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GLOBAL SURVEILLANCE NETWORKING FOR GLOBAL HEALTH

A COMMUNITY RESPONSE TO AVIAN INFLUENZA IN LOMBOK INDONESIA[1]

Muktasam Abdurrahman[2], Cynthia Hunter[3], and Jenny-Ann Toribio[4]

ABSTRACT

Highly Pathogenic Avian Influenza (HPAI) has been a headline issue in Indonesia, not only due to it impacts on poultry industries, but also on human. From 2004 to 2010 there have been over 794 HPAI outbreaks in Indonesian poultry, and the virus has killed 141 of the 171 confirmed human cases in 13 Indonesian provinces (WHO Report, 9th December 2010). Due to these severe impacts, in 2005 the Indonesin government launched the National Strategic Plan for Controlling Avian Influenza to better address issues associated with control of HPAI. The present study was carried out to examine the influence of government policies, programs and activities on community responses to Avian influenza over the last five years. Interviews with 400 village households were carried out between August and September 2010, covering two sites in Lombok (Pujut sub-district a non-infected area in Central Lombok, and Pringgasela sub-district an infected area in East Lombok district). In addition to the survey, data were also collected through in-depth interviews & Focus Group Discussions (FGDs) involving key informants and participants from district and village levels who represent various stakeholders such as Livestock and Animal Health, Public Health, and community leaders, both formal and informal. Results of the studies reveal low and limited community responses to the HPAI – especially those involved in kampong chicken production or Sector 4. Due to their limited knowledge of the HPAI and the "absence" of HPAI cases (in Pujut), they do not demonstrate strong and positive attitudes and perceptions about HPAI. According to most respondents, Avian Influenza only takes place on other islands and not in Lombok. These attitudes and perceptions have been supported by the fact that very limited programs and activities were conducted ***at the village and community level*** *by the govermment agencies, even though, in fact, there have been, more generally, many programs and activities carried out at provincial, district and subdistrict level. Most village households claimed that television programs have been the most dominant source of information for HPAI.*

Key Words: Community, Response, Avian Influenza

1. Introduction

Highly Pathogenic Avian Influenza (HPAI) has been the major issues in Indonesia, not only due to it impacts on polutry industries, but also on human. From 2004 to 2010 there have been over 794 HPAI outbreaks in Indonesian poultry, and the virus has killed 141 of the 171 confirmed human cases in 13 Indonesian provinces (WHO Report by 9th December 2010). Due to these severe impacts, in 2005 the national government of Indonesia has launched the National Strategic Plann to control and address issues associated with HPAI. This study was carried out to (i) document the HPAI education, control and surveillance activities implemented by human and animal health agencies in Lombok since 2004 - including the levels of implementation of HPAI education, control and surveillance activities across

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members of the district human health and animal health agencies in Lombok, and the relationships between the human health and animal health sectors at district and sub-district levels, (ii) find out community responses to Avian influenza due to government policies, programs and activities, (iii) explore the social, cultural, economic and poultry management repercussions of HPAI for households in sectors 3 and 4 of the poultry industry in Lombok, and (iv) provide up-to-date information to appropriate policy-makers at district, provincial and central levels of the research findings and their implications for future activities Lombok.

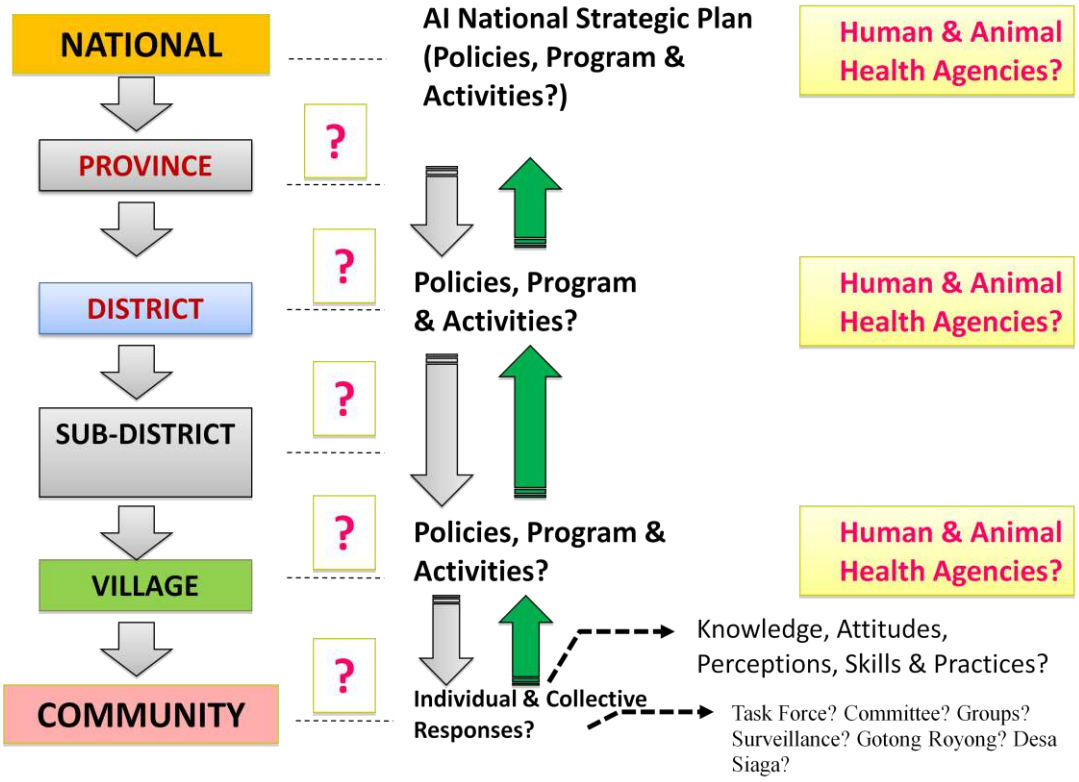
2. Objectives and Significance of the Study

The ultimate objective of this study is to evaluate the impact and extent of activities undertaken to date through the ***National Strategic Plan*** in sectors 3 and 4 of the poultry industry in Lombok, Indonesia with the following specific objectives:

(1) Document the HPAI education, control and surveillance activities implemented by human and animal health agencies in Lombok, especially since 2004.
(2) Evaluate the response to HPAI H5N1 outbreaks and to HPAI education, control and surveillance activities by members of sector 3 and 4 communities in Lombok.
(3) Explore the social, cultural, economic and poultry management repercussions of HPAI for households in sectors 3 and 4 of the poultry industry in Lombok.
(4) Determine the levels of implementation of HPAI education, control and surveillance activities across members of the district human health and animal health agencies in Lombok.
(5) Investigate the relationships between the human health and animal health sectors at district and sub-district levels.
(6) Provide up-to-date information, to appropriate policy-makers at district, provincial and central levels, of the research findings and their implications for future activities Lombok.

The findings from this study will be comunicted to the government, from the national level to the district level where in turn that may contribute to policy development and implementation. At the end it is hope that the government and the community would be able to control and prevent HPAI transmission more effectively.

3. The Conceptual Model of the Study



4. Study Methods

Quantitative and qualitative research methods were applied to this study. Structured inteviews with 400 village households were carried out in August – September 2010, covering two study sites in Lombok. The first site - Pujut sub-district represents an H5N1 non-infected area in Central Lombok, and the second site - Pringgasela sub-district represents an H5N1 infected area in East Lombok district (based on AI positive laboratory test did by the Diseases Investigation Center or Balai Besar Veteriner or BBVet Denpasar). In addition to the structured interviews or survey, data collection were also carried out through in-depth interviews with key informants from provincial to village levels, and Focus Group Discussions (FGDs) involving various participants from districts to village levels who represents varies stakeholders such as Livestock and Animal Health agents, Public Health personnels, formal and informal community leaders. Quantitative (descriptive statistic) and qualitative (such as N-Vivo) data analysis were applied for quantitative and qualitative data.

5. Results

Results of the studies reveal (i) there have been many policies, programs and activities carried out by the local governments (from provincial to district levels) to inform community about HPAI (Box 1). Governoor and bupati decree and educational activities are few examples of interventions taken by the government

to improve community knowledge, and to change their attitudes and practices to controll and prevent HPAI transmission.

Box 1. Government Decrees to Control and Prevent the HPAI Transmission in West Nusa Tenggara Province – Administrative Approach

(1) Surat Dirjen Bina Produksi Peternakan No.5666/Po.610/F5/10/03, tgl 17 Oktober 2003 tentang ***Wabah Penyakit Unggas Menular.***
(2) Surat Kadisnak Prov NTB No.524.3/2791/Keswan tgl 4 November '03 tentang ***Wabah Penyakit Unggas Menular.***
(3) Surat Kadisnak Prov. NTB No.524.3/2894/Keswan tgl. 20 November 2003 tentang ***Pengaturan Lalulintas Unggas.***
(4) Surat Kadisnak Prov. NTB No.524.3/2894/Keswan tgl. 27 Januari 2004 tentang ***Kewaspadaan Penyakit AI***
(5) Kep. Gubernur NTB N0.71 tgl 21 April 2004 tentang ***Penolakan dan Pencegahan Masuknya AI di Provinsi NTB.***
(6) Surat Dirjen Bina Produksi Peternakan 4278/Sr.140/F.5/07/04 tgl 30 April 2004 tentang ***Penetapan NTB sebagai Daerah Tertular Baru AI.***
(7) Surat Gubernur/Wakil Gubernur NTB Thn.2005-2006 tentang ***Kewaspadaan terhadap AI.***
(8) Surat Kadisnak Prov NTB Thn. 2005-2010 tentang ***Kewaspadaan AI.***
(9) Kep. Gub. NTB No. 94/2007 tentang ***Task Force Pengendalian & Pemberantasan Penyakit Zoonosis AI dan Anthrax.***
(10) Kep. Gub. NTB No. 99 A/2007 tentang "***Komisi Provinsi FBPI***".

In addition to these administrative approaches, there had been many tehnical programs and activities taken by the provincial and district governemnt to control and prevent HPAI transmission in Lombok island (Box 2).

Box 2. Government Actions to Control and Prevent the HPAI Transmission in West Nusa Tenggara Province - Technical Approach

(1) Improving biosecurity such as "issolation and quarantine of infected poultry, decontamination/desinfection had been carried out at poultry farms and markets such as: chicken and duck pens, poultry markets, traditional live bird markets where slaughter activities taking place. Since 2005 to-2009 there had been about 14000 liter of disinfectant used in 10 districts/municipality of West Nusa Tenggara province. However, there are some problems remain such as controlling people and poultry movement to and around polutry farms and pens. For sector 4, there is a difficulty in conducting regular and effective controling activities.
(2) Surveilannce and tracing
(3) Controlling movement of poultry, poultry product and poultry farm waste
(4) Vaccination
(5) Depopulation at infected areas
(6) Restocking
(7) Improving public awareness
(8) Stamping out
(9) Monitoring and evaluation

This study found a low and limited community responses to the HPAI – especially those involved in kampong chicken production or Sector 4. Most kampong chicken and duck farmers do not have enough knowledge on all apect Avian Influenza suxh as the specific symptoms of AI, the way how it is transmitted and how to control and to prevent it (Table 1).

Table 1. Distribution of Respondents according to Their Knowledge on the Way How AI is Transmitted

The Way AI Transmited to the Village	Site 1: Pujut				Site 2: Pringgasela			
	Sector 3		Sector 4		Sector 3		Sector 4	
	n	%	n	%	n	%	n	%
1. Infected birds	8	21.62	17	16.51	6	24	26	25.74
2. Infected wild birds	0	0	0	0	3	12	4	3.96
3. Contaminated vehicles	0	0	0	0	1	4	0	0.00
4. Contaminated cages	0	0	1	0.97	0	0	1	0.99
5. Contaminated cloths/shoes	0	0	1	0.97	0	0	0	0.00
6. Lainnya (don't know. air)	**29**	**78.38**	**85**	**82.52**	17*	68	**75**	**74.26**

Remark: *Don't know (11 respondents), air/wet fases/dirty pen (3 respondents), and "no cases" (3 respondents)

Table 2. Distribution of Respondents according to Their Perceptions of Actions to Prevent AI Transmission to Human

The Way to Stop AI Transmission to Human	Site 1: Pujut				Site 2: Pringgasela			
	Sector 3		Sector 4		Sector 3		Sector 4	
	n	%	n	%	n	%	n	%
1. Avoid contact between kids and the sick birds	4	10.81	4	3,88	2	8.00	3	2.97
2. Do not slaughter and consume sick birds	4	10.81	2	1,94	2	8.00	6	5.94
3. Dispose sick and death birds at the proper place – burn and burried	4	10.81	12	11,65	3	12.00	7	6.93
4. Clean and spray cages with disinfectants	5	13.51	1	0,97	2	8.00	4	3.96
5. Draw poultry waste/manure at the proper place – burried it. compos	3	8.11	5	4,85	0	0.00	1	0.99
6. Do not use manure/waste of the sick birds for fertilizers	0	0	10	9,71	0	0.00	1	0.99
7. Others_____	**26***	**70.27**	79	76,70	18[a]	72.00	87	86.14

Remarks: * Don't know (16 respondents), culling (2 respondents), and washing hand/use masker (5 respondents), and others (AI hasn't happened, report to Public Health Service Center or Puskesmas)

[a] Don't know (7 respondents), burried death birds (1 respondents), use masker (2 respondents), and others (washing hand regularly, AI hasn't happened, follow government direction)

Table 2a. Distribution of Respondents according to Their Perceptions of Actions to Prevent AI Transmission to Human, 2010

The Way to Stop AI Transmission	Site 1: Pujut			
	Sector 3		Sector 4	
	n	%	n	%
1. Avoid contact between kids and the sick birds	4	10.81	4	3,88
2. Do not slaughter and consume sick birds	4	10.81	2	1,94
3. Dispose sick and death birds at the proper place – burn and burried	4	10.81	12	11,65
4. Clean and spray cages with disinfectants	5	13.51	1	0,97
5. Draw poultry waste/manure at the proper place – burried it. compos	3	8.11	5	4,85
6. Do not use manure/waste of the sick birds for fertilizers	0	0	10	9,71
7. Others_____	**26***	**70.27**	79	76,70

Remarks: * Don't know (16 respondents), culling (2 respondents), and washing hand/use masker (5 respondents), and others (AI hasn't happened, report to Public Health Service Center or Puskesmas)

Table 3. Distribution of Respondents according to Their ***Willingness to Report AI Suspect or Suden Death*** at Their Farm/Poultry

Wilingness to Report AI susperct or Suden Death	Site 1: Pujut				Site 2: Pringgasela			
	Sector 3		Sector 4		Sector 3		Sector 4	
	n	%	n	%	n	%	n	%
1. Yes	29	78.38	25	24.27	17*	68.00	18	17.82
2. May be	0	0	2	1.94	0	0.00	3	2.97
3. No	8	21.62	76	73.79	8**	32.00	80	79.21

Notes: * Report to village leaders such Village head and subvillage head (3 respondents), field extension agent (1 respondent), field agents of the company (9 respondents), animal health agency and peronell (4 respondents).

** Don't know where and to whom to report (4 respondents), has been recorded in control card (2 respondents), it is my own business (1 respondent), and others such 'its a common case".

Ever hear about AI and Sources of knowledge: Some respondents even never heard about AI (Table 2).

Table 4. Distribution of Respondent according to Whether The Respondents Ever Hear about AI

Ever hear about AI	Site 1: Pujut				Site 2: Pringgasela			
	Sector 3		Sector 4		Sector 3		Sector 4	
	n	%	n	%	n	%	n	%
1. Yes	37	92.5	103	64.38	25	83.33	101	59.41
2. No	**3**	7.5	**57**	**35.63**	5	16.67	**69**	**40.59**
Total	**40**	100	160	100.00	30	100	170	100.00

Due to their limited knowledge on the HPAI and the "absence" of AI case (no AI out break in Lombok, there were AI positive in Pringgasela, and no case in Pujut), the

community demonstrates negative attitudes and perceptions on the HPAI. According to most respondents, Avian Influenza just took place in other island and not in Lombok (Table 2).

Table 5. Distribution of Respondent according to Their Perceptions & Attitudes to AI, 2010

Code	Statement	Site 1: Pujut										Site 2: Pringgasela									
		Sector 3 (n: 37)					Sector 4 (n: 103)					Sector 3 (n: 25)					Sector 4 (n: 101)				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
F8	*HPAI is an important issue of human health facing by the community these days*	10	**18**	7	2	0	8	**60**	29	6	0	2	**16**	3	4	0	20	**54**	21	6	0
F9	*No much I can do to prevent AI enter to my farm/poultry farms*	1	12	9	**13**	2	3	56	32	12	0	1	15	5	**4**	0	9	62	22	8	0
F10	*If I have sick birds, I will sell it straigh away*	3	7	2	24	1	5	46	8	43	1	0	5	1	18	1	0	14	8	77	2
F11	*If I vaccinate my birds, I am sure my birds will not be infected by Avian Influenza when the virus enter the village*	5	25	7	0	0	5	56	41	1	0	2	16	6	1	0	12	56	31	2	0
F12	*If my bird is sick, it is the God will and I will accept it*	5	22	1	8	1	4	80	7	12	0	2	13	3	6	1	13	79	1	8	0
F13	The only way the HPAI transmission is from consuming infected cooked chicken	3	10	12	11	1	3	32	41	27	0	0	6	7	12	0	3	22	27	49	0
F14	HPAI is the problem in broiler or layer farms and not in kampong chicken	1	3	3	22	8	1	43	29	26	4	1	2	0	20	2	1	41	12	41	6

Remark: 1: Very agree, 2: Agree, 3: Not sure, 4: Disagree, 5: Very disagree

Actions taken for sick and death birds: There are two common actions taken by respondents from sector 4 (Pujut) when their birds are sick, **first** *slaughter them* and consume, and **second** *sell them*. Killing sick birds seems to be an uncommon practice in Lombok, not only because of "no experience for AI outbreak", but also because of religious faith. In Table 6, it could be seen that ony one respondent selected option 4 and 5 while no one select option 6. Data presented in Table 6 also indicates that about 20% respondents did not do anything to their sick birds. From HPAI prevention and controlling perspective, these practices are in high risk for disease transmision and outbreak.

Table 6. Distribution of Respondent according to Their Action for Sick Birds

Actions for Sick Birds	Site 1: Pujut				Site 2: Pringgasela			
	Sector 3		Sector 4		Sector 3		Sector 4	
	n	%	n	%	n	%	n	%
1. Separating from the healthy birds	29	**72.5**	28	17.50	24	**80**	**51**	**30.00**
2. Selling with cheaper price	**3**	7.5	**45**	**28.13**	**1**	3.33	0	0
3. Slaughter and sell	**3**	7.5	4	2.50	**0**	0	7	4.12
4. Culling and burn	**0**	0	1	0.63	**0**	0	0	0
5. Kill and burried	**2**	5	1	0.63	**0**	0	1	0.59
6. Kill and draw to the river/water way	**0**	0	0	0.00	**0**	0	1	0.59
7. Slaughter and consume by the households	**6**	15	**49**	**30.63**	**2**	6.67	**72**	**42.35**
8. Do nothing	**0**	0	32	20.00	**1**	3.33	32	18.82
9. Others (give drug. Etc.)	**20**	**50**	37	23.13	**9**	30	33	19.41

Table 7 summarise respondents' behaviour when they found death birds. This table shows that most farmers from sector 4 in Pujut burried the death birds (75.63%) while some of them claimed to draw the birds to waterway or river. Almost 9% said other options such as giving away the death birds to someone who usually come to the village to find death birds for fresh watter fish feeding. Selling, burning, eating are not the good options for the respondents.

Table 7. Distribution of Respondent according to Their Action for Death Birds

Actions for Death Birds	Site 1: Pujut				Site 2: Pringgasela			
	Sector 3		Sector 4		Sector 3		Sector 4	
	n	%	n	%	n	%	n	%
1. Separating from the healthy birds	0	0	0	0.00	0	0	1	0.59
2. Selling it	0	0	1	0.63	1	3.33	0	0
3. Burn	5	12.5	1	0.63	4	13.33	1	0.59
4. Burried	**26**	**65**	**121**	**75.63**	**21**	**70**	**155**	**91.18**
5. Draw to the river/water way	5	12.5	31	19.38	0	0	7	4.12
6. Consume	0	0	0	0.00	0	0	0	0
7. Do nothing	0	0	1	0.63	0	0	0	0
8. Others (feeding fish/dog)	10	**25**	14	8.75	7	**23.33**	11	6.47

These attitudes, perceptions and practices have been supported by the fact that very limited programs and activities were counducted **at the village and community level** by the govermment agencies, even though in facts there had been many programs and activities carried out at provincial, district and subdistrict level. Most respondents stated that they got information on Avian Influenza was mostly from television programs (Table 4).

Table 8. Distribution of Respondents according to the Source of AI Knowledge

Source of kowledge	Site 1: Pujut				Site 2: Pringgasela			
	Sector 3		Sector 4		Sector 3		Sector 4	
	n	%	n	%	n	%	n	%
1. Televisi	35	94.59	96	93.2	22	88	92	91.09
2. Radio	5	13.51	10	9.71	2	8	11	10.89
3. Newspaper/book/magazine	8	21.62	6	5.83	1	4	1	0.99
4. Pamphlets/brochure	3	8.11	0	0	2	8	1	0.99
5. Posters	2	5.41	1	0.97	0	0	20	19.80
6. Staff of livestock or public health	2	5.41	4	3.88	0	0	2	1.98
7. Others	13	35.14	10	9.71	7	28	15	14.85

Most village households claimed that television programs have been the most dominant source of information for HPAI, (iii) socio economic and cultural factors have been hindering the community to implement such biosecurity measures to controll and prevent AI, especially at the sector 4 farms and households.

6. Discussion

Despite the high levels of government programs, policies and plannng strategies at provincial and the district levels, the **community and villagers' responses** demonstrate that in both sites at village levels, where sector 3 and sector 4 poultry producers live, there was a perception of little or no government activity for AI. These activities included little or no exposure or experience of print media (brochures/leaflets) and over 90% of respondents had no recollection of being asked to change their poultry management practices. Further information from these groups reported that if activities did occur they were at the sub-district level with only formal and informal village leaders present.The government agencies of animal and human health had not been to their village, nor did any of these respondents know the names of the current field agents. However, it was reported that there was some information at the health clinic or subdistrict health office as well as information being given back in 2003 at posyandu (village medical post for women and infants' vaccinations). Print media was distributed at health clinics also.

From all sites the most ubiquitous medium for activities was television and not from direct contact with field extension agents.. However, as television viewing is a passive activity there is a high possibility that the information given is not necessarily effective in relating to real life experiences, compared with information given by direct contact with field agents from animal and human health agencies.

Additionally we don't know what programs they saw or whether there was a high content of news items about outbreaks etc. rather than educational material.

There was the general perception that the activities of the livestock and animal health office focused on big animals such as cattle and not on poultry. Those involved in contract poultry farms (sector 3) claimed support from the contractor company about healthy production practices and biosecurity measures for cleaning cages and pens. In the Pringgasela subdistrict (the infected site) one participant recalled visits of both public health and animal health to his farms for sample taking. There were no collective or community groups specifically for AI matters at the subdistrict, community or village level.

Quite a different perception of government activities was given by the animal health and public health personnel. Animal health and human health agencies reported socialization around AI activities at district and provincial levels and at village level at *posyandu* through media distribution to community and community leaders and socialization at elementary school (Pringgasela site). Animal health agencies reported having vaccine and also some coordination with public health agencies, although there is no formal existence of inter-agency coordination and collaboration in AI control and prevention programs and activities. AI promotion activities by the Public Health Service Center or *Puskesmas* have lessoned since 2007 when there was an AI human suspect (confirmed negative). Surveillance activities were strongest in Pringgasela (infected site) through PSDR activities, sample collections and involvement with the Disease Investigation Centre and BBVet Bali. Activities have become less intensive since 2007 and with the end of FAO support funding. There is a perceived need to increase the number of PDSR to do AI surveilance in all villages in East Lombok.

Results of the FGD with community leaders and the other FGD with villagers highlighted limited programs and activities carried out by the government to promote changes of communities' knowledge and practices to prevent and control Avian Influenza .

The results of the two Focus Group Discussions at the East Lombok study site Pringgasela revealed that there had been **limited programs and activities carried out by the local government** to introduce AI to the community – especially that involving the village communities

Killing sick birds, other than for consumption purposes, seems to be an uncommon practice in Lombok, not only because of "no experience for AI outbreak", but also because of religious faith. The killing of sick birds and the consumption of them by humans is a very risky enterprise in terms of disease transmission from poultry to humans. Villagers have a perception of no risk because of past experiences but diseases are created and/or mutate and they need to be educated about these aspects of the disease burden in relation to bird and poultry management and practices.

Another aspect of dead birds is the environmental one, where village folk say they throw and discard the dead birds and the slaughtering waste into water ways or open land around the houseyards. Both these practices pose health risks for humans and for animals.

A number of respondents 23.53% stated that poultry were pets. From the HPAI prevention and control perspective, these practices are in high risk for disease transmission and outbreak.

Data presented in Table 62 indicates that none of the respondents who vaccinated their birds mentioned the staff of government agencies such as from animal health office. DISCUSSION PAGES 54 reluctant to and if do then don't use government agencies. This begs the question where or how does the vaccine get used?

In 2008 there were about 15,931 migrant workers working in Malaysia and Saudi Arabia from East Lombok district. In regard to the global concern of Avian Influenza transmission, this population movement and migrant workers may contribute to the AI risk transmission.

This study found that Program and activities promoted to create community awareness, improve knowledge and change practices had been supported by the distribution of brochures to the head of subvillages, and schools.

7. Conclusions and Recomendation

Limited resposes of the community to the HPAI was found in Lombok. The community have limited knowledge on all aspects of Avian Influenza, such as the symptoms, the way how it is transmited (bird to birds, and birds to human trnasmission), what to do to prevent and control AI, and recomended biosecurity practices. The community also has negative attitudes and unfavourable perceptions of AI as they considered that it is safe to consume sick birds, no such ilnesses have been experienced due to the practices (eating sick birds). This study also confirmed for unvavourable practices of the community, both in sectors 3 and sector 4 and most importantly in sector 4. Farmers and villagers do not apply recomended biosecurity measures to prenvent their birds from infections such as AI. Most respondents in sector 4 did not vaccinate their birds, coumsume sick birds, do not clean regularly their cages and pen, do not use mask and hand glove in handling sick birds, do not apply disinfectant for cleaning the bird pen.

These limited responses (lack of knowledge, negative attitudes and perceptions, poor management practices) have been due to the facts that very limited activities, programs and policies were counducted by the govermment agencies, **especially at the village levels**. The flow of AI related information has been smooth at the higher levels (from National to provincial, to districts and subdistrict level), but from subdistricts to village level and from village leaders to ordinary community have been very low and limited. Numbers of media such as brochures, posters, leaflets, booklets and others were repported insuficient at the village level. The use of these media have limited impacts on peoples' knowledge, attitudes, perceptions, and practices.

Consistent to this, the study confirmed that most village households learned Avian Influenza mostly from the national television program – from the News program. There is a significant difference in responses between the community in sector 3 and sector 4. The sector 3 community seems to have more positive responses compared to those in sector 4. This could be understood as those involved in sector 3 have strong profit oriented and interest while in sector 4, they mostly just

do rearing kampong chicken and duck as additional income and activities. This study also found the absence of collective responses at the community level. There is no groups/committees/associations established at the community level as part collective efforts to address AI issues and concerns. Statistical test higlights for no significant different in community responses between site 1 and site 2.

On the basis of these findings, this study recomend (i) more effective communication is required especially at the lower level – village level communication, in addition to mass media communication, (ii) there is a need to form groups/associations/network of sector 4 farms to effectively promote effective behavioural changes at the community level and to articulate their concerns and interest to the government, and (iii) an operational research is needed to develop "the best approach or model" in disseminating information on HPAI, especially at the lower level (from subdistrict to village level), to changes peoples' knowledge, attitudes and skills, and practices as well.

8. References

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We do hope that this report will be a useful source of information for the local and the national government to develop and implement sound policies, programs and activities to prepare for, prevent and control HPAI in Lombok in particular and Indonesia in general.

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