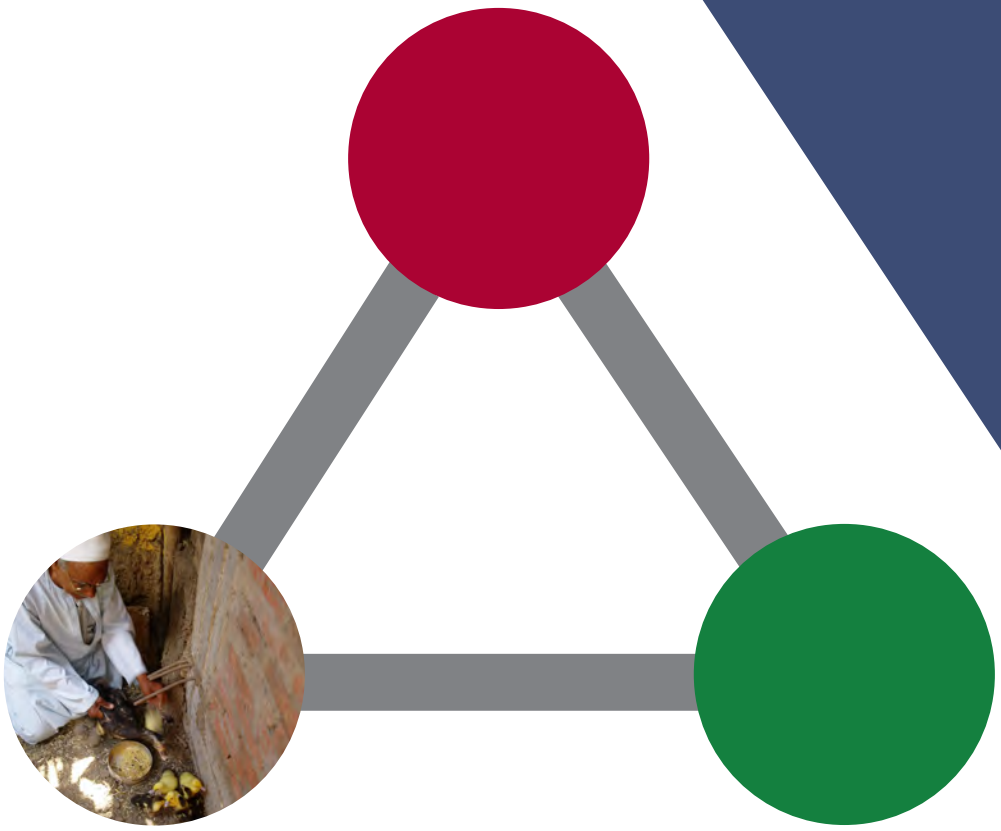
Highly pathogenic avian influenza: a rapid assessment of its socio-economic impact on vulnerable households in Egypt



AHBL • Promoting strategies for prevention and control of HPAI

Highly pathogenic avian influenza: a rapid assessment of its socio-economic impact on vulnerable households in Egypt

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SUMMARY

FAO conducted a livelihood impact study of highly pathogenic avian influenza (HPAI) and its control in the Egyptian governorates of Gharbia (lower Egypt) and Fayoum (upper Egypt). The study was implemented in the field by the Egyptian Demographer Association (EDA) under the supervision of and in close collaboration with the national coordinator of project GCP/INT/010/GER, based at FAO Egypt (the Emergency Centre for Transboundary Animal Diseases [ECTAD]).

The aim of the study was to gain a better understanding of the impact of HPAI on the livelihoods of vulnerable households and to identify changes over time, from pre-outbreak (2006) to post-outbreak, highlighting changes that occurred between 2007 and 2008.

To ensure that the results of the various analyses could be compared, data analysis was carried out, as explained in a previous study conducted by FAO and the World Food Programme (WFP) (Geerlings, Albrechtsen and Rushton, 2007; referred to in this report as "the 2007 study"). The study unit was the household and the main variable was the socio-economic level of each household, which is denoted as “very poor”, “poor” or “medium”, as in the previous assessment.

The study distinguished between the situation before the HPAI outbreak in February 2006 and the situation in 2008. Sixteen villages were covered. Key informant and household interviews and group discussions were carried out using standardized questionnaires that combined qualitative and quantitative methods.

The three types of interview used generated the same conclusion: before the 2006 outbreak, nearly 99 percent of households kept poultry, but this had decreased dramatically to just 60 percent of households at the time of the study. Household interviews gave an average flock size of 106.2, which is twice as large as that reported in the 2007 study.

This difference might be because the governorates included in the 2007 study have the lowest Human Development Index (HDI) scores in Egypt, whereas this study included Gharbia governorate, which has one of the highest.

Confirming findings from the previous report, HPAI and its control have had the greatest impact on the very poor, in terms of reducing the number of households keeping birds and the total number of birds kept by this group, which has fallen by 80 percent. As in the 2007 study, inter-governorate differences were found, with flocks in Gharbia being an average of three times as large as those in Fayoum before the HPAI outbreak. However, when this study was carried out (in 2008) average flock sizes in both governorates were pretty similar.

Poultry flocks comprise different species (chickens, ducks, geese, pigeons and turkeys). As in the 2007 study, chickens are the most important species in terms of number of households keeping them and numbers kept, across all socio-economic groups. Turkeys seem to be kept mainly by the medium socio-economic group.

On average, poultry production was the main source of income before the outbreak, mainly through selling birds. It accounted for 30 percent of the earnings of very poor and poor groups, and for 29 percent of those of the medium group. As mentioned in the 2007 study, while very poor households depend mainly on irregular labour and pensions, households in the medium group have regular salaries that represent a secure source of income. The implication is that HPAI has left very poor households, which are mainly headed by women, in the worst and most vulnerable position.

About 70 percent of the participants in group discussions and household interviews mentioned that they have no particular strategy for generating alternative income. Where such strategies do exist, they differ among socio-economic groups. For the poor and very poor, the main approach is to send children to work and to work in agriculture.

People in the medium socio-economic group use such strategies as buying fewer vegetables and butter, or husbands working longer hours. These results were confirmed in all three types of interview.

On the other hand, the main activities mentioned for reducing household expenditure showed no differences across socio-economic groups; all groups mentioned reducing meat consumption and the overall amount of food as the main strategy. This too was reported in household and key informant interviews and group discussions.

In conclusion, HPAI has had a strong negative impact on the livelihoods of rural households. Results from this study suggest that not only the poorest governorates, but also those with higher HDI scores, have been affected. In addition, the situation in Egypt does not seem to have improved over the last year, and rural households, particularly poor and vulnerable ones, are still struggling to find alternative sources of income and cope with the general increase in food prices.

ACRONYMS

AI	Avian Influenza
CAPMAS	Central Agency for Public Mobilization and Statistics in Egypt
DHS	Demographic and Health Survey
EDA	Egyptian Demographer Association
ECTAD	Emergency Centre for Transboundary Animal Diseases
FAO	Food and Agriculture Organization of the United Nations
HDI	Human Development Index
HPAI	Highly Pathogenic Avian Influenza
LE	Egyptian Pound
OIE	World Organisation for Animal Health
UNDP	United Nations Development Programme
WFP	World Food Programme

INTRODUCTION

In Egypt, keeping small poultry flocks has been a livelihood strategy since ancient times. Poultry rearing has been critical for the poor, and represents an income-generating activity for maintaining household economy and an affordable source of animal protein for household members. (Ahmed and Schwabenbauer, 2009; Schwabenbauer *et al.,* 2009)

Before the HPAI outbreak in 2006, poultry diseases were not a government priority (Schwabenbauer and Rushton, 2008). As a consequence, people did not usually report unusual events among their birds, as official services did not react (Geerlings, Albrechtsen and Rushton, 2007).

A previous assessment of the socio-economic impact on vulnerable households in Egypt, carried out in 2007 (Geerlings, Albrechtsen and Rushton, 2007; referred to in this report as "the 2007 study"), described and analysed the traditional poultry system, as well as the coping strategies adopted by poultry keepers and the impact of highly pathogenic avian influenza (HPAI) at the time. The aim of this second assessment is to understand changes over time, from pre-outbreak (2006) to post-outbreak, highlighting the changes between 2007 (reported by Geerlings, Albrechtsen and Rushton) and 2008.

THE HPAI IMPACT STUDY

Scope and limitations

The purpose of this study was to assess the livelihood impacts of HPAI and its control for families operating smallholder poultry production systems. It was carried out as follow up to the study described by Geerlings, Albrechtsen and Rushton (2007).

The intention of both studies was to provide a clear picture of what happened to people during the outbreak and the consequences this had on people's livelihoods. A rapid rural assessment was used, employing a combination of quantitative and qualitative methods. As in the 2007 study, the findings from this study are only indicative, but the results of both studies give a broad picture of the impact that the HPAI outbreak and associated control measures have had on the well-being of the poor.

Material and methods

Livelihood data were collected as described in the 2007 study, and this study builds on that work. Key informant and individual household interviews and focus group discussions were carried out using standardized questionnaires. These had been developed to incorporate qualitative and quantitative methodologies. In addition, the survey team made observations during fieldwork and made additional notes, when considered relevant.

Data quality control was considered throughout the survey, and field supervisors worked with local surveyors. Constructive comments and suggestions from the supervision and monitoring teams were given due attention when implementing the surveys. Best practices were developed to ensure the quality of the data gathered.

This second study collected data in 2008 and was implemented by the Egyptian Demographer Association (EDA) under the supervision of and in close collaboration with the national coordinator of project GCP/INT/010/GER, located at FAO Egypt (the Emergency Centre for Transboundary Animal Diseases [ECTAD]).

Sampling

To ensure representation of both lower and upper Egypt, two governorates were purposively selected: Gharbia and Fayoum. The aim was also to cover the spectrum of Human Development Index (HDI) scores, in which Gharbia (which was not included in the 2007 study) scores higher than Fayoum. The latter governorate was selected to ensure inclusion of one of the governorates studied in 2007. Both governorates have high poultry density and vulnerable population groups. It was thought that by working in these two governorates, information on some of the most vulnerable households affected by HPAI could be captured, as well as the different impacts in governorates with different HDI scores. Eight villages were visited in each governorate (two in each of the four districts studied in each governorate).

Selection of key informants and respondents

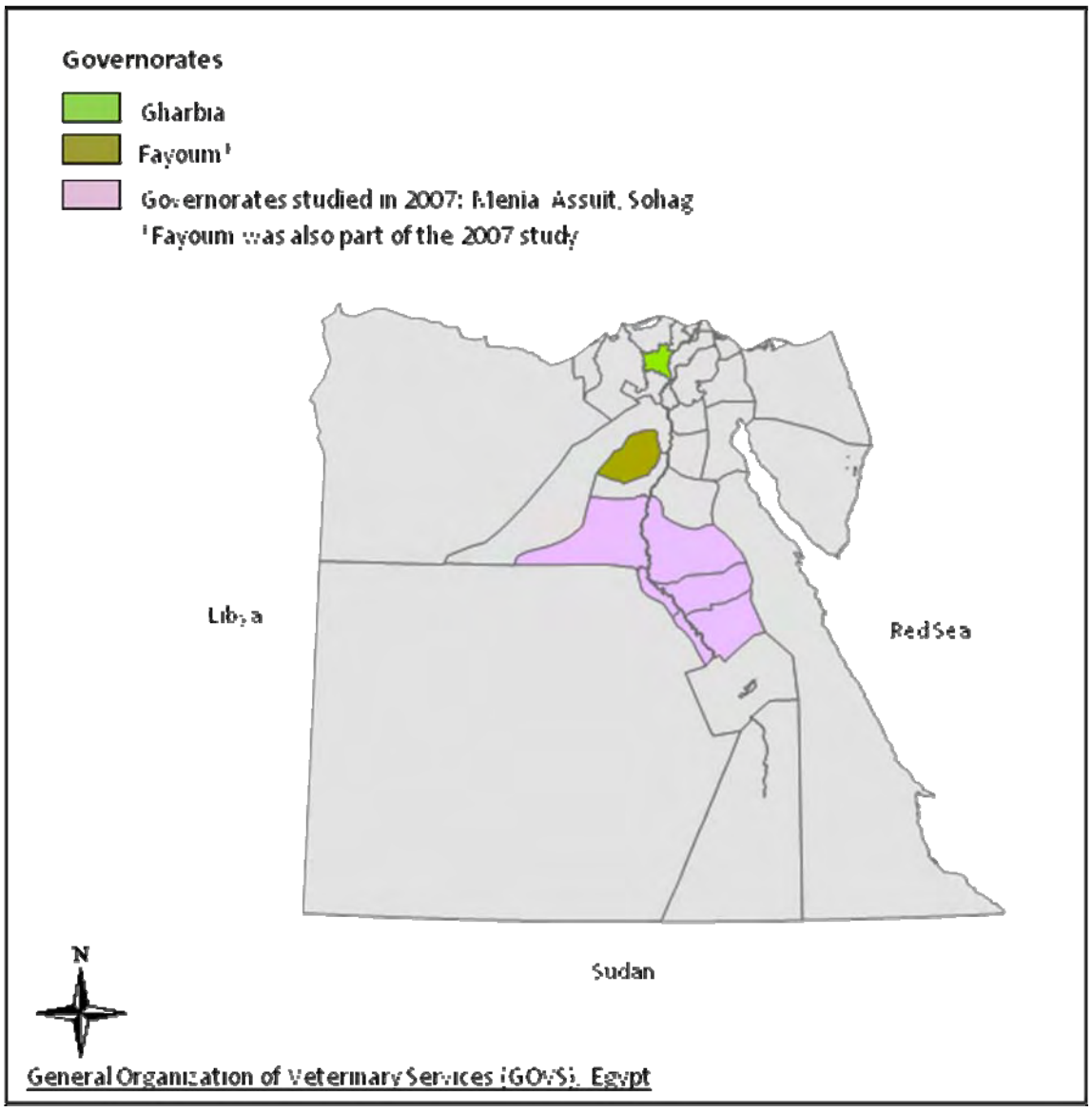
Key informants were local community leaders and extension workers. Selection of key informants was based on their level of familiarity with the wealth and vulnerability characteristics of villagers. Having established these indicators, the key informants were asked to indicate the names of women and to suggest households to be selected for interview.

A total of 16 key informants were interviewed per governorate, 64 people participated in the group discussions (32 per governorate), and 194 households were interviewed (97 per governorate).

Data analysis

To allow comparison of the results from this analysis with those of the 2007 study, data analysis was carried out as explained in that study. The study unit was the household, and the main variable was the socio-economic level of each household: very poor, poor or medium, as in the 2007 study. This report presents analysis of the data collected in 2008, with differences between the two governorates cited when relevant.

Figure 1 Map of the study area



BACKGROUND INFORMATION

Country overview

A more detailed country overview can be found in Geerlings, Albrechtsen and Rushton (2007). Egypt is situated in the northeast corner of Africa; it is bound by the Mediterranean Sea to the north, the Sudan to the south, the Red Sea, Palestinian Territories and Israel to the east, and the Libyan Arab Jamahiriya to the west. Egypt has a total land area of 995 450 km^2 and is divided into 29 administrative divisions, or governorates. The larger part of Egypt has a desert climate, which is hot and arid. There are two main seasons, the cool winter season from November to April, and the hot summer season from May to October. Arable land lies mainly along the Nile, and accounts for 2.9 percent of the country's land surface.

Egypt has the largest and most densely settled population among Arab countries (*Egypt Demographic and Health Survey,* 2008). The population growth rate is 1.721 percent, and the Central Agency for Public Mobilization and Statistics in Egypt (CAPMAS) estimates the population at 73 671 661 in 2006.

The official religion is Islam, and over 95 percent of the population are Sunni Muslims. Most of the remainder are Coptic Christians.

Egypt's main primary products are barley, beans, buffaloes, cattle, clover, cotton, goats, gypsum, iron ore, lead, lentils, limestone, maize, manganese, millet, oil and natural gas, phosphates, rice, sea salt, sugar cane, sheep, talc, wheat and zinc.

Egypt and the Millennium Development Goals

Egypt has agreed to halve income poverty and hunger, achieve universal primary education, promote gender equality, reduce under-five mortality by three-quarters, combat HIV/AIDS, malaria and tuberculosis, ensure environmental sustainability, and build a global partnership by 2015 (Human Development Project, 2005).

Egypt has achieved success in reducing illiteracy among both men and women, improving literacy rates by 12 and 25.1 percentage points respectively. Life expectancy has increased substantially. The proportions of households with access to an improved water source and of urban people with access to improved sanitation have increased over the years for all governorates (Human Development Project, 2005).

The economy has grown over the past ten years, but progress in human development has been uneven. The State has encountered difficulty in reaching the poorest and most vulnerable groups, the largest numbers of whom are in agriculture and informal occupations. These groups have remained at or below the poverty line. The *Human Development Report* and the *Egypt Demographic*

RESULTS AND OBSERVATIONS

Demographic profile and human development

The following information was obtained from the United Nations Development Programme (UNDP) 2005 *Human Development Report* (Human Development Project, 2005). As mentioned in the section on Sampling in Chapter 2, the two governorates surveyed were purposively selected to represent both lower and upper Egypt. In addition, Fayoum is worse off than many other governorates in Egypt in terms of human development, while Gharbia is better off. Fayoum was also selected to ensure inclusion of one of the governorates in the 2007 study. Table 1 shows selected indicators of human development in the two governorates. The country's overall HDI score is 0.689, with the highest governorate-level score being 0.778.

Table 1 Selected indicators of human development*

	Fayoum	Gharbia	Overall averages
Population size (thousands)	2 371.8	3 859.3	3 115.55
Population density (people/km^2)	390.9	1981.7	1186.3
Adult literacy rate (%)	47.8	69.6	58.7
Females with secondary or higher education (% of females 15 +)	14	26.7	20.35
Women in labour force (% of total)	14.3	30.8	22.55
Access to: Electricity	92.5	99.4	95.95
Piped water	79.6	95.5	87.55
Underweight (children under 5, %)	12.6	3.3	7.95
Labour force in agriculture (% of population 15 +)	45.8	31.6	38.7
Human Development Index**	0.609	0.703	0.656
	Rank 22	Rank 7	(Country score)

* Source: UNDP. Human Development Report, 2008
** Out of 27 governorates in Egypt.

Socio-economic categories and characteristics

The general characteristics of the 194 respondents in household interviews are shown in Table 2, according to their socio-economic category. The very poor group has the highest proportion of widows, divorced and single people, as was the case among respondents in the 2007 study and in the DHS (*Egypt Demographic and Health Survey,* 2008).

Table 2 General socio-economic characteristics of respondents in household interviews

Characteristic	Very poor	Poor	Medium	Overall
Number of respondents	65 (33.5%)	67 (34.5%)	62 (31.96%)	194
Number married	24 (18.5%)	49 (37.7%)	57 (43.8%)	130
Number single	4 (66.7%)	2 (33.3%)	0	6
Number divorced	3 (50%)	2 (33.3%)	1 (16.7%)	6
Number widowed	34 (65.4%)	14 (26.9%)	4 (7.7%)	52
Average age	46.1 (15.5)	39.7 (12)	39.3 (11.7)	194
Minimum age	19	19	20	
Maximum age	92	65	67	
Average number of household members)	4.5 (2.6)	5.1 (2.4)	5.7 (2.6)	194
Average number of children < 15	1.9 (1.8)	2 (1.7)	2.3 (1.6)	194
Average monthly income from poultry during high seasons*	288.7 (384.6)	379.7 (416.4)	537.9 (459.4)	
Average monthly income from poultry during medium seasons*	266.8 (406.6)	404.3 (463.5)	497.3 (477.8)	
Average monthly income from poultry during low seasons*	252.8 (412.2)	348.6 (458.1)	485.4 (486.5)	

Average monthly income given in Egyptian pounds (LE).
Standard deviations are given in brackets

The principal characteristics given by key informants to classify wealthy households were ownership of at least 5 feddan,[1] which was mentioned by more than 95 percent of the key informants; ownership of a large farm factory; high ranking jobs with average income exceeding LE3 000[2] per month; travel abroad; and rearing of birds for eating only.

[1] 1 feddan = 4 200 m^2 (0.42 ha).
[2] LE1 = US$0.71 (www.xe.com).

These matched the characteristics given in the group discussions, which added other characteristics of well-being: living in houses made of bricks and cement; dressing well and expensively; rearing expensive birds, such as turkeys; and children completing university education.

The main characteristics of poor households mentioned by key informants were: not owning agricultural land; low income; houses made from materials from the environment; rearing of a small number of birds; and selling vegetables. These were agreed in the group discussions, where participants also mentioned such attributes as: irregular jobs; rearing birds for sale as a source of income; and inability to dress or eat well.

These indicators for poor and wealthy households coincided with those given in the 2007 study and in FAO ESA Working Paper No. 06-02 (Croppenstedt, 2006).

Flock sizes and composition before and after the outbreak

Based on findings from the 194 individual interviews, Table 3 presents the average flock sizes in the two governorates. Before the HPAI outbreak, flocks in Gharbia were three times as large as those in Fayoum, but when this study was carried out in 2008, the average flock sizes were similar in both governorates. However, Gharbia households had reduced their flock sizes by an average of 14 percent, while in Fayoum the average reduction was 30.8 percent. Calculations were based on all the households interviewed in each governorate, and not just those rearing poultry; according to key informants the percentage of households keeping poultry dropped from nearly 90 percent before the HPAI outbreak in 2006, to 55 percent in Gharbia and 62 percent in Fayoum in 2008.

In addition, the average flock size of 106.2 in this study is twice as large as that reported in the 2007 study, of 51.7. This difference might because the governorates included in the previous study have the lowest HDI scores in the country, while Gharbia, one of the two governorates included in this study, has one of the highest.

Table 3 Mean poultry populations kept per household in the two study governorates (based on household interviews)

Governorate	2008 study					
	Poultry	Chickens	Ducks	Geese	Pigeons	Turkeys
Gharbia	23.1	10.6	9.9	0.5	1.7	0.4
Fayoum	16.62	10.4	3.6	0.5	2.1	0.02
Overall average	19.86	10.5	6.75	0.5	1.9	0.21
	Before HPAI outbreak					
Gharbia	158.5	81.8	60.5	4	5.5	6.7
Fayoum	53.9	28.6	10.8	2.7	11.2	0.6
Overall average	106.2	55.2	35.65	3.35	8.35	3.65

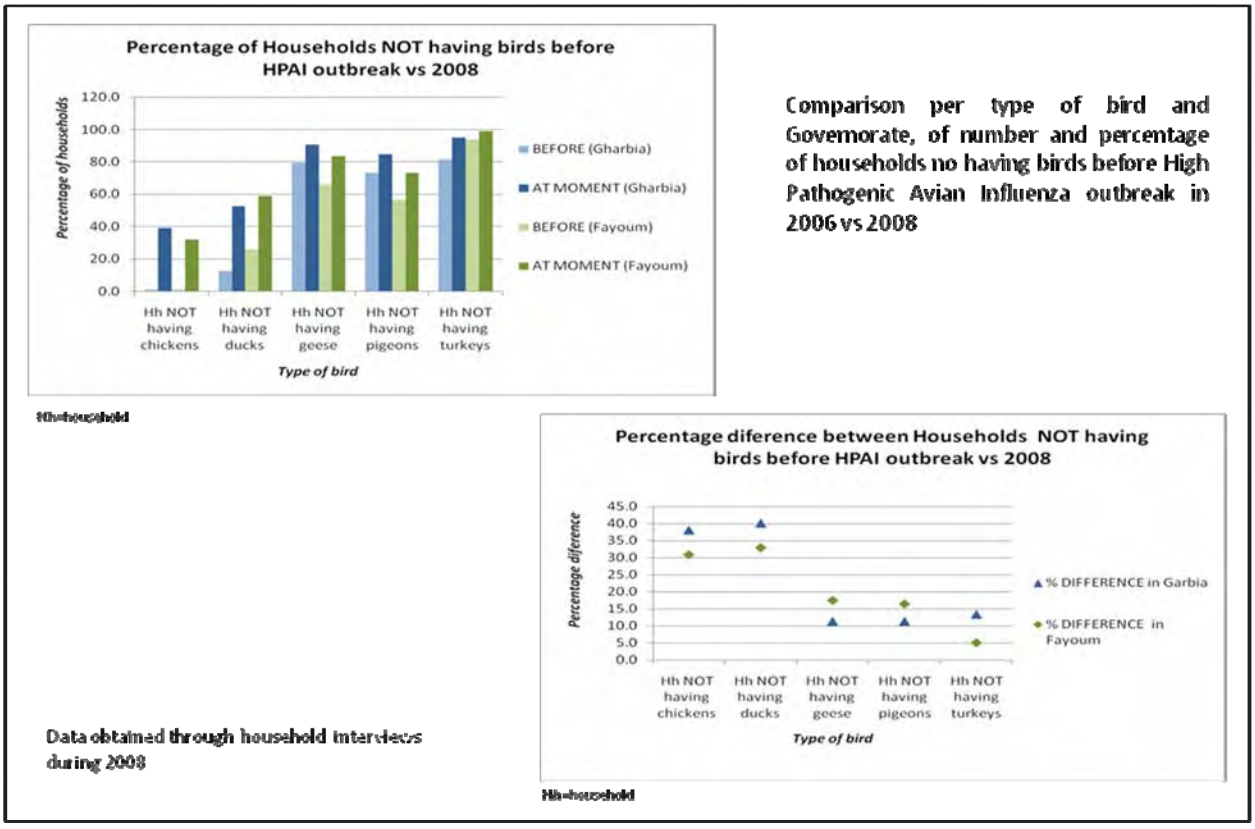
Table 4 indicates the average flock sizes in the different socio-economic groups. The overall standard deviation pre-outbreak was 75.6 (n = 194), which is much higher than that found in the 2007 study. This too could be owing to the socio-economic differences between the governorates surveyed in the two studies (Human Development Project, 2005).

Table 4 Mean poultry populations kept in different socio-economic groups (based on household interviews)

Socio-economic group	2008 study					
	Poultry	Chickens	Ducks	Geese	Pigeons	Turkeys
Very poor	20.24	8.6	9.8	0.13	1.7	0.01
Poor	15.13	8.5	4.8	0.61	1.1	0.12
Medium	24.68	14.7	5.7	0.68	3.1	0.5
	Before HPAI outbreak					
Very poor	100.7	47.1	41.8	1.7	7.3	2.8
Poor	96.6	42.6	45.5	2.8	5	0.7
Medium	122	77.2	18.5	5.5	13	7.8

After the outbreak, the percentages of households with no poultry increased dramatically: from 1 to nearly 40 percent for chickens; and, for ducks, from 12 percent in Gharbia and 25 percent in Fayoum to more than 50 percent. Almost 100 percent of households did not keep turkeys in 2008, which matched findings from the 2007 study and suggests that the situation had not improved much over the previous year. This is shown in more detail in Figure 2.

Figure 2 Numbers and percentages of households with no poultry before and after the HPAI outbreak



Proportions of income generated from different sources

On average, poultry production was the main source of income before the outbreak, mainly through sales of birds, accounting for 30 percent of the earnings of very poor and poor

households, and 29 percent for households in the medium socio-economic category. As also mentioned in the 2007 study, while very poor households depend mainly on irregular labour and pensions, those in the medium group have regular salaries, which represent a secure source of income. Consequently, HPAI has had a very important impact on the livelihoods of the poor and very poor, with women-headed households being the most disadvantaged. This is illustrated in Table 5.

Table 5 Proportions of income generated from different sources and livelihood activities in each socio-economic group (based on household interviews and group discussions)

Income source	Very poor	Poor	Medium
Selling birds	32.3%	30.0%	22.6%
Pension from Ministry of Social Solidarity	17.0%	7.0%	1.5%
Husband's work	10.8%	37.3%	54.8%
Selling vegetables and fruits	3.1%	1.5%	0.0%
Son's work	3.1%	2.9%	1.6%
Father in-law's work	9.2%	5.9%	8.1%
Husband's pension	10.8%	7.5%	6.4%
Livelihood activities	**Very poor**	**Poor**	**Medium**
Selling birds	15.4%	13.4%	14.5%
Selling vegetables and fruits	3.1%	4.5%	0.0%
Selling milk	0.0%	4.5%	1.6%
Government employment	1.5%	5.9%	11.3%
Selling groceries	0.0%	1.5%	3.2%
Handicrafts	1.5%	3.0%	3.2%
Employment in domestic services	6.2%	3.0%	0.0%

Role of poultry in household economics and food consumption

As mentioned in the 2007 study, women look after poultry, with help from children (mainly girls). Women have therefore been more affected by the HPAI outbreaks than men, but all the families across the three socio-economic groups have suffered consequences, mainly because there are now insufficient chickens to consume and sell. Table 6 shows how the consumption of eggs and birds has dropped dramatically since the HPAI outbreak in both governorates. Figure 3 shows how prices have generally increased, putting very poor households into a particularly difficult situation.

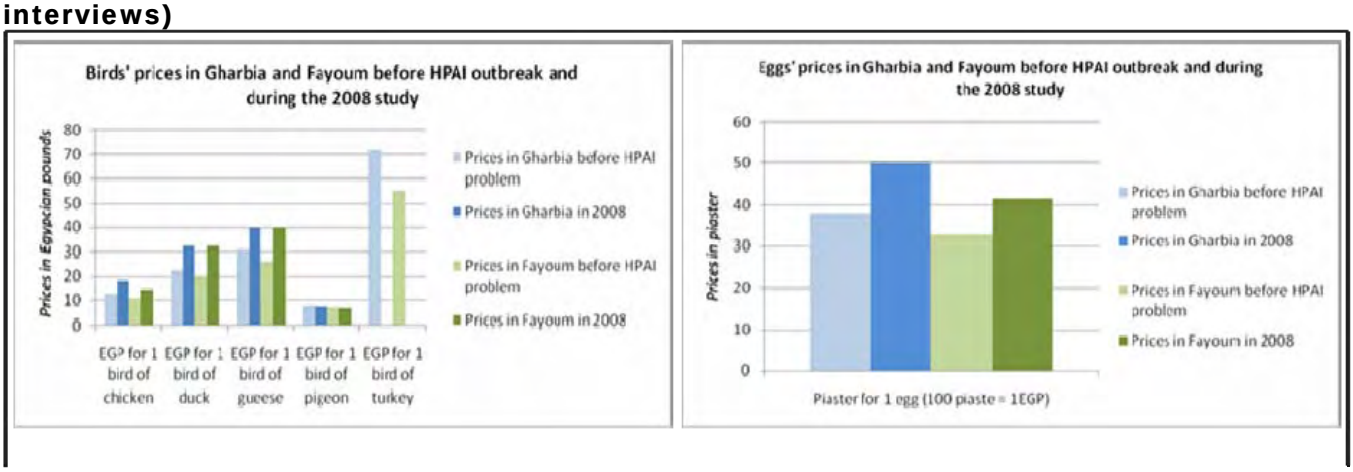
This trend coincides with the deterioration in young children's nutrition status reported in the results of the 2008 DHS. Nationwide, stunting has increased by 7 percent (from 18 to 25 percent) over the last three years, to reach levels not experienced since the early to mid-1990s. Levels of wasting have reached a long-term high of 7 percent. Chronic and acute malnutrition are particularly high in upper Egypt, where close to 9 percent of children are underweight (*Egypt Demographic and Health Survey,* 2008).

Table 6 Mean numbers of eggs and birds consumed and sold per household before HPAI outbreak and in 2008

			2008 study			
Governorate	Laying hens	Eggs produced	Eggs consumed	Birds eaten	Eggs sold	Live birds sold
		per day	per day	per week	Per week	per week
Gharbia	4.3 (7.1)	2.2 (3.2)	1.5 (2.2)	0.4 (1)	2 (7)	2.3 (20.3)
Fayoum	3.5 (4.6)	1.9 (2.4)	1.5 (2.6)	0.2 (0.7)	2.8 (5.6)	0.5 (1.6)
			Before HPAI outbreak			
Gharbia	19.17 (18.9)	11.8 (10.6)	5.1 (3.7)	1.9 (1.4)	28.6 (43.3)	7.3 (32.9)
Fayoum	15.5 (11.8)	9 (6.4)	3.9 (2.9)	1.6 (1.3)	24.8 (25.4)	3.4 (4.7)

Standard deviations are given in brackets.

Figure 3 Mean prices before HPAI outbreak and in 2008 (based on household interviews)



Strategies for buffering income loss

The strategies taken to diversify income-generating activities differ among socio-economic groups; for the poor and the very poor the main approach is sending children to work, and working in agriculture for more than one landowner; while families from the medium socio-economic group buy fewer vegetables and less butter, or the husband works longer hours. These results were confirmed in the three types of interview, although about 70 percent of participants in group discussions and household interviews mentioned that they had not adopted any strategy for generating additional income. Another important difference among socio-economic groups is that the poor will ask for cash from charities, while the medium group will not (as also pointed out in the 2007 study). However, of the activities mentioned for reducing household expenditure, reducing the overall amount of food was the main strategy across all socio-economic groups; this was expressed during household and key informant interviews and in group discussions.

Time line: events, information and behaviour

Information gathered from the three types of interview confirmed that people first heard about avian influenza (AI) in February 2006. The disease started in commercial farms and some backyards in Gharbia. The presence of large numbers of dead birds was also noticed near the water canal in Fayoum.

More than 50 percent of the key informants in both governorates agreed that villagers are still suffering from loss of income and the accumulation of debts. Household interviews

revealed that about 30 percent of families have not yet returned to poultry keeping, with families in the very poor socio-economic category being the worst affected.
TV and radio were the main sources of information mentioned, neighbourhood mosques were mentioned in household interviews, and physicians were mentioned by key informants, but only in Gharbia. Information was not targeted to specific population groups, instead it was designed to be accessible and understandable to everybody. All interviewees agreed that the messages were clear and comprehensible, but key informants reported that some messages were rather difficult to follow up on. Table 7 synthesizes these results.

Table 7 Main messages given by the media and difficulties in following them up (based on key informant interviews)

Main message	Difficult messages	Reasons for difficulties
There is a disease called avian influenza	Get rid of birds	Birds are the mainstay of people's livelihoods
AI is a fatal disease and can infect people	Prevent home poultry rearing	Gloves are expensive, people cannot afford them
Avoid contact with sick birds	Change clothes frequently	Contact with birds all day therefore it is difficult
Instructions on how to deal with sick birds		to keep changing clothes
Wear clothes, shoes and masks when dealing with birds		
Prevent children from being in contact with birds		
Clean floors with detergent and wash hands		
Slaughter safely		

The messages that people adopted in their poultry management practices were:

- cleaning the areas around poultry coops with disinfectant;
- using special clothes;
- slaughtering indoors and not on the street;
- washing hands and cooking birds well;
- preventing children from coming into contact with birds.

These practices were also found as the main modes people reported for preventing HPAI in the DHS (*Egypt Demographic and Health Survey,* 2008).

During the household interviews, nearly 50 percent of respondents said that their birds had died, while only 9 percent in Gharbia and 3 percent in Fayoum reported culling them or burying them alive (by a team of vets or police or by the municipality unit).

Current poultry disease and animal health measures

Although various diseases and symptoms affect birds across the two governorates and in all socio-economic groups, people reported that control measures are not normally taken; when control measures are adopted, the first options tend to be natural remedies. This is shown in Table 8.

Table 8 Main disease prevention and cure measures (based on household and key informant interviews and group discussions)

Poultry disease	Prevention methods generally adopted	Cure methods generally used
Mass death	None	Add powder, obtained from the
Nasal discharge	Provide birds with boiled herbs	pharmacy, to drinking-water
White diarrhoea	Add onion to drinking-water	Antibiotics
Cold, cough	Go to the vet unit	Injection by local vet
Avian pox	Continuous vaccination	
Shaking and walk in circles	Clean coops	
Newcastle disease	Use wood shavings, lime and disinfectants	
Weakness in legs		
Gumboro		
Fowl pox		
Coccidiosis		

This study was carried out two years after the first HPAI outbreak, and people seemed to be more familiar with the characteristics of HPAI. Some of the symptoms they mentioned are not specific to HPAI, and can be symptoms of other diseases (swollen blue face, ruffled feathers, nasal discharge), but almost all the people interviewed identified sudden and mass death as the main characteristic of HPAI, as was also found in the DHS report (*Egypt Demographic and Health Survey,* 2008). There also seems to be consensus that HPAI can be transmitted to humans, especially children.

DISCUSSION AND RECOMMENDATIONS

Before the HPAI outbreak, poultry diseases were not part of the animal disease surveillance system in Egypt (Schwabenbauer *et al.,* 2009). It is therefore not surprising that the reporting of unusual events was not a priority for poultry holders.

It has been suggested that successful HPAI control is directly linked to early reporting of suspected cases (Schwabenbauer and Rushton, 2008). At the beginning of the HPAI outbreak, control actions by government authorities were directly mainly to industrial production, both large- and small-scale (FAO, 2006), and it has recently been reported that intensive awareness campaigns under the global HPAI prevention programme are having some effect on early reporting (UN System Coordinator for Avian and Human Influenza and World Bank, 2008). However, the results of this study indicate that the situation of very poor households in rural areas does not seem to have improved since 2007 (Geerlings, Albrechtsen and Rushton, 2007). This suggests that government support, such as compensation for affected households and development support, has not yet reached backyard poultry. The impact of HPAI on the livelihoods of poor and very poor households has therefore been very significant.

For the poor and very poor, it is difficult to develop alternative strategies that fulfil the same role as poultry raising; chickens are small, hardy and durable providers of protein that are easy to care for in conjunction with other activities. Rabbits and goats need far more care and do not provide protein on the spot (eggs). Since the HPAI outbreak, generating extra income has been a challenge for rural households, particularly those headed by women, whose employment opportunities are limited. Alternative strategies have had to be taken, such as sending children to work and reducing meat and other food consumption, all of which compromise children's welfare and well-being.

The results from this study support previous findings, indicating that poultry keeping is a fundamental part of rural households' livelihood strategies (FAO, 2006; Geerlings. Albrechtsen

and Rushton, 2007), keeps household economies running (Schwabenbauer et al., 2009), and is especially important for female-headed households (Geerlings, Albrechtsen and Rushton, 2007; *Egypt Demographic and Health Survey,* 2008). However, the role of poultry in the livelihood strategies of the poor, especially female-headed households, in Egypt has not been fully understood. Social solidarity funds seem to be widespread in Egyptian society as a temporary community measure, but longitudinal studies need to be carried out to identify the shifts in household assets that have compensated for the loss of poultry, but that do not translate into alternatives to poultry keeping. The medium- and long-term impacts of HPAI on the poor and the extent to which social solidarity funds can withstand the accumulated effect of HPAI also need to be assessed.

Current results suggest that rural areas in both upper and lower Egypt and with different HDIs are all affected. This finding is supported by the World Organisation for Animal Health report (OIE, 2008), which mentions that "*The current endemic situation of HPAI in Egypt is affecting not only the commercial flocks but also rural households through most of the governorates*".

As mentioned in the 2007 study, and sustained by the results of this study, the ability to control HPAI seems to play a vital role in Egypt's capacity to achieve the Millennium Development Goals. Given the various roles that poultry plays in the livelihoods of rural households (nutrition, income, social, etc.), it appears essential that efforts be made to help rural households to restock their poultry. In parallel to this, formal employment should be created – particularly for women – and access to education increased, to create alternative household income sources and help households to move out of poverty (Croppenstedt, 2006). It seems clear that smallholder poultry production's important contribution to national livestock production should be recognized, to encourage and promote the control of HPAI.

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ANNEX

GLOSSARY

Avian influenza: A disease caused by a virus that affects birds, it can be either low pathogenic avian influenza (LPAI) or highly pathogenic avian influenza (HPAI), based on its potential to cause disease in poultry. This report is concerned with the outbreak of HPAI H5N1 in poultry.

Coping strategy: A response to shocks; alternative ways of obtaining food and income.

Culling: The slaughter of birds that are sick or have a strong risk of being infected and becoming sick, to prevent further spread of a disease.

Flock size: The total number of adult birds owned by a household, and including birds of all species (e.g., chickens, ducks, geese, pigeons and turkeys).

HPAI: A form of avian influenza that spreads rapidly and may cause severe disease and high mortality rates in domestic poultry.

Industrial poultry keeping: (Semi)-intensive, high-input production systems with flocks of more than 500 birds of improved breeds kept on specialized farms and sold for commercial profit.

Livelihood: The assets, activities and strategies that people use to sustain their lives.

LPAI: A form of avian influenza that causes only mild disease in birds, has lower mortality rates than HPAI, and can be without symptoms in some species of bird.

Poultry species: Different types of poultry birds, such as chickens, ducks, turkeys, pigeons and geese.

Restocking: Introducing new birds into a flock after losing birds through death from disease or culling, or through bird sales for marketing purposes.

Socio-economic group: A group of people/households with the same level of wealth (or poverty); groups are divided on the basis of the financial, social and physical capital that their members possess.

Traditional poultry keeping: Poultry keeping by a household with fewer than 500 birds, requiring low or medium production inputs (feed, medicine, etc.) and depending on scavenging on rooftops or in backyards; its main aim is the production of meat and eggs for home consumption and sale to meet basic household needs.

Transfer: A charitable contribution, gift to family members or government aid.

Vaccine: A weakened or inactivated virus that is administered to a bird by injection or other ways to stimulate active immunization (antibodies) against the specific disease agent.