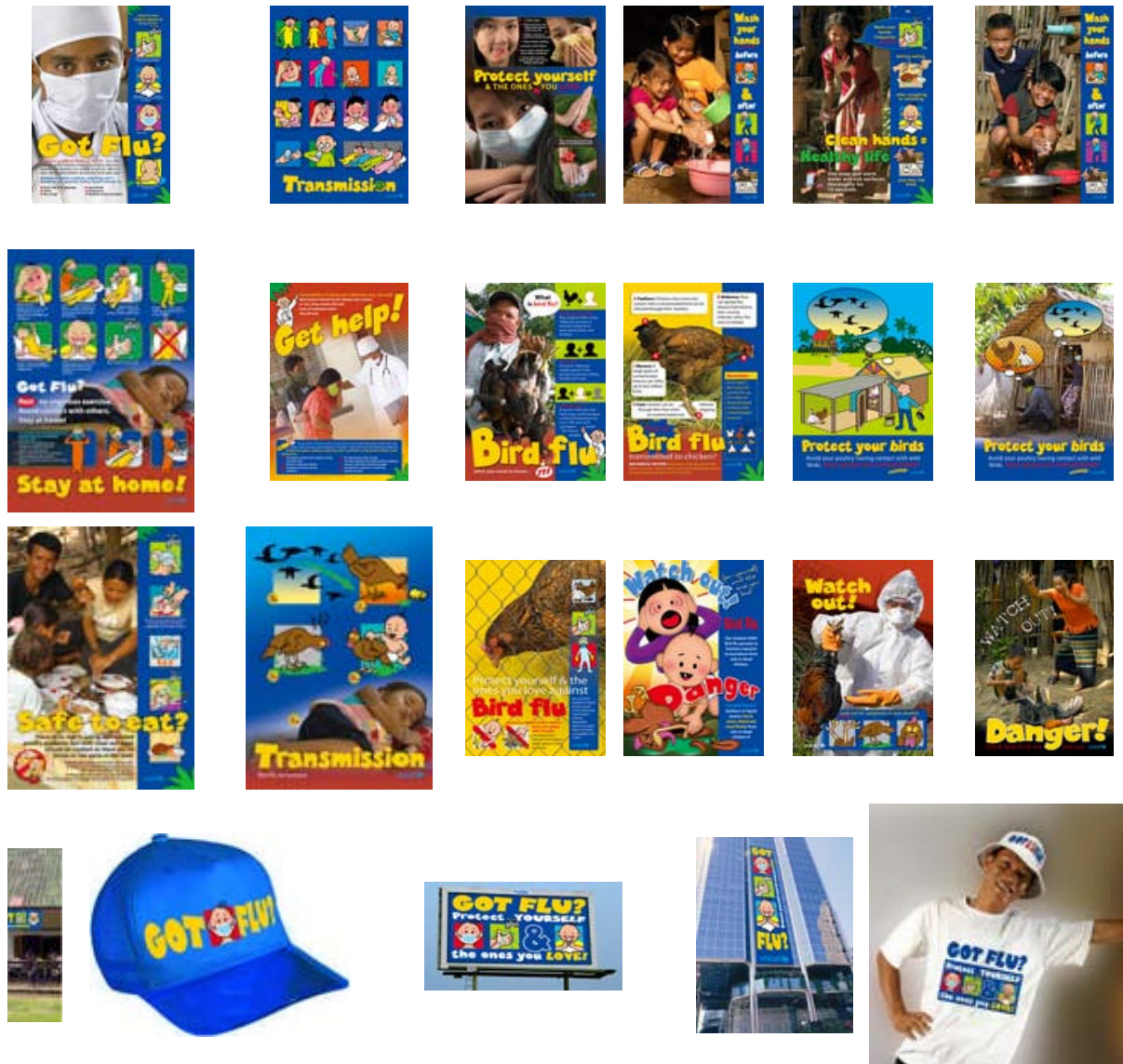
RA 1: No AI pandemic occurs; RA 2: Targeted settings remain accessible; RA 3: Concerned stakeholders participate actively; RA 4: Needed interventions are supported adequately

Specific objectives	Indicators	Sources of verification
To reduce the potential AI transmission by training and raising awareness of concerned authorities, human and animal health personnel, and community leaders on the need to implement preventive public health measures, and adopt behaviour and attitudes conducive to the achieving healthier environments	<p>I1. At least .....personnel in ..... districts, are trained on how to assess biosecurity in wet markets, prepare action plans, implement, monitor and evaluate Healthy Food Markets</p> <p>2. Number of officially certified Healthy Markets</p> <p>I3. Rate of AI transmission in wet markets</p>	<p>Pre tests and post tests from the training sessions</p> <p>KAP study done by a third party</p> <p>Records of Local, district and Provincial and national authorities,</p> <p>WHO, FAO and other organizations</p>
Expected Results	Indicators	Source of verification
1. Risks of potential AI transmissions due to improper poultry / food management along the food supply chain and notably in wet markets are	<p>I1.1.Number of wet markets assessed</p> <p>I1.2. Number of wet markets that have introduced / improved sanitation facilities</p>	<p>Records of Local, district and Provincial and national authorities,</p>

assessed and reduced.	and sound waste disposal and management facilities	WHO, FAO and other organizations
2. The concept and elements of Healthy Food Markets are adopted by.....wet markets and are officially certified as such	I.1.2.Number certified Healthy Food Markets	Inspection and monitoring reports of Local, district and Provincial and national authorities, WHO, FAO, other
3. Over .....market managers, local authorities and human and animal health personnel, responsible for food safety and public health are trained on how to implement healthy Food Markets	I.1.3Percentage of concerned personnel in the intervention areas who know how to implement healthy Food Markets	Knowledge and practice studies. Monitoring and supervision report from authorities concerned
<b>Main activities</b>		
<ul style="list-style-type: none"> <li>– Detailed assessment of the extent of the problem and number of wet markets that are functional in the intervention areas</li> <li>– Assessment of current biosecurity levels in wet markets</li> <li>– Develop training and Communication materials for different types of targets</li> <li>– Organize training of concerned personnel on Health food Markets</li> <li>– Organize awareness raising of the market communities and concerned authorities, through targeted public health campaigns</li> <li>– Provide logistics to assist in setting up Healthy Food Markets</li> <li>– Monitor and supervise proper implementation of Healthy Food Markets</li> <li>– Monitor AI transmission at all levels of the food supply chain</li> </ul>		

## Annex 6

### SAMPLES OF COMMUNICATION MATERIALS TO PREVENT AND CONTROL AI SPREAD



Source: UNICEF at : <http://3w.sailvega.com/NGO%20projects/cre.html>

## Annex 7

### SAMPLE PHOTOS FROM WET MARKETS IN INDONESIA, 01.2006



Open air transportation of chicken

Geese drinking from a pond soiled with chicken droppings



Dead chicken "inspected" with bare hands



Cat scavenging on dead chicken amongst bamboo cages



Slaughtering space used for taking shower



Need for awareness to reduce unnecessary human/animal contacts



Near to all slaughtering operations are carried out on the floor



Feathers are recycled for animal feed

**BUT, on the other side:**



Some sellers and stall owners are ready to invest in healthier surroundings





Plastic cages are gradually replacing the old ones



Still a lot to do!



For more information, contact: [outbreak@searo.who.int](mailto:outbreak@searo.who.int)