Emergency assistance for surveillance of influenza A (H7N9) virus in poultry and other animal populations in the South Asia region
TCP/RAS/3406 (E) and TCP/RAS/3407 (E)

POULTRY VALUE CHAIN AND H7N9 RISK ASSESSMENT FOR H7N9 IN SOUTH AND SOUTHEAST ASIA
18-20 DECEMBER 2013
BANGKOK, THAILAND

Summary

The 'Poultry value chain and H7N9 risk assessment for H7N9 in South & South-East Asia' workshop was held during 18-20th December 2013. 24 participants attended the workshop from 11 countries, as well as four FAO-RAP and two resource persons (32 total). This workshop provided a platform to provide a regional update on current H7N9 surveillance activities, describe value chain analysis (VCA) techniques and application and increase knowledge on risk assessment strategies targeted at H7N9. The workshop included both formal presentations and group and individual exercises. Participants were introduced to a range of computer software including R program for Social Network Analysis (SNA), QGIS mapping, and gross margin analysis using Microsoft Excel.

The heterogenic nature of poultry value chains in both South and South-East Asia makes VCA a highly applicable tool for understanding poultry movements, drivers, and risk of H7N9 spread. The implementation and application of VCA is not complicated, making it an even more powerful tool where veterinary resources and capacities vary across the two regions.

The group session's and exercises stimulated engagement and open discussions on cross-border movement of poultry, including the unregulated trade across porous borders. Scenario based exercises raised issues of culling and compensation further highlighted that VCA tools can provide significant value and support policy formation.

1. Introduction

Background

After the emergence of the novel avian influenza strain A (H7N9) in Eastern China in March 2013, large numbers of animals have been tested and virus has been detected in only very few animal and environmental samples predominantly from markets. A major challenge in early detection and response to avian influenza A(H7N9) is its 'silent' infection in birds as a low pathogenic avian influenza (LPAI) virus that does not produce clinical signs in infected birds, which increases the risk of incursion, and spread of the virus in the animal population as well as potential exposure of humans.

The experience with controlling other avian influenza viruses such the A(H5N1) has shown the critical role of domestic and international poultry trade in both the spread as well the containment of the epidemic. Value chain analysis provides an effective risk analysis tool to identify critical control points and high-risk networks. Modern poultry value chains are of dynamic nature and quickly adjust to economic and disease related factors. Therefore continuous updating of poultry value chain information is essential both for surveillance and rapid response capacity.

An integration of the value chain analysis tool into epidemiologic risk assessments supports animal health decision makers with the identification of efficient and equitable disease control interventions. Social network analysis (SNA) allows a description of the contact structure within poultry value chains. SNA is formally addressing the role of the pattern of interactions between units (traders, flocks, markets, etc.) in order to explain the occurrence and transmission of Avian Influenza. SNA has been applied in veterinary epidemiology to identify nodes in the poultry value chain that pose a high risk of Avian Influenza spread.

Approach

The three-day workshop will introduce participants to the value chain analysis methodology with application examples for poultry value chain risk assessments. Options for the integration of value chain data collection into regular surveillance activities will be introduced and discussed in view of the country specific contexts. This will include a prioritization of required data to be collected and an identification of effective data collection techniques. Participants will be introduced to the concept of SNA by defining networks and network paradigms. Applications of SNA in veterinary epidemiology will be given.

The Terms of Reference for the consultant have been included as Annex 1.

Objectives

1. To familiarize participants with the value chain analysis approach for disease control
    a. To prioritize the required epidemiological and socio-economic data for targeted surveillance and sustainable control interventions to reduce disease maintenance and transmission of Avian Influenza.
    b. To identify the required data collection techniques, data storage and data analysis and modelling techniques.
2. To update domestic and cross-border poultry value chain information.
3. To conduct H7N9 risk assessments based on updated domestic and cross-border poultry value chain information.

Meeting Format

The meeting will include plenary presentations and focus on facilitated and structured discussions with leading questions. The agenda with formal presentation topics, group and individual exercises (including software introduction) and questions for facilitation can be found in **Annex 2**.

List of the consultant's presentations

- Economic assessment for H7N9 control – Cost Benefit Analysis and Gross Margin
- Obtaining Value Chain information summary
- Quantifying trading volume, source and destination at different points of the value chain (descriptive data analysis)
- Prioritizing variables
- Risk management for H7N9

List of exercises facilitated by the consultant

- Facilitated discussion on identification of informants and sampling schemes
- Gross margin analysis of poultry production and trading
- Poultry value chain survey tool (targeting Live Bird Markets)

List of participants is provided in Annex 3.

2. Implemented activities

Day 1 – 18 December

Dr Jan Hinrichs welcomed the participants and introduced the workshop objectives, followed by an update from Dr Sothyra Tum on the H7N9 epidemiological situation and on-going surveillance activities in South and South-East Asia.

Jan Hinrichs (JH) presented an introduction and overview on what a value chain is, its application and key methods used to conduct a value chain analysis (VCA). This provided participants with a summary of the workshop aims and presentation contents in the context and application to H7N9.

After the break participants split into ASEAN and SAARC groups and undertook the first group exercise (groups facilitated by Jim Young (JY) and Jan Hinrichs respectively). Regional South-East Asia and South Asia maps were projected onto a flipchart and participants from each country took turns to highlight cross-border movements geographically. This allowed participants to identify H7N9 risk pathways spatially, and opened discussions amongst participants about unregulated trade patterns. This exercise prompted early engagement of participants and good discussions in an open and sharing environment. Participants from Vietnam and Pakistan who have already been active in value chain studies were able to provide detailed insight of their results and share with others. This provided real-time examples for other participants and showed encouraging local leadership of value chain techniques and applications. Both the ASEAN and SAARC groups presented a summary to the full group, which allowed key movement pathways to be identified and stimulated further discussion.

In the next session Sothyra Tum (ST) led a 1-hour introduction to QGIS mapping software, which (not surprisingly) presented some difficulty in loading of shape files of some participants due to file sharing and computer compatibility issues. These are not unexpected in this kind of exercise and by mid way through the session the majority of participants were able to load their own country's shape file and open the 'print composer' to draw a basic map and include poultry movements. By the end of the session the participants had successfully loaded a shape (map) file of their own country and were able to draw basic indicators (arrows) of poultry movements. Some participants had received training in this software previously while others were first time users. This introduction will hopefully encourage more use of this powerful and open source software, which can allow users to draw quality graphical representations of value chains.

In the final Day 1 session Epidemiologist Dr David Castellan presented a group exercise on response scenarios based upon AI incursions or reports of a positive test. David Castellan (DC) initially presented an introduction explaining what the exercise entailed, as well as raising key epidemiological principles about H7N9 in the context of surveillance and the value chain. Participants were encouraged to consider both the value chain as compartments, and consideration for operating in disease zones. The objectives were to 1) determine what information is needed to conduct surveillance based on value chain information, and 2) identify possible actions that can be taken for prevention and control as well as minimising impacts through incentives. The participants were divided randomly (through counting off) into four groups; this time ASEAN and SAARC participants mixed together. Four predetermined scenarios, some of which based on real situations, were then applied to each

group. The session concluded and each group was scheduled to present summarised findings first thing on Day 2.

Day 2 – 19 December

The opening session comprised of representatives from each group reporting back on the group surveillance scenario exercise. It was clear from the presentations and feedback from facilitators (DC, ST, JY and JH) that the participants worked enthusiastically and as teams. Group members raised a number of important issues during this discussion and presentation:

- Live Bird Markets (LBMs) have both push and pull factors up and downstream including farmers wanting to sell poultry to maintain incomes, farms needing to move poultry out of barns to make room for new batches, demand of poultry in peak or festival seasons etc. which are all likely to be impacted in the event of market closure. This highlighted that VCA investigations need to seek both up- and downstream of the LBMs.
- Farmers are resistant to some intervention methods making H7N9 a difficult issue to manage. The key change from HPAI H5N1 is that farmers may no longer observe sick birds in the case of LPAI H7N9, resulting in the requirement for active H7N9 surveillance.
- How can closure of a market be justified? There is significant potential for profit loss and market closure is likely to be met with resistance by multiple stakeholders. This stimulated a lot of discussion about compensation and how this could be implemented. It is clear each country has various policies on the use of vaccination, culling, compensation and compensation rates. This discussion raised key points that don't have simple answers, however the importance of obtaining value chain information through VCA is likely to provide important details to help key decision making.

In the second session Jan Hinrichs introduced Social Network Analysis (SNA) methodology and its application to understanding value chains. Participants were familiarised with networks and basic terminology and concepts. Key terminology of nodes, links and centrality were discussed. Dr Chaithep Poolkhet (Kasetsart University, Thailand) then presented two SNA investigations of AI spread and movement patterns of backyard chickens in Thailand. This helped consolidate the introduction by Jan Hinrichs by showing recent and highly relevant SNA application.

The next session was prepared by JH and involved a two-step exercise of 1) seek out traders and obtain trading information, and 2) an introduction to R statistical computing and graphic program ™ (Bell laboratories) and its use in SNA. The exercise required groups to use the information obtained from (sham) traders in the room and then apply this to the R program and build a network. Participants were able to load a copy of the open source software and follow a predesigned worksheet that provided step-by-step instruction for development of a network. This process allowed hands-on experience with powerful statistical software.

Ms Nguyen Thi Thanh Thuy provided an informative session 'Collecting information for value chain studies' which updated the group on the significant VCA activities in Vietnam. This presentation showed a significant amount of work and highlighted the value of obtaining information and insight into poultry movements.

In the following session (facilitated by Jim Young) participants were introduced to Gross Margin (GM) analysis techniques that can be applied to various components of the value

chain. Following background details on basic economic principles, the participants were shown a predesigned GM spreadsheet that could be adapted to calculate the GM of a farmer, trader, and wholesaler in the poultry value chain. A copy of the spreadsheet tool was provided to the participants and they were allowed a period of time to trial it and adjust to their own production system, currencies and projected volume traded etc. Following this the presentation included how using a basic tool similar to the one provided could be used to calculate expected financial impacts in a scenario where a market was closed for a period of time.

In the final session for the day Jim Young presented a summary obtaining value chain information. This focused on four key questions of:
  1. Where do we start?
  2. Where do we go?
  3. Who should we talk to?
  4. What data is needed?
The context was obtaining information on 'informal' value chains. Investigative methods including snowball sampling, developing a database, structured and semi-structured interviews were presented.

Day 3 – 20 December

In the first session Jim Young presented a summary on 'Prioritising variables' for obtaining value chain information. This presentation reviewed previous material and discussed how the objective of the epidemiological situation (such as high prevalence/low prevalence, active surveillance in a H7N9 free country/infected country) will help define what information is needed for VCA. This led to a group exercise where participants were asked to review a predesigned survey tool, and prioritise key questions based on two different objectives:
  1. Identify risk based target surveillance points along the value chain
  2. Identify cost-effective and incentive compliant disease risk reduction measures
This required participants to think critically about how to make a trader (or other stakeholder) survey tool as efficient as possible while capturing key VCA details.

In the following session Jim Young presented 'Qualifying trading volumes, source and destination at different points of the value chain' through using descriptive analytical methods to summarise data obtained through surveys. This focused on simple summary methods; it also discussed challenges faced when data contains wide ranges and techniques to manage these issues. An example was provided on how to use summary data to develop an impact report of financial impacts.

Jim Young presented 'Risk management for H7N9', which included general veterinary measures, a review of biosecurity, LBM risk factors, and 13 identified actions that could be taken to both prevent and control H7N9 incursions. This presentation focused on the FAO publication 'Addressing avian influenza A(H7N9): Risk management along the food chain' and discussed pros and cons of each action as well as its application to the value chain.

In the finals session Jan Hinrichs and Jim Young led an open discussion on summarising the workshop and how understanding the value chain and VCA can be a powerful tool and framework to understand H7N9 disease risk.

3. Conclusions and recommendations

This workshop used a balanced approach of formal presentations and group exercises, including the introduction of mapping software (QGIS), statistical software for SNA (R program) as well as structured survey tools and a gross margin analysis speadsheet (Microsoft Excel). The participants from 11 countries were enthusiastic and provided valuable input stimulating informative discussion on risk management of H7N9. The topic of culling and compensation was introduced by participants, and led to open discussions on how value chain analysis can assist in decision making around this sensitive issue.

As with many computer based technology introductions, it would be hoped that some of the participants would use these baseline skills to further develop at their own pace.

The participants generally had a good understanding of H7N9, and also brought experience and knowledge from previous activities undertaken for HPAI H5N1. Using this existing knowledge provided a strong base from which to build on risk management targeted at H7N9, both at institutional and value chain levels.

Recommendations

Several participants commented that they would value this training in-country for their regional/provincial staff. This was encouraging that they felt the training was valuable. Some also requested more in-depth training in some of the software.

Training in leadership skills and communication could also be of value. It is clear that many of the participants were knowledgeable of AI risks, however some commented on the difficulty with engaging with higher-ranking officials and human health care stakeholders. Veterinary staff generally have a strong understanding of the poultry production system and value chains, therefore should be key leaders in the event of human infection and surveillance activities in the case of an outbreak. Development of a 'One Health' framework where both human medical and veterinary staff can communicate may facilitate greater understanding and risk reduction.

Annex 1: Agenda

Agenda

Time	Details	Responsible
Day 1: Wednesday, 18 December 2013		
08.30 -	Registration	
09.00 –	Opening session - Welcome remarks - Introduction - Workshop objectives	Jan
9.20	Update on H7N9 epidemiological situation and ongoing surveillance	Tum
09.30 –	Refreshment	
Session 1: *Value chain analysis approach; scenarios and responses*		
10.00	Livestock value chain analysis methodology	Jan
10.50	Group exercise - mapping of cross-border poultry value chains in ASEAN and SAARC region	Jan & Jim
12.30 –	Lunch	
13:30	Reporting back from group exercise	Jan & Jim
14:00	QGIS application to visualize movement data	Tum
15:00	Surveillance and response for different H7N9 detection scenarios based on epidemiological and value chain information.	David
15:30	Break	
15:45 17:00	Break into 4 groups (Split SAARC & ASEAN each into 2 groups)	David, Tum, Jan & Jim
Thursday, 19 December 2013		
Session 2: *Social network analysis*		
09:00	Social Network Analysis methodology	Jan
10:00	SNA application example for poultry movements	Chaithep Poolkhet
10:30	Refreshments	
10:45	Introduction to SNA software	Jan & Chaithep
12:30	Lunch	
13:30	SNA application exercise for poultry movements between live bird markets	Jan & Chaithep
Session 3: *Poultry value chain data collection and storage*		
15:00	Application example of poultry value chain analysis	Thuy

	approach in Viet Nam	
15:15	Trading margin analysis Exercise – simulate Gross Margin using the 'GM analysis' tool (in pairs or individually)	Jim
16:00-16:15	Break	

16:15-17:00	Obtaining Value Chain information Summary
	    a. How can the involved actors be identified?
	    b. What information collection technique works best?
	    c. Recommended routine information gathering for veterinary services, livestock services and other relevant institutions?
		Jim

Day 3: Friday, 20 December 2013		
Session 3: *Poultry value chain data collection and storage*		

08:30	Facilitated discussion on prioritized variables that should be included a data collection list?
	    a. Prioritize a list of data variables to be collected?
	        i. Epidemiological context/situation
	        ii. Disease prevalence
	        iii. Socio-economic/poultry movement
		Jim & Jan

08:45	Presentation of questionnaires for poultry market survey Exercise – mock survey	Jim
10:00	Quantifying trading volume, source and destination at different points of the value chain (data analysis descriptive)	Jim
10:30	Refreshments	
10.45	Risk pathway and hotspot identification and risk management Interventions at LBM	Jim & Jan
12.30	Lunch	

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