

**Review of the poultry production and assessment
of the socio-economic impact of the highly
pathogenic avian influenza epidemic in Cambodia.**

Final Report

Vétérinaires Sans Frontières

Under FAO's TCP/RAS/3010
“Emergency Regional Support for Post Avian Influenza Rehabilitation”

Summary

This document reports a study conducted during July and August 2004 by Vétérinaires Sans Frontières at the request of the Department of Animal Health and Production (DAHP) - Gouvernement of Cambodia and of the Food and Agriculture Organization (FAO), under the “Emergency Regional Support for Post Avian Influenza Rehabilitation” Project (TCP/RAS/3010). The report includes 4 parts: (1) Methodology, (2) Description of poultry production in Cambodia, (3) Socio-economic impact of the highly pathogenic avian influenza (HPAI), (4) Key findings and recommendations.

The Terms of References written for this study were probably too ambitious considering the number and variety of stakeholders to be interviewed and the complexity of the economic analysis of several types of poultry enterprises. The methodology included the review of existing documents on the poultry sector in Cambodia and other related documents, design of questionnaires and of databases, conduct of more than 200 interviews with stakeholders (small, medium and large scale poultry farms; middlemen; market retailers; private companies; etc.) in 5 provinces, data entry and data analysis. The preliminary results were presented at the “Avian Influenza National Workshop”, Phnom Penh, 2-3 September 2004.

Poultry production in Cambodia is insufficiently developed. On one hand, the commercial sector depends highly on import of breeding stock from neighbouring countries and its production levels are lower than the demand of a growing urban market. On the other hand, the backyard / small-scale poultry could well be developed both for improved food security and income generation for poor rural households, but also to supply the urban market. There is a risk that this inability of the Cambodian poultry producers to fully answer the needs of the domestic market will worsen in the future if no real development of the sector is operated. Although this is not specific to Cambodia, the poor linkage between poultry producers and service providers is an aspect that should be dealt with more attention: 80% of poultry smallholders do not use any animal health service; links between private veterinarians / companies or Village Animal Health Workers, on one hand, and State Veterinary services, on the other hand are limited.

The HPAI epidemic and more importantly the dramatic drop in demand and prices of poultry products that followed, induced a lack of profit for all kind of poultry enterprises (whether of small or large scale, producers, service producers, middlemen, market retailers, whether infected by HPAI or not) during 1st semester 2004 when compared to profits in 1st semester 2003. However, some enterprises (e.g. smallholders, middlemen, market sellers, integrated commercial farms) still made a profit out of the poultry activity, even though this was less than the profit made in 2003. For some others (e.g. commercial broiler farms), serious losses were observed during 1st semester 2004. These lacks of profit and losses may have been partly or fully compensated by the very high price of poultry products when HPAI epidemic was over, for most of poultry enterprises (except those who did not restart their activity due to stamping-out). In addition, since the price of other animal products has been higher in 2004 than in 2003, farms and service providers who were not just specialized on poultry may have gained from unexpectedly higher profits in other livestock activities (e.g. pig). The consumers definitely supported an important cost of the HPAI epidemic since they had to buy animal products at a much higher price than in 2003.

In addition to providing financial compensation to producers officially HPAI-infected (to compensate for their losses and to encourage disease reporting by producers in the future), there is an urgent need to design and then implement a comprehensive national policy to develop and secure poultry production in Cambodia.

Table of Contents

<i>Summary</i> _____	2
<i>Table of Contents</i> _____	3
<i>List of Maps, Tables & Figures</i> _____	5
<i>Abbreviations</i> _____	7
<i>PART ONE: METHODOLOGY</i> _____	8
I. Context and objectives of the study _____	8
II. Organisation of study _____	9
III. Data Collection _____	9
IV. Data Analysis _____	11
<i>PART TWO: DESCRIPTION OF POULTRY PRODUCTION IN CAMBODIA</i> ____	12
I. Overview _____	12
II. Backyard / small-scale poultry raising _____	16
III. Commercial farms _____	17
III.A. Chicken Broiler farms _____	18
III.B. Chicken Layer farms _____	19
III.C. Duck farms _____	19
III.D. Breeding / Incubator farms _____	21
IV. Providers of services and inputs _____	21
IV.A. CP Group _____	21
IV.B. Importers / wholesalers for animal feed & import of chicks _____	23
IV.C. Importers / wholesalers for veterinary products & import of chicks: Medivet _____	23
IV.D. Importers / wholesalers for veterinary products _____	23
IV.E. Distributors of animal feed and veterinary products _____	23
IV.F. Veterinarians and para-veterinarians _____	23
IV.G. Credit _____	24
V. Marketing _____	26
VI. Consumption _____	27
<i>PART THREE: SOCIO-ECONOMIC IMPACT OF THE HIGHLY PATHOGENIC AVIAN INFLUENZA EPIDEMIC IN CAMBODIA</i> _____	29
I. Results from data collected on 100 smallholders during the study. _____	29
I.A. Results of the survey on 83 smallholders raising chickens only _____	30
I.B. Results of the survey on 15 smallholders raising chickens and ducks _____	36
I.C. Other results _____	36
II. Results on commercial broiler farms. _____	38
II.A. Results of the analysis on 12 chicken broiler private farms _____	39

II.B.	Results of the analysis on 4 chicken broiler integrated farms	43
II.C.	Results of the analysis on 4 duck broiler private farms	43
III.	Results on commercial chicken layer farms	46
IV.	Results on Middlemen and Market Retailers.	49
IV.A.	Results on middlemen	49
IV.B.	Results on market retailers	54
V.	Results on Service Providers.	59
 <i>PART FOUR: KEY FINDINGS & RECOMMENDATIONS</i>		 60
I.	Description of Poultry Production and Stakeholders	60
II.	Assessment of the socio-economic Impact of HPAI	61
III.	Ways to reduce the economic impact of HPAI on poultry producers	63
 <i>CONCLUSION</i>		 65
 <i>ANNEXES</i>		 66
	ANNEXE 1: Terms of Agreement	66
	ANNEXE 2: List of people / organizations met	70
	ANNEXE 3: Documents consulted.	71
	ANNEXE 4: Questionnaires (examples)	72
	ANNEXE 5: Decisions issued by the Government of Cambodia in relation with HPAI (not an official translation).	76

List of Maps, Tables & Figures

Map 1: Administrative map of Cambodia.....	10
Map 2: Provinces & Districts where interviews were conducted during the study.....	10
Map 3: Sites investigated for HPAI during 1 st quarter 2004 (Thomas Rawdon- FAO).....	11
Map 4: Communes with report of poultry mortality during 1 st quarter 2004 (Thomas Rawdon- FAO).	11
Map 5: Estimated poultry density in Cambodia (FAO).....	13
Figure 1: Evolution of poultry numbers in Cambodia.....	12
Figure 2: Linkages between CP, contracted / integrated poultry farms and wholesalers.....	22
Figure 3: Summary of linkages between some stakeholders of the poultry sector in Cambodia.....	28
Figure 4: Evolution of average number of chickens per small-scale farm in 2003 and 2004.....	30
Figure 5: Distribution of poultry smallholders according to number of chickens in July 2003 & July 2004.	30
Figure 6: Average of total cash expenses per farm (riels).....	31
Figure 7: Average number of chickens sold per farm (heads).....	31
Figure 8: Average income from chickens sold per farm (riels).....	32
Figure 9: Percentage of farms reporting chicken mortality during 2004.....	32
Figure 10: Average number of chickens dead (1st bar) and number of dead chicken eaten (2 nd bar).	32
Figure 11: Average number of live chickens eaten (1st bar) and given (2nd bar).....	33
Figure 12: Average number of chickens unsold in 2004.....	33
Figure 13: Number of eggs eaten per farm in 2004.....	33
Figure 15: Average number of chickens and ducks per farm (heads).....	36
Figure 16: Average cash incomes, expenses and profit per farm raising both chickens and ducks (riels) ..	36
Figure 17: Average number of chicks bought per farm (heads).....	39
Figure 18: Relative importance of “commercial feed” and “home-made feed” before and after HPAI.....	40
Figure 19: Price of chicken broilers sold by private farms (riels / kg).....	40
Figure 20: Average Number of Broilers sold per farm (heads).....	40
Figure 21: Average monthly profit for each of 12 private broiler farm before and after HPAI (USD).....	41
Figure 22: Average Number of Ducklings bought per farm (heads).....	43
Figure 23: Price of duck broilers sold by private farms (riels / kg).....	44
Figure 24: Average profit per month for each of 4 commercial duck farms (USD).....	45
Figure 25: Average quantity of eggs produced according to HPAI status of farms in 2003 and 2004.	47
Figure 26: Evolution of price of eggs sold by commercial chicken layer farms in 2003 and 2004.....	47
Figure 27: Average monthly expenses and incomes of commercial chicken layer farms in 2003 and 2004.....	48
Figure 28: Average number and price of chickens bought by middlemen in 2003 & 2004.....	50
Figure 29: Buying price of chickens (by middlemen) according to breed in 2003 & 2004.....	50
Figure 30: Average number and price of chickens sold by 21 middlemen in 2003 and 2004.....	51
Figure 31: Percentage of poultry mortality between purchase & selling by middlemen.....	51
Figure 32: Comparison of average expenses & incomes of middlemen (poultry trading) between Jan-Jul 2003 and Jan-Jul 2004.	52
Figure 33: Average number of poultry sold by market retailers in 2003 & 2004.....	55
Figure 34: Average number of poultry eggs sold by 4 market retailers in 2003 & 2004.....	56
Figure 35: Evolution of prices of meat, fish and eggs sold by market retailers in 2003 and 2004.....	56
Figure 36: Average margin made by market retailers over chickens (%).....	57
Figure 37: Expenses, incomes and profits of market retailers in 2003 & 2004.....	58

Table 1: Interviewed commercial poultry farms according to HPAI status of district and to province.....	10
Table 2: Calculation of the poultry enterprise profit.	12
Table 3: Ranking of provinces according to number of poultry and density of poultry in Cambodia.....	14
Table 4: Poultry numbers in Cambodia according to province & species (from DAHP's 2003 census)	15
Table 5: Number of commercial poultry farms in Cambodia according to province and type of production.	17
Table 6: Chicken broiler farms in Cambodia.....	18
Table 7: Chicken Layer Farms in Cambodia.....	19
Table 8: Commercial duck farms	20
Table 9: Use of “animal health” and “technical advice” services by poultry producers.....	24
Table 10: Use of “credit” services by poultry producers.....	25
Table 11: Quantity of fresh products consumed by households in Phnom Penh in 1997 & 2000.....	27
Table 12: Distribution of interviewed poultry smallholders.....	29
Table 13: Mortality rate in chickens in HPAI declared farms and non declared farms.....	32
Table 14: Calculation of poultry enterprise profit in 83 smallholders (riels).	34
Table 15: Type of support requested by poultry smallholders during and after HPAI.....	37
Table 16: Distribution of 21 commercial broiler farms according to location & HPAI status.....	38
Table 17: Calculation of poultry enterprise profit in 12 private broiler farms before and after HPAI (USD).	41
Table 18: Type of support requested by broiler private farms during and after HPAI.....	42
Table 19: Use of livestock-related services.	46
Table 20: Investment and depreciation of 16 commercial chicken layer farms.....	46
Table 21: General information on the 22 middlemen interviewed.....	49
Table 22: Expenses, incomes and profits of middlemen in 2003 & 2004.	52
Table 23: Alternative activities of middlemen to compensate from decrease in poultry trading.....	52
Table 24: Type of support requested by middlemen during and after HPAI.....	53
Table 25: General information on the 22 market retailers interviewed.....	54
Table 26: Expenses, incomes and profits of market retailers in 2003 & 2004.	57
Table 27: Type of support requested by market retailers during and after HPAI.....	58
Table 28: Comparison of estimated lack of profit according to type of poultry enterprise.	61
Table 29: Estimation of lack of profit in 2 types of poultry enterprises in the 5 provinces.....	62

Abbreviations

APIP	Agriculture Productivity Improvement Project
CLDC	Cambodian Livestock Development Committee
DAHP	Department of Animal Health and Production
DOC	Day-Old-Chicks
FAO	Food and Agriculture Organisation
HPAI	Highly Pathogenic Avian Influenza
NGO	Non Governmental Organisation
OIE	Office International des Epizooties (World Animal Health Organisation)
SLPP	Smallholder Livestock Production Project
TCP	Technical Cooperation Program
TF	Task Force
VAHW	Village Animal Health Workers (also called para-veterinarians or para-vets in this report)
VRC	Vétérinaires Ruraux du Cambodge
VSF	Vétérinaires Sans Frontières

PART ONE: METHODOLOGY

I. Context and objectives of the study

- At the beginning of 2004, the first outbreaks of Highly Pathogenic Avian Influenza (HPAI) were detected in Cambodia. In spite of the low development of the poultry sector in Cambodia compared to neighbouring countries like Vietnam & Thailand, poultry production plays an important role in the economy of poor farmers. Commercial farms started to develop in the nineties.
- Since the outbreak, no exhaustive assessment of the socio-economic impact had been conducted. Improving understanding of the impact that AI had on different farming systems, the coping strategies, the farmers' ambitions and constraints to improve or to abandon the sector and the implications for food security, will provide AIERP (Avian Influenza Emergency Rehabilitation Project) with useful insights to help identify beneficiaries and design this intervention.
- The objectives of the study are:
 - to review the poultry industry in Cambodia (Part 2) and to assess the importance of poultry production for smallholders (Parts 2 and 3),
 - to assess the socio-economic impact of the epidemic for commercial farms and smallholders, and for other stakeholders involved in the poultry sector (Part 3),
 - to provide recommendations for policies related to zoning and surveillance, public information, compensation and restocking (Part 4).
- The primary questions that the study will try to answer are the following:
 - What is the poultry production system in Cambodia and what are the stakeholders?
 - What has been the direct economic impact on farmers due to death of animals, stamping out and compensation?
 - What has been the indirect economic impact on farmers and other stakeholders related to the ban of production, the market restriction and the variation of demand and prices?
 - What has been the social impact on different stakeholders?
 - How could concerned authorities improve the management of the crisis in order to alleviate/soften the economic impact on smallholders and commercial farms?

II. Organisation of study

- The methodology used to conduct this study refers to the Terms of References (see Annex), which were signed on 12th July 2004.
- The team included:
 - ⇒ 1 International Team Leader: M. Patrice GAUTIER (VSF Vietnam)
 - ⇒ 1 International Livestock specialist: M. Nicolas DUMONT (VSF Cambodia)
 - ⇒ 5 National Livestock specialists: M. SOK Seyha & M. HAK Makara (VSF Cambodia), M. TEP BENG Thay & M. LOK Sokthea (AgriCam), Mrs KHIN Yarooun (VRC).
 - ⇒ 1 Data Manager: M. LY Proyuth (VSF Cambodia).
- Logistic support was provided by VSF Office in Cambodia (office space & equipment, car & driver, translation).
- Coordination with FAO & DAHP. Regular meetings took place with FAO & DAHP in Phnom Penh. Exchange was organised through email with the TCP/RAS/3010 International Coordinator and FAO Headquarters.
- End of July, a Mid Term Progress Report was written and submitted to FAO & DAHP.
- A draft final report was submitted to FAO in September 2004.
- Results were presented orally at the National HPAI workshop organised by FAO & DAHP early September.

III. Data Collection

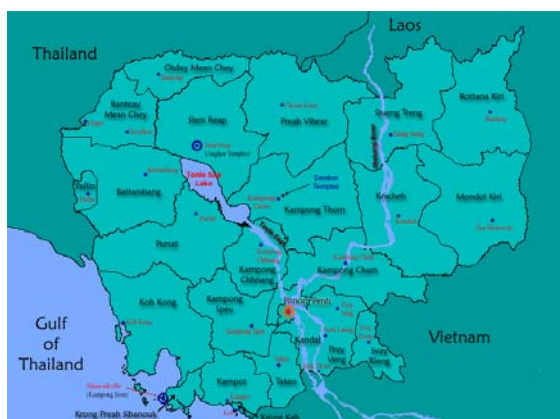
- **Review of literature.** Various documents were collected from VSF, DAHP & FAO Offices. Some of these documents are listed in annex of this report as well as the Decisions (“Prakas”) issued by the Government of Cambodia (unofficial translation into English).
 - **Questionnaires** were designed for the following poultry stakeholders:
 - ⇒ Commercial producers: chicken layer farms; chicken broiler farms; duck layer farms; duck broiler farms; hatcheries.
 - ⇒ Small scale producers.
 - ⇒ Middlemen.
 - ⇒ Market retailers.
 - ⇒ Private companies.
- Some questionnaires were tested in the field during week 2 and then revised. Questionnaires were designed to provide information on:
- ⇒ Description of the “poultry activity” units and linkages with other stakeholders.
 - ⇒ Assessment of economic results of each unit in 2003 and 1st semester of 2004.
 - ⇒ Other information related to social impact, etc.
- **Sampling.**
 - ⇒ Out of the 12 farms that were officially declared as infected by H5N1, only 8 were included. Four farms were not included: Takmau Zoo; one could not be located; one was a NGO run farm; one was raising geese as a hobby.
 - ⇒ 100 small scale poultry farms (smallholders); 16 commercial and semi-commercial chicken broiler farms (20% of total registered); 17 commercial and semi-commercial chicken layer farms (30% of total registered); 31 commercial and semi-commercial ducks farms (5% of total registered).
 - ⇒ 22 Middlemen and 22 market retailers.
 - ⇒ Around 10 service providers.

According to the FAO classification developed during a recent expert consultation, which describes four production sectors, smallholders can be included in sector 4 and the commercial & semi-commercial farms fall into sectors 2 and 3 farms. There are no sector 1 farms (highly integrated and with very good biosecurity).

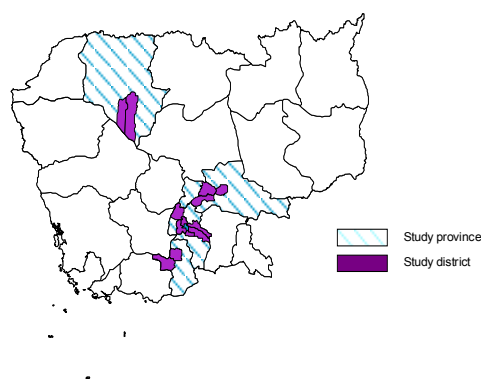
	nb chicken layer farms		nb chicken broiler farm		nb of duck farms		total
	infected district	non infected district	infected district	non infected district	infected district	non infected district	
Phnom Penh	1 (20%)	2 (40%)	1 (10%)	3 (30%)	1 (6%)	6 (35%)	14
Kandal	2 (4%)	6 (13%)	1 (6%)	6 (33%)	0 (0%)	4 (36%)	19
Siem Reap	0 (0%)	2 (33%)	3 (17%)	4 (22%)	3 (3%)	3 (3%)	15
Takeo	1 (25%)	1 (25%)	0 (0%)	0 (0%)	4 (1%)	5 (2%)	11
Kampong Cham	0 (0%)	2 (100%)	0 (0%)	0 (0%)	0 (0%)	4 (2%)	6
Sub total	4	13	5	13	8	22	65
total and % of the 5 provinces farms	17 (27%)		18 (33%)		30 (5%)		65

Table 1: Interviewed commercial poultry farms according to HPAI status of district and to province.

Two target districts were selected for each province: one with officially infected cases, one without. Map No. 2 below shows the provinces and districts where interviews were conducted in July 2004.

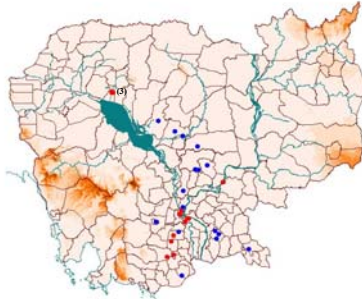


Map 1: Administrative map of Cambodia.

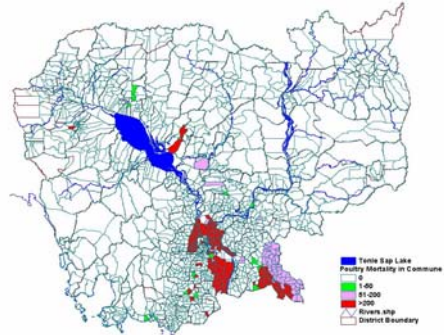


Map 2: Provinces & Districts where interviews were conducted during the study.

Sites Investigated and confirmed positive (red) and negative (blue), Jan-April, 2004
Map 4 (FAO Report Misalon - Thomas Rawdon)



Map 3: Sites investigated for HPAI during 1st quarter 2004 (Thomas Rawdon- FAO).



Map 4: Communes with report of poultry mortality during 1st quarter 2004 (Thomas Rawdon- FAO).

IV. Data Analysis

Databases were created under SPSS¹ for each group of poultry units (smallholder, commercial broiler, etc.). To assess the economic impact of HPAI on the “poultry activity” of producers, middlemen & market retailers, the “poultry enterprise profit” during 1st semester 2004 was compared to the one during 1st semester 2003. The poultry enterprise profit was calculated according to the table below.

Table modified from “Animal Health Economics in Livestock Development” VEERU, Reading, UK.

	Quantity	Unit price	Value
Output (incomes)			
Sales of poultry, eggs, manure.			
TOTAL OUTPUTS			
Variable costs			
Purchase of animals, feed.			
Veterinary costs			
Casual labour			
Other costs			
Fixed costs			
Depreciation of investment (equipment, building, etc.)			
TOTAL COSTS			
POULTRY ENTERPRISE PROFIT (Total output less Total costs)			

Table 2: Calculation of the poultry enterprise profit.

Results were then extrapolated for each of the 5 provinces/municipality (using census of commercial farms and census of rural smallholders) and then for all aggregated together.

¹ SPSS for Windows. Release 11.0.0. SPSS Inc.

PART TWO: DESCRIPTION OF POULTRY PRODUCTION IN CAMBODIA

I. Overview

- Poultry population has increased on a regular basis over the second half of the 20th century (see figure 1 – Data is not available between 1970 & 1985). A particular high increase was observed between 1995 and 2000: 50% (i.e. 10% per year on average). This increase was twice the increase observed between 1990 and 1995. The last census (table 4) conducted in 2002 indicates a total number of more than 16 millions poultry in Cambodia.

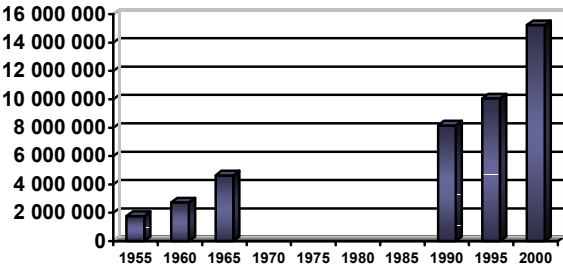
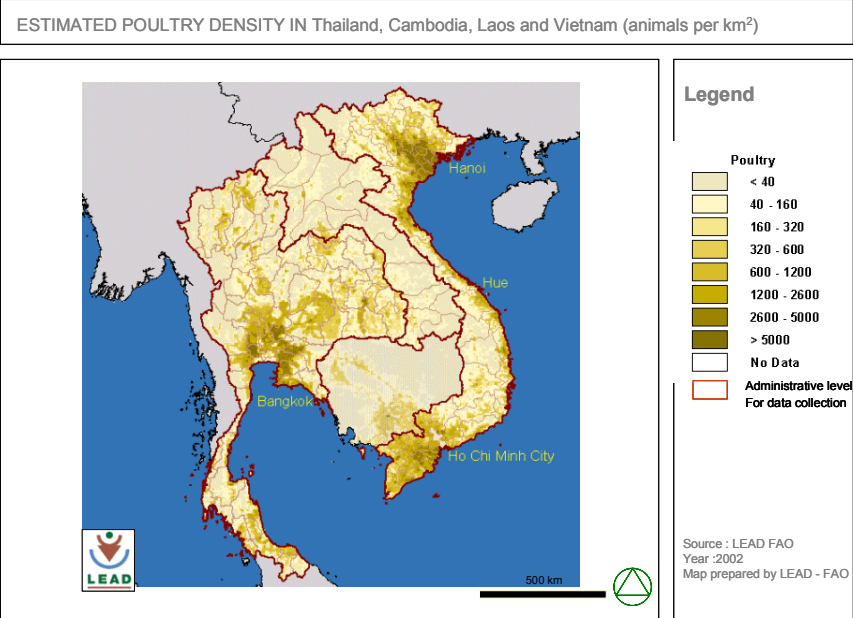


Figure 1: Evolution of poultry numbers in Cambodia.

- Main species raised are chicken (82%) and ducks (18%). Six per cent of the chickens in Cambodia are raised in commercial farms and 94% in non-commercial farms. However for ducks the figures are 29% and 71% respectively (DAHPC).

Map 5: Estimated poultry density in Cambodia (FAO).



- Poultry density is much higher in the **south-east** part of Cambodia (lower Mekong area, around Phnom Penh, close to Vietnam) and in the **north-west** part (north and around Tonle Sap, close to Thailand), than in other parts of the country. This density reflects the human density. The table ranks provinces according to the number and density of poultry.

Ranking of provinces according to the number of poultry (heads)

Pursat	2 203 791
Takeo	1 622 549
Kampong Cham	1 516 373
Prey Veng	1 269 111
Kandal	1 259 088
Kampot	1 146 019
Kampong Speu	1 035 002
Svay Rieng	968 689
Otdar Mean Chey	855 176
Siem Reap	769 104
Battambang	717 042
Kampong Chhnang	648 980
Kampong Thom	632 354
Banteay Mean Chey	450 533
Kratie	352 756
Preah Vihear	341 914
Krong Preah Sihanouk	332 692
Phnom Penh	223 073
Rotanak Kiri	112 867
Stung Treng	85 293
Koh Kong	52 779
Mondul Kiri	30 430
Krong Kaeb	29 771
Krong Pailin	25 334

Ranking of provinces according to the density of poultry (heads / km2)

Phnom Penh	769
Takeo	455
Krong Preah Sihanouk	383
Kandal	353
Svay Rieng	327
Prey Veng	260
Kampot	235
Pursat	174
Kampong Cham	155
Kampong Speu	147
Otdar Mean Chey	139
Kampong Chhnang	118
Krong Kaeb	89
Siem Reap	75
Banteay Mean Chey	67
Battambang	61
Kampong Thom	46
Kratie	32
Krong Pailin	32
Preah Vihear	25
Rotanak Kiri	10
Stung Treng	8
Koh Kong	5
Mondul Kiri	2

Table 3: Ranking of provinces according to number of poultry and density of poultry in Cambodia.

- Medium & large-scale commercial production of poultry is recent in Cambodia. It started to develop between 1995 and 2000, particularly with the start of CP's activities (Thai company) in Cambodia in 1997. Establishment of CP in Cambodia has enabled poultry producers to find chicks and pullets of improved genetics without having to import directly from Thailand or Vietnam (although this direct import still continue).
- The State Services are very little involved in the poultry sector. The National Strategic Plan for Animal Health & Production (December 2000) written in relation to the Agriculture Productivity Improvement Project (World Bank's loan) intended "to focus Government, private enterprises and livestock owners on the two livestock species (pigs and large ruminants) that have the potential to assist in the development of all livestock due to the turnoff in value and volume."
- There are frequent imports of poultry and poultry products from Thailand and Vietnam. There is very little export from Cambodia (e.g. layer ducks sold to Vietnam). Most of these movements are not controllable by the State.

Table 4: Poultry numbers in Cambodia according to province & species (from DAHP's 2003 census)

	Chicken	Duck	Kapa Duck	Goose	Pigeon	Total Poultry	%
	<i>heads</i>	<i>Heads</i>	<i>heads</i>	<i>heads</i>	<i>heads</i>	<i>heads</i>	
Plain	4 468 507	1 420 785	0	670	232	6 858 883	41,1%
Phnom Penh	153 530	69 543	0	0	0	223 073	1,3%
Kandal	1 144 857	114 231	0	0	0	1 259 088	7,5%
Kampong Cham	1 244 561	270 910	0	670	232	1 516 373	9,1%
Svay Rieng	-	-	-	-	-	968 689	5,8%
Takeo	1 129 974	492 575	0	0	0	1 622 549	9,7%
Prey Veng	795 585	473 526	0	0	0	1 269 111	7,6%
Tonle Sap	4 769 264	640 453	9 561	2 526	0	6 302 314	37,8%
Kampong Thom	552 337	80 017	0	0	0	632 354	3,8%
Siem Reap	628 015	141 089	0	0	0	769 104	4,6%
Battambang	580 399	125 413	9 561	1 669	0	717 042	4,3%
Pursat	2 139 662	64 129	0	0	0	2 203 791	13,2%
Kampong Chhnang	526 980	122 000	0	0	0	648 980	3,9%
Banteay Mean Chey	341 871	107 805	0	857	0	450 533	2,7%
Otdar Mean Chey	-	-	-	-	-	855 176	5,1%
Krong Pailin	-	-	-	-	-	25 334	0,2%
Coastal	1 069 849	488 215	0	1 619	1 578	1 561 261	9,4%
Krong Preah Sihanouk	253 638	77 239	0	237	1 578	332 692	2,0%
Kampot	747 447	397 917	0	655	0	1 146 019	6,9%
Krong Kaeb	21 694	8 077	0	0	0	29 771	0,2%
Koh Kong	47 070	4 982	0	727	0	52 779	0,3%
Plateau & Mountain	1 669 005	169 981	6 161	228	20	1 958 262	11,7%
Kampong Speu	924 603	110 399	0	0	0	1 035 002	6,2%
Stung Treng	69 342	9 790	6 161	0	0	85 293	0,5%
Rotanak Kiri	-	-	-	-	-	112 867	0,7%
Mondul Kiri	25 470	4 940	0	0	20	30 430	0,2%
Kratie	326 951	25 577	0	228	0	352 756	2,1%
Preah Vihear	322 639	19 275	0	0	0	341 914	2,0%
Total Cambodia	11 976 625	2 719 434	15 722	5 043	1 830	16 680 720	

II. Backyard / small-scale poultry raising

Chickens

- This group of producers own more than 90% of the poultry in Cambodia and concerns up to 2,000,000 households in Cambodia. In other words, almost every single household in Cambodia (except most of urban households) is involved in poultry production.
- Animals raised are almost exclusively of local breeds:
 - Chickens: Skouy, Sampeov, Kragnas.
 - Ducks: Tear Angkam (layer), Tear Sampeov (layer/meat). Muskovi ducks (Tear Kapa) is also found but in smaller numbers (2 to 5) per farm.
- Initial investment to start the activity is very limited. Housing is very basic and mostly used for the night.
- Inputs are also very limited, with a small proportion of cash expenses (buying animals, buying complementary feed). Animals are very rarely bought and eggs produced by the female are used to restock. The major part of the inputs consists of feed for animals, but this is usually not a cash expense (use of crops products and by-products and animals are scavenging).
- Animals are slaughtered and eaten by the family or are sold live at the farm gate to middlemen (on motorbike or bicycle). This output is a very important source of cash for the economy of the household (for duck raising, the main output is represented by the eggs).
- Chicken eggs are rarely sold and usually serve for the renewal of the stock. On the contrary, duck eggs are usually sold or eaten.
- The sample analysed in this study (100 smallholders) showed that 80% of smallholders raise chickens only, 19% raise both chicken and ducks and 1% raise ducks only.
- Many authors report a mortality rate around or higher than 50%. However, it is not very clear how this mortality rate is estimated, whether it is per year, per batch, etc. The analysis of the data through interviews of smallholders in this study (cf. Part III) indicates an average mortality rate of 5% per month.
- Use of support services is very limited. In this study, around 80% of smallholders reported a non-use of animal health, technical advice and credit services.

III. Commercial farms

- The data from a census conducted in February 2004 (see table below, adapted from data from DAHP) indicates 74 layer chickens farms, 108 broiler chickens farms and 951 duck farms.

		Chicken Layer		Chicken Broiler		Duck		Total
		Nb of farms	nb of heads	Nb of farms	nb of heads	Nb of farms	nb of heads	total nb of commercial heads
	Plain							
1	Phnom Penh	5	42 955	10	37 085	17	27 574	107 614
2	Kandal	46	158 395	18	63 032	11	13 740	235 167
3	Kampong Cham	2	3 500	4	1 900	177	80 789	86 189
4	Svay Rieng	0	0	0	0	3	600	600
5	Takeo	4	6 400	5	19 296	303	244 656	270 352
6	Prey Veng	0	0	0	0	57	26 134	26 134
	Tonle Sap							
7	Kampong Thom	0	0	0	0	13	9 200	9 200
8	Siem Reap	6	10 920	18	30 780	98	58 870	100 570
9	Battambang	1	6 000	6	18 000	48	178 755	202 755
10	Pursat	0	0	0	0	0	0	0
11	Kampong Chhnang	0	0	1	1 000	36	54 125	55 125
12	Banteay Mean Chey	1	1 400	2	240	32	61 967	63 607
13	Otdar Mean Chey	0	0	0	0	0	0	0
14	Krong Pailin	0	0	0	0	0	0	0
	Coastal							
15	Krong Preah Sihanouk	0	0	0	0	146	64 194	64 194
16	Kampot	0	0	0	0	6	9 358	9 358
17	Krong Kaeb	0	0	0	0	0	0	0
18	Koh Kong	1	900	3	3 120	1	400	4 420
	Plateau & Mountain							
19	Kampong Speu	8	148 200	41	204 900	0	0	353 100
20	Stung Treng	0	0	0	0	0	0	0
21	Rotanak Kiri	0	0	0	0	3	230	230
22	Mondul Kiri	0	0	0	0	0	0	0
23	Kratie	0	0	0	0	0	0	0
24	Preah Vihear	0	0	0	0	0	0	0
	Total Cambodia	74	378 670	108	379 353	951	830 592	1 588 615

Table 5: Number of commercial poultry farms in Cambodia according to province and type of production.

- These 1133 farms represent around 1,600,000 poultry heads, equivalent to 10% of the poultry number in Cambodia. The average size of a commercial farm is around 1,400 heads per farm.
- Less than half of Cambodia's provinces have commercial poultry farms.
- In July 2004, a new census of commercial poultry farms was made. Results are not available at the time of writing this report.
- Commercial farms of chickens consist of closed or semi-closed buildings. Ducks are raised outdoors in the fields.

III.A. Chicken Broiler farms

- Total number of commercial chicken broiler farms in Cambodia = 108.

- Mainly located in Kampong Speu, Siem Reap, Kandal and Phnom Penh.

- Average size = 3,500 heads.

- Private or under contract with CP (integrated producer). There are 68 broiler chicken farms in Cambodia that are "integrated", all of them with CP. Under this contract, CP supplies animals, feed, veterinary products and technical advice to the farm and the farm provides the building, equipment and manpower. The farm's owner is paid by CP according to performances of the activity (number of broilers produced, etc.)

- Almost all farms use exotic breeds.

- Broilers are raised in batches and usually leave the farm at a weight around 1.88 kilogrammes.

- High level of initial investment (building) and high level of inputs (mainly feed)

- In private farms, commercial feed is only used to feed young broilers, then feed rations are made at the farm using raw ingredients and premix (these ingredients are usually bought). Rice bran, maize, soybean and dried fish are the main raw materials in the feed rations. The incorporation rate of each raw material varies according to its price especially with regard to soybean and dried fish.

- In integrated / CP farms, commercial feed is used during the whole cycle.

- Day old chicks (DOC) are imported by Medivet or 3 other importers based in Phnom Penh and sold to private farms. Integrated farms get their DOC through CP's breeding farm in Kandal. Before the HPAI epidemic, 80% of the DOC production of this CP breeding farm was going to integrated farms and 20% was sold to private farms. In July 2004, CP now reports selling 50% of DOC production to private farms.

- Buildings are closed or semi-closed.

- Most of the farms operate on a unique batch basis (broilers in the farm are of the same age).

- Broiler farms represent an important production system to supply cities like Phnom Penh. Their production seems to be sufficient (before HPAI) to supply the domestic market, since very few broilers are imported (estimation not available).

	Nb of farms	nb of heads
Phnom Penh	10	37 085
Kandal	18	63 032
Kampong Cham	4	1 900
Takeo	5	19 296
Kampong Thom	0	0
Siem Reap	18	30 780
Battambang	6	18 000
Kampong Chhnang	1	1 000
Banteay Mean Chey	2	240
Koh Kong	3	3 120
Kampong Speu	41	204 900
Total Cambodia	108	379 353

III.B. Chicken Layer farms

- Total number of commercial chicken layer farms in Cambodia = 74. In addition, there are 57 pullet farms (these are not included in the official census).
- Mainly located in Kandal, though the biggest farm (100,000 layers) is in Kampong Speu. This farm represents ¼ of the commercial chicken layer numbers.
- Average size = 5,000 heads.
- 65 private farms.
- 9 contracted farms (with CP), with an average capacity of 5,000 heads. They buy pullets from CP at a guaranteed price and CP buys the eggs.
- 57 integrated farms (with CP) for the raising of pullets (contract similar to the one between CP & broiler farms).
- 100% of exotic breed.
- The layers are sold / culled when the laying rate is below 60%.
- Initial investment is high (building).
- Private farms mainly use feed (110 – 120 gr/day/layer) made at the farm, and use commercial feed at the start only. CP farms and a few private farms use only commercial feed.
- Farms buy either DOC imported by Medivet (or others) or pullets (17 weeks old) produced by CP's integrated farms.
- 60% of the pullets produced by CP integrated pullet farms were supplying CP integrated layer farms before HPAI epidemic. In July 2004, this is now 40%. Rest is sold to private farms.
- Closed or semi-closed buildings. Individual cages.
- Usually operate on a unique batch at the same time, but sometimes batches are partially sold / bought.
- Average selling price are 140 riels / egg and 3,500 riels / kg of culled layer (sold at 1.8 kg).
- There is an import of eggs from Thailand and Vietnam to supply markets in Phnom Penh, when eggs are cheaper than those produced in Cambodia.

	Nb of farms	nb of heads
Plain		
Phnom Penh	5	42 955
Kandal	46	158 395
Kampong Cham	2	3 500
Takeo	4	6 400
Tonle Sap		
Siem Reap	6	10 920
Battambang	1	6 000
Banteay Mean Chey	1	1 400
Coastal		
Koh Kong	1	900
Plateau & Mountain		
Kampong Speu	8	148 200
Total Cambodia	74	378 670

III.C. Duck farms

- Total number of commercial duck farms in Cambodia = 951. There is no data available on the share between broilers & layers.
- Main locations are: Takeo, Kampong Cham, Sihanoukville, Siem Reap, Prey Veng, Battambang, etc. Broilers are concentrated around Phnom Penh.
- Average size = 900 heads.
- Commercial raising of ducks is much less standardised than chicken.
- Around 35% of the commercial duck numbers are broilers, and 70% are layers.
- There are no integrated farms, but a semi-integration system with incubators (hatcheries): oral contract through which the incubator lends ducklings and feed and the farm sells eggs to the incubator.

- Initial investment is often moderate (feed mixer, building to store feed). Ducks are usually raised outdoors, near a pond and in fields.
- Practices vary a lot according to farmers and years. The cycle duration depends on availability of local resources. Activity is sometimes stopped for a year and restarted again.
- Commercial feed is used in some farms for young animals during 1 or 2 weeks, then feed is made at the farm (sometimes with commercial supplement)
- Duck raising developed considerably in Cambodia with the immigration of Chinese people at the beginning of the 20th century. This activity closely follows the rice cycle. Ducks may be moved for fairly long distances in order to help them find their own feed in rice fields. The most frequent activity is raising of layers to produce and sell eggs.
- An interesting study has been done on duck raising in Cambodia: JM Brun, E Hyvernât. Analyse de la filière canard au Cambodge: quel avenir pour les éleveurs de Takéo? VSF/ISARA. 1994.

Specific to broilers

- 90% of exotic breed. Pekin breed is the most popular for its meat quality.
- Ducklings are bought at one day old of age.
- Some are imported (from Vietnam).
- Average cycle duration = 65 days.
- Weight at end of cycle = 2.7 kg (exotic breeds)
- There is no information regarding import of finished broilers.

Specific to layers

- 95% of Kaki breed (imported a long time ago).
- Farmers either buy day-old ducklings (both sexes) or buy young layers at the age of 4-6 months, or adult layers at 8-10 months (or after one laying cycle).
- Ducklings are produced by local incubators (mainly in Takeo) or imported from Vietnam. There is also an import of eggs from Thailand and Vietnam.
- In Takeo province, duck layers are raised with a short cycle (4 months of laying), then sold.
- Farmers who buy ducklings usually do so in October / November. Season is less a factor for farmers who buy duck layers.
- Both eggs and embryonnated eggs are sold.
- Farms that have bought ducklings of both sexes, sell male ducks at 4 months old.
- Laying cycle varies from 4 to 24 months.

	Nb of farms	nb of heads
Plain		
Phnom Penh	17	27 574
Kandal	11	13 740
Kampong Cham	177	80 789
Svay Rieng	3	600
Takeo	303	244 656
Prey Veng	57	26 134
Tonle Sap		
Kampong Thom	13	9 200
Siem Reap	98	58 870
Battambang	48	178 755
Kampong Chhnang	36	54 125
Banteay Mean Chey	32	61 967
Coastal		
Krong Preah Sihanouk	146	64 194
Kampot	6	9 358
Koh Kong	1	400
Plateau & Mountain		
Rotanak Kiri	3	230
Total Cambodia	951	830 592

III.D. Breeding / Incubator farms

- There is only one farm with chicken parent stock and an incubator in Cambodia (in Kandal province). It is owned by CP and produces day-old-chicks for broiler farms and pullet / layer farms (foreign breeds).
- There is no breeding farm for local chicken or duck breeds.
- Some provinces have hatcheries for production of local breed duck embryonnated eggs or ducklings. Takeo is probably the most important one with 20 to 30 hatcheries (especially in Sre Ronong commune). This activity is reported to have started decades ago with chinese people.
- Owners of hatcheries usually have strong links with duck farmers, through the sale of ducklings on credit, the purchase of the eggs and some technical advice. This enables them to obtain good quality and quantity of eggs to be incubated. Eggs are sometimes imported from Vietnam.
- Despite the presence of these hatcheries, there are still imports of ducklings from Thailand and Vietnam going to provinces like Kampot, Kampong Cham, Siem Reap, Battambang, etc.
- In Takeo, ducklings are sold to both smallholders (around May) and commercial farms (around october). Outside these periods, hatcheries produce embryonnated eggs.
- The production of foreign-breed chicks and ducklings in Cambodia is insufficient to meet the needs of the producers. Imports are therefore regularly organised from Vietnam (ducklings mainly) and Thailand (chicks mainly). In addition to the risk of cross-bordering transmission of animal diseases (both ways), this poses a risk in the medium and long term to the conservation and use of Cambodian poultry breeds.

IV. Providers of services and inputs

IV.A. CP Group

Operations in Cambodia:

- CP started operating in Cambodia in 1996 and currently has 150 employees. Its domains of activities:
 - Production and sale of animal feed for pig and poultry. Most of the ingredients are produced in Cambodia; some are imported (e.g. soya).
 - Production of chicks, pullets, sows and boars. Parent stock is imported from Thailand or Europe.
 - Animal production with contracted farms (integrated farms).
 - Supply of veterinary products imported from Thailand to contracted farms and also to private farms.
 - Maize production with farmers (supply of technical advice; buy maize).
- Relative importance of poultry activities in the company's turnover: before HPAI, the sale of poultry products and of pig products represented 70% and 30% respectively. In August 2004, each represented 50%. Objectives for 2005 are 70% from pig products and only 30% from poultry.
- CP owns and manages 7 shops, and has 10 big dealers in provinces (these are supplying CP products to sub-dealers).

CP and the poultry sector:

- There are 2 types of contracts with farms.

- “Integrated”: relates to “broiler” and “pullet” farms: all inputs are provided by CP except the building and the manpower; the company pays the farmer according to technical results.
 - “Contracted”: relates to “layer” farms: farmers buy inputs at an agreed / guaranteed price from CP; CP buy the eggs at a guaranteed price.
- Capacity for production of broiler chicks: 30,000 chicks per week (80% are for integrated farms and 20% are sold to private farms - before HPAI).
- Capacity of production of layer chicks: 6,000 chicks per week. All these chicks are transferred to CP’s pullets integrated farms.
- CP is the only day-old-chick (DOC) producer in Cambodia (other DOC supplies are imported by Medivet, etc.) and the CP DOC price is 300 riels cheaper than imported ones.
- Production of chicken feed: 15,000 tonnes /month. Quantity bought by private farms is equivalent to the quantity supplied to contracted farms. Different types of feed are available. The private farms buy the starter feed at the same time as they buy the chicks. Most of growth, finishing, and laying feed is supplied to the contracted farms. For these stages, the private farms generally produce the feed themselves.
- Production of duck feed: 100-120 tonnes /month. 80 to 90% consist of a concentrate feed for broilers and layers is sold to be added to raw ingredients at the farm. The rest is a complete feed for layers.
- 68 integrated chicken broiler farms, with an average size of 3,000 heads.
- 9 contracted chicken layer farms, with an average size of 5,000 heads.
- 57 integrated pullet farms, with an average size of 2,000 heads (40% of pullets are sold to private farms and 60% are kept for contracted farms - before the outbreak).
- There are no contracted / integrated farms for duck production.
- Current egg production by contracted farms is equivalent to 30,000 eggs /day.

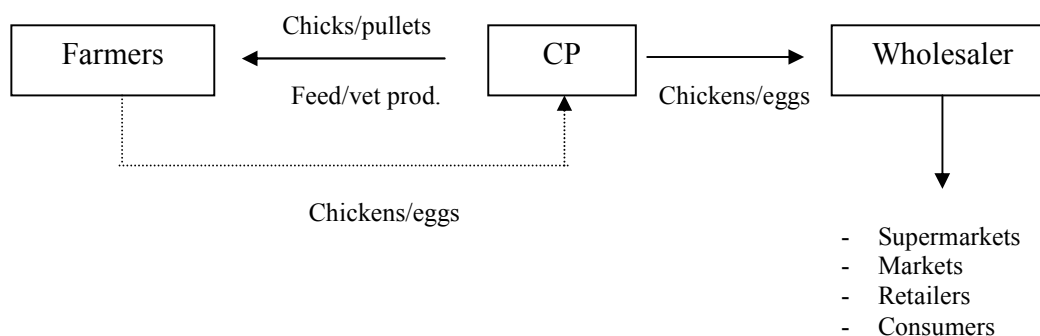


Figure 2: Linkages between CP, contracted / integrated poultry farms and wholesalers.

- There are 50 wholesalers for CP broiler production and 20 wholesalers for CP layer production. All the production is sold in Cambodia (no export).
- The CP poultry products produced in Phnom Penh and Kandal supply Phnom Penh and Kandal markets. The CP poultry products produced in Battambang supply Battambang markets and Siem Reap markets (there is no CP producer in Siem Reap).
- 80% of the veterinary products imported from Thailand are provided to contracted farms and the rest are sold to private farms through the shop or the dealer.
- CP staff regularly visit the contracted farms to provide technical assistance on animal health and other aspects.

IV.B. Importers / wholesalers for animal feed & import of chicks

- 3 – 4 wholesalers based in Phnom Penh were identified during the study.
- **Feed.** They buy poultry & pig commercial feed from Thai companies (Betagro, Suntaco, etc.) at the border or at the factory in Thailand. This represented 20 to 40% of their activity before HPAI. Around 100 tonnes per month was traded before HPAI.
- **Chicks.** They buy chicks in Thailand for broiler and layer farms, between 100,000 & 200,000 chicks per month before HPAI. Buyers have to order in advance.
- **Sales** are organised through 15 to 30 distributors, based in different provinces, or directly to big farms.

IV.C. Importers / wholesalers for veterinary products & import of chicks: Medivet

- Medivet is a Cambodia company of 18 employees.
- Chicks are imported from Thailand and bought by Medivet at the border. Around 60,000 chicks (40,000 for broilers, 20,000 for layers) are bought per month – before HPAI.
- Sales of chicks are organised directly to poultry farms (90%) and through local distributors (10%). Veterinary products and premix are sold through 50 local distributors in provinces (50%) or directly to users (e.g. an association of Village Animal Health Workers in Takeo buys directly from Medivet).
- Medivet staff provides technical advice and regularly visits poultry farms.

IV.D. Importers / wholesalers for veterinary products

- There are at least 3 companies: VE (Indian company – started in November 2003 – distributor for Indian & British companies); Thom Thom (French-Cambodian company – started in August 2003 – distributor for European companies); one distributor for Navetco (Vietnamese veterinary company) based at Olympic market. They have around 4-9 employees each.
- They sale premix, vaccines and medicines mainly through distributors and also directly to some big farms.
- Poultry represent 60% of turn over for Thom Thom, 30% for the Navetco distributor and 5% for VE – before HPAI.
- Only Thom Thom provides technical advice services to poultry farms with regular visits.

IV.E. Distributors of animal feed and veterinary products

- There are a lot of them in provinces. They sell both feed and veterinary products to shops, to vets and animal health workers, to farmers.

IV.F. Veterinarians and para-veterinarians

- State Services: the Department of Animal Health & Production (national level) supervises 24 provincial Offices of Animal Health & Production. Then the lowest element of the State Services is represented by the District Office of Animal Health and Production.
- Private practitioners: animal health care for small-scale livestock is mainly done by Village Animal Health Workers (also called para-veterinarians, paravets). However, their involvement with poultry is very limited compared to pigs, buffalo and bovine. “More than 6,129 Village Animal Health Workers (VAHW) have been trained by APIP and NGOs in Cambodia and 68% are recognized by DAHP. Additional 5,901 VAHWs need to be formed and trained to cover countrywide.” (Khieu Borin, Report on Innovation Community-Based

Animal Health Worker in Cambodia, draft version). The already trained VAHWs represent an average of 2.7 VAHW per commune or for 300 rural households.

- The linkages between private practitioners (VAHW) and the State Veterinary Services are still poor (but vary between districts).
- Medium and large scale poultry farms usually use services from State veterinarians and veterinarians employed by feed and pharmaceutical companies or distributors.
- The two tables below present the results of interviews conducted during this study with poultry farms (from small to large scale operations) as regards to use of animal health service and technical advice. The difference between small-scale poultry farms and commercial poultry farms in terms of percentage of farms using these services is clear: more than 80% of poultry smallholders do not use any of these services.

Who do you ask about animal health problems?

	Smallholders		Commercial Farms	
	Nb	%	Nb	%
No one	82	82%	20	28%
Neighbour	2	2%		
VAHW	10	10%	5	7%
State Veterinarian	1	1%	15	21%
Vet shop	5	5%	4	6%
Company (Feed/Vet)			20	28%
NGO			6	8%
Other			2	3%
Total	100	100%	72	100%

Who do you ask for technical advice?

	Smallholders		Commercial Farms	
	Nb	%	Nb	%
No one	78	78%	19	26%
Neighbour	1	1%	1	1%
VAHW	15	15%	4	5%
State Veterinarian	2	2%	18	24%
Vet shop	4	4%	4	5%
Company (Feed/Vet)			21	28%
NGO			6	8%
Other			1	1%
Total	100	100%	74	100%

Table 9: Use of “animal health” and “technical advice” services by poultry producers.

IV.G. Credit

- Credit for poultry in Cambodia seems to be found through:
 - Non Governmental Organisations.
 - Farmers’ Associations (e.g. Siem Reap)

- Village Animal Health Associations.
 - Relatives.
 - Etc.
- Buying poultry on credit seems to be frequently organised, particularly for duck farms who get their supplies in ducklings from hatcheries. They pay back with eggs.
- The table below presents the results of interviews conducted during this study with poultry farms (from small to large scale operations) as regards to use of credit services. Again, as for animal health & technical advise services, **the proportion of poultry smallholders using credit to develop poultry is very small (around 10%).**

Who do you ask for credit?

	Smallholders		Commercial Farms	
	Nb	%	Nb	%
No one	88	88%	30	42%
Neighbour	4	4%	8	
Relative	1	1%	10	14%
Bank	2	2%	6	8%
Farmers Association			5	7%
NGO	5	5%	8	11%
Other			2	3%
Total	100	100%	69	85%

Table 10: Use of “credit” services by poultry producers.

V. Marketing

- It must be recalled here that a large part of poultry production in Cambodia is consumed by producers themselves and does not involve marketing: this concerns the smallholders. This chapter relates more to part of the production from smallholders, and mainly to the production from medium and large scale poultry farms.
- Middlemen play a key role in bringing poultry and eggs from producers to markets. They transport poultry products by bicycles, motorbikes and cars. They are sometimes organised at different levels. To simplify: a bicycle middleman collects in its commune for a motorbike middleman (collecting from few others), who himself collects for a car middleman, who sells to the market retailers in another province. Part or all of the poultry products collected is left at each administrative level (district, province) and the rest goes to the higher level up to Phnom Penh markets. In reality, it is more complex and diversified. The text in the box here is a good example of this diversity.
- Market retailers exist at commune, district and provincial levels. The biggest markets are located in Phnom Penh and in Siem Reap.
- Supplies in live chickens and ducks and poultry eggs are brought by middlemen directly to the markets and to big restaurants.
- Consumers usually buy the poultry alive; the market retailer then slaughters the animal and prepares it before the consumer brings it home.
- There is no export of poultry outside Cambodia. However, during the study, there was a report of duck layers being transported to Vietnam.
- Import of poultry animals and poultry products from Thailand and Vietnam into Cambodia is difficult to estimate. As mentioned previously in this report, duck eggs, chicken eggs, ducklings, chicks are more or less regularly imported. A high proportion of this import cannot realistically be controlled.

“Through road No. 1, there are 6 “poultry cars” coming daily to Phnom Penh from Prey Veng and Svay Rieng provinces. Chickens are then transported by motorbike drivers to the markets (drivers are hired by the market sellers). Markets are also supplied directly by motorbike middlemen who buy chickens in provinces. Poultry therefore flows into the city especially towards Chba Ampov market. Only local breeds are transported. Through road No. 5, there are no motorbike middleman transporting poultry directly from provinces because of the distance. Only local breeds are brought by 2 permanent car middlemen who always park north of the Cambodian Development Council. One car can carry at least 200 kg of poultry daily for around 8 market sellers. During HPAI epidemic, this was reduced to 100 kg per car. For ceremony, quantity can increase to 1 – 1.5 tonnes per day. Poultry go to Kandal, O. Russey and Deum Hor market. Through road No. 6, around 10 motorbike middlemen bring poultry from Prey Veng (5 middlemen) and Kompong Tom (5). One motorbike can carry 60 kg of poultry but for ceremony this can go up to 100 kg. Usually, one motorbike middleman supplies one market seller. Some go directly to the market but some park at north of Kean Khlaing Pagoda for market sellers of Kandal, O. Russey and Deum Hor markets. Also, 3 middlemen rent a car for 25,000 riels each to bring poultry from Kompong Tom to Phnom Penh.”

Report from one VSF’s surveyor.

VI. Consumption

Main products consumed:

- Local breed chickens are marketed at around 1.2 kg of live weight.
- Chickens of foreign breeds are marketed at around 1.8 kg. They are rarely eaten by Cambodian people, although this tends to change in Phnom Penh and Siem Reap.
- Duck meat is mainly eaten during and around festivities. There are 2 types of products : local breed sold at 1.8 kg and foreign breed sold at 2.7 kg.
- Duck eggs are eaten either fresh or embryonnated.

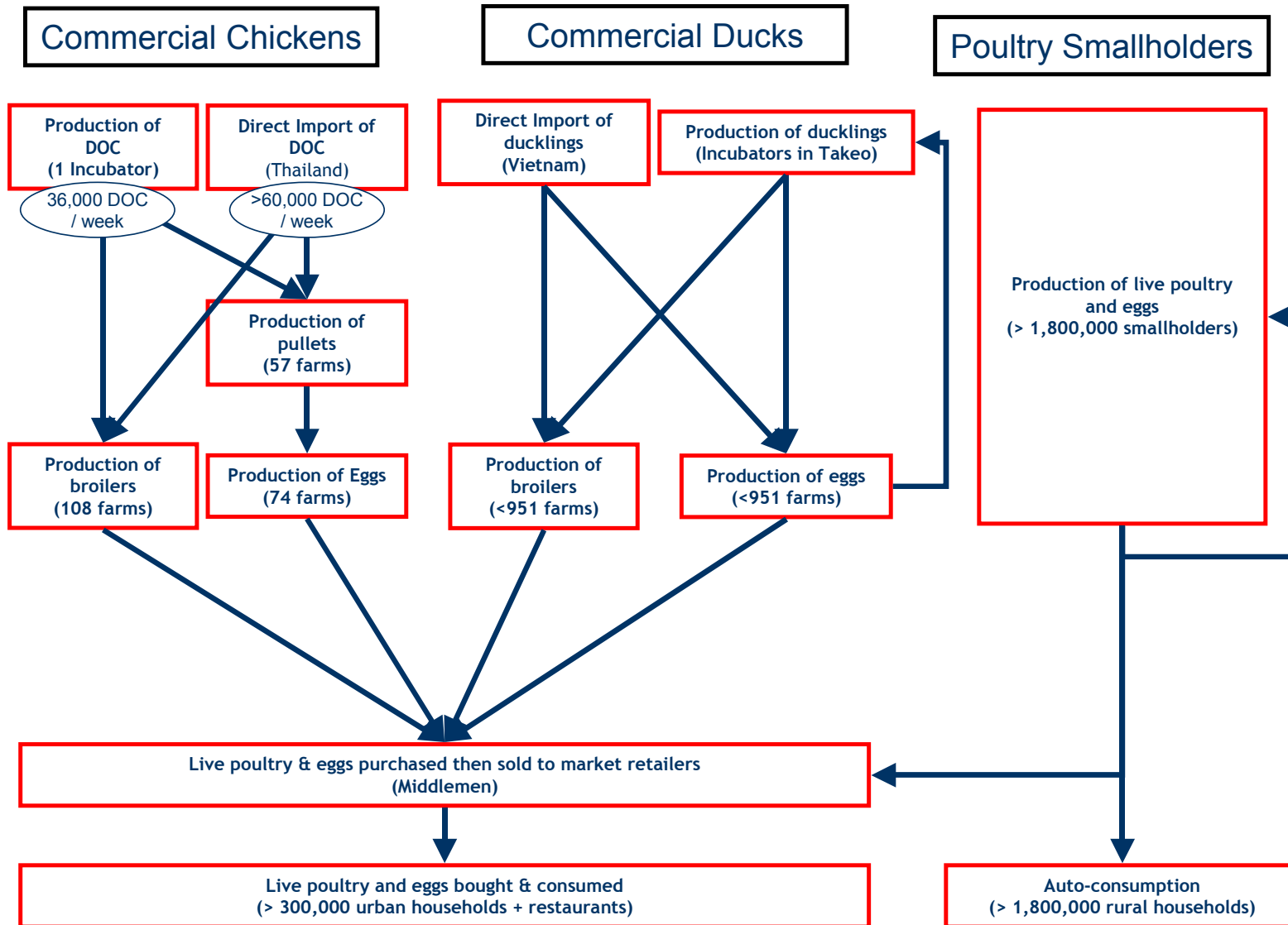
Quantity:

- Consumption of poultry products in Cambodia is growing both because of a high population increase and because of the increase of incomes (per capita consumption increases). The table below indicates an increase per capita (in Phnom Penh) of 44% and an increase of total consumption for Phnom Penh population of 62% between 1997 & 2000 for chicken meat.

	Consumption of households (g / person / day)			Total consumption by Phnom Penh's households (tonnes / day)		
	1997	2000	% increase	1997	2000	% increase
Vegetables	143	144	1%	186	216	16%
Fresh Fruits	75	88	17%	99	130	31%
Fresh Fish	44	82	86%	57	123	116%
Pig Meat	25	56	124%	32	84	163%
Chicken Meat	16	23	44%	21	34	62%
Eggs	1,5	2	33%	230 000	277 000	20%
	eggs / week			eggs / day		

Table 11: Quantity of fresh products consumed by households in Phnom Penh in 1997 & 2000
(from "Approvisionnement et consommation de Phnom Penh en produits alimentaires", AgriSud/AFD. 2001)

Figure 3: Summary of linkages between some stakeholders of the poultry sector in Cambodia.



PART THREE: SOCIO-ECONOMIC IMPACT OF THE HIGHLY PATHOGENIC AVIAN INFLUENZA EPIDEMIC IN CAMBODIA

I. Results from data collected on 100 smallholders during the study.

- 100 smallholders (less than 200 heads) were interviewed between end of July & mid-August 2004. Their distribution according to location & species is presented in the table below.

Province	District	Commune	Nb of "chicken only" farms interviewed	Nb of "chicken+duck" farms interviewed
Phnom Penh	Roousey Koe	Phnom Penh Thmey	2	1
		Khmuonch	1	
		Kilometer 6	1	2
		Svay Pak	1	
	Dongkor	Prey Sar	7	1
		Kring Pon Ror	3	
Cheng Ek		1		
Kandal	Kien Svay	Kbal Koh	1	1
		Prek Eng	2	
	Lovea Em	Sarikakoe	2	2
	Ponhea Leu	Ponheapong	5	
	Angsnoul	Damnak Ampil	2	3
Kampong Cham	Kampong Siem	Koh Samrong	5*	
		Srak	6	
	Cheung Prey	Preycha	5	
		Sromor	5	
Siem Reap	Chikreng	Tlok Krom	4	1
		Pongror Krom	5	
	Siem Reap	Sla Krom	5*	
		Sro Ngea	5	
Takoe	Samrong	Khao	2	
		Chumreah Pen	2	1
		Sla-TK	5	
	Tramkak	Sronong	4	
		Taphem	2	3
Grand total			83	15

* = Farms officially confirmed with HPAI outbreak.

Black boxes represent districts or communes, officially confirmed with HPAI outbreak.

Table 12: Distribution of interviewed poultry smallholders.

- 84 raising chickens only: 83 were analysed (included 2 officially HPAI infected farms); one farm was excluded from analysis since this farm had more than 200 heads).
- 15 raising both chickens and ducks
- 1 farm raising ducks only was interviewed but not analysed.

I.A. Results of the survey on 83 smallholders raising chickens only

- The **average number of chickens per farm** was stable from January 2003 till January 2004 (around 40 heads). In July 2004, this number had decreased by 40% and was only 24 heads (Figure 4). Figure 5 show that farms were much less diverse in terms of number of poultry kept in July 2004 compared to July 2003.

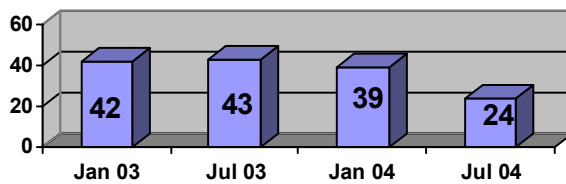
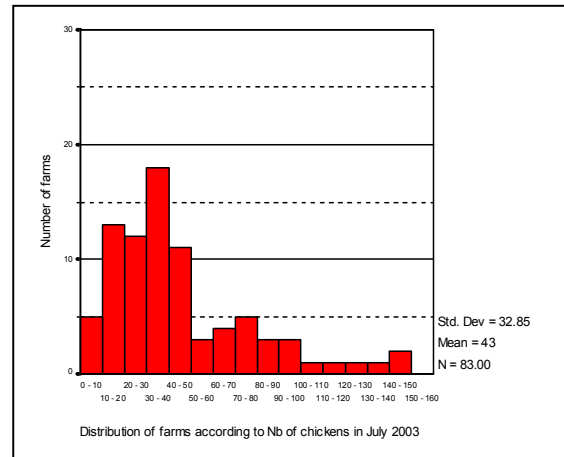


Figure 4: Evolution of average number of chickens per small-scale farm in 2003 and 2004.

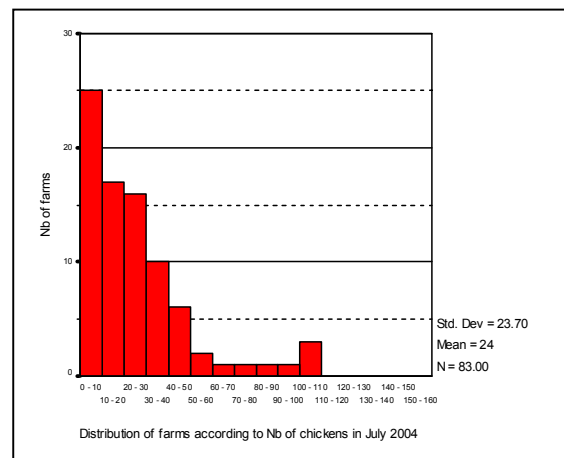


Figure 5: Distribution of poultry smallholders according to number of chickens in July 2003 & July 2004.

- The cost of the building & equipment for the chicken raising activity is around 37,000 riels (9 USD), and its productive life-span around 6 years. The **depreciation cost** was therefore estimated to be around 500 riels / month (0.12 USD).
- Out of 83 farms, there was only one **purchase of chicks** in 1st semester 03 (40 chicks), one in 2nd semester 03 (40 chicks) and two in 1st semester 04 (112 chicks). Only 2 farms out of 83 bought chicks (both from Takeo). Chicks were bought from other smallholders, at the same price whether in 2003 or 2004 (1,500 riels per head).

- Out of 83 farms, there were 8 **purchases of chickens** in 1st semester 03 (24 heads), 2 in 2nd semester 03 (7) and 11 in 1st semester 04 (29). These chickens were bought in the neighbourhood (1 farm) and from a middleman (1 farm).
- **Feed purchased.** In the economic assessment of animal production, the feed cost is extremely important since it usually represents the main cost out of all inputs. However, in small-scale chicken enterprises, this is very difficult to assess due to low and irregular quantities, absence of any records and use of many ingredients, most of them produced by the farm. The cash spent on buying animal feed (whether raw material or commercial feed) is around 48,578 riels (6USD) per farm in 2003. During the first 6 months of 2004, it was 19,882, indicating a slight decrease.
- **Other cash expenses.** Apart from expenses on animal health care, there is no other cash expenses (disinfection, contract-in manpower, biosecurity, stamping-out). There was an increased in **animal health care expenses** during 1st semester 2004 (2,442 riels), compared to 2003 (2,624 riels for the entire year). This could be related to HPAI but no information is available to confirm.
- **Total cash expenses.**

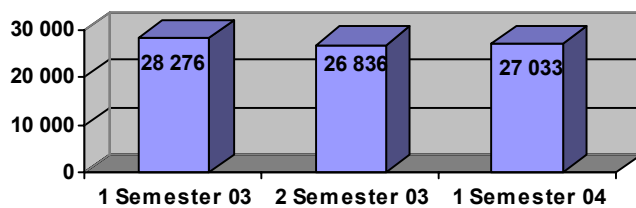


Figure 6: Average of total cash expenses per farm (riels)

- **Selling chickens.** 66 (80%) farms sold chickens in 2003. Between 1st January & 31st July 2004, 53 (64%) sold chickens. There was a 25% decrease in the number of chickens sold between 1st semester 03 and 1st semester 2004, which resulted in a 20% decrease income. In January 2004, smallholders were still able to sell chickens (3 per farm on average). During February & March 04, numbers sold were greatly reduced (1 & 0.5 heads respectively). The graphs below shows that, although there were more chickens sold in January compared to July 2004, incomes were higher in July. This is explained by the difference in prices which was still increasing in July (see evolution of the price for chickens bought by middlemen later in the same part of this report).

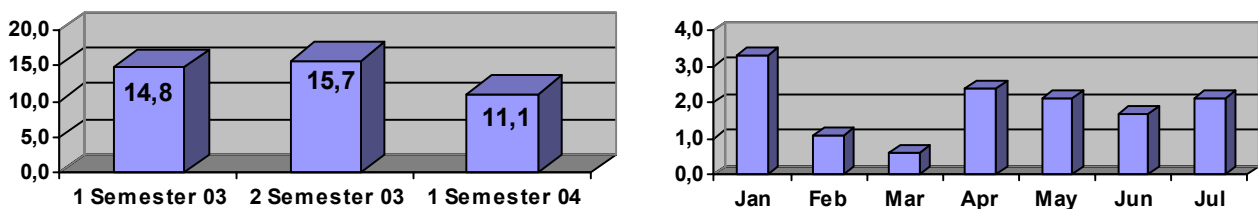


Figure 7: Average number of chickens sold per farm (heads)

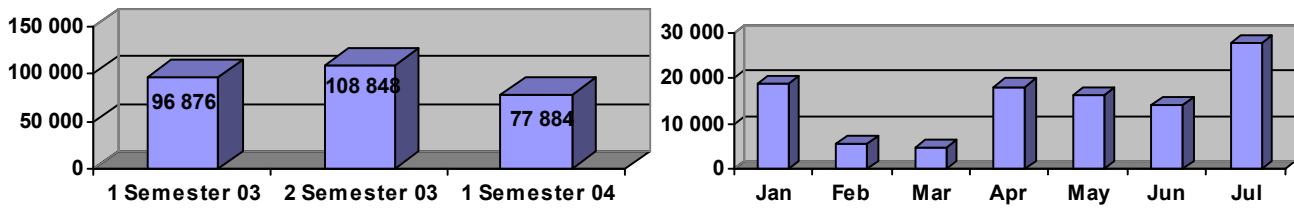


Figure 8: Average income from chickens sold per farm (riels)

- Mortality.** The mortality rate was on average around 16% in January 2004 and 5% in July 2004. It is not possible here to confirm that this mortality was due to HPAI, since the data collected did not allow for calculation of a mortality rate in 2003, and since mortality rate per month is not accurately reported in the literature. However, literature usually reports a higher mortality rate in March / April. A “normal” mortality rate in chickens raised by smallholders in Cambodia can be estimated to be around 5% per month. This is when no major outbreak of fatal diseases is observed. Also, farms which were not officially reported as HPAI infected experienced a similar mortality rate.

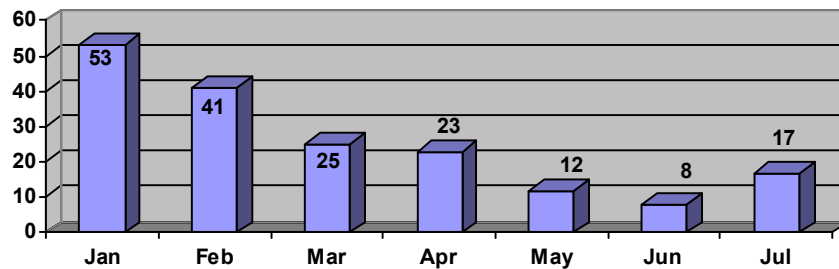
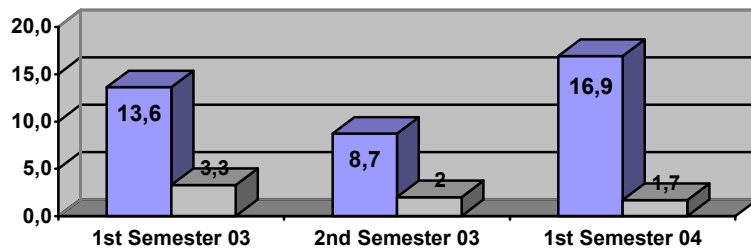


Figure 9: Percentage of farms reporting chicken mortality during 2004.

Figure 10: Average number of chickens dead (1st bar) and number of dead chicken eaten (2nd bar).



	% Mortality in Chickens		
	Officially HPAI (2)	Others (81)	All (83)
January 2004	13%	16%	16%
July 2004	0%	5%	5%

Table 13: Mortality rate in chickens in HPAI declared farms and non declared farms.

- **Eating & giving chickens.** Chinese New Year is not importantly celebrated in the countryside (no increase in chicken consumption observed). There is an increase in chicken consumption by smallholders at the period of the Khmer New Year (around 15th April). The Khmer New Year is the occasion for big meals particularly in the countryside (people who have migrated to the city usually go back to their native place at this occasion).

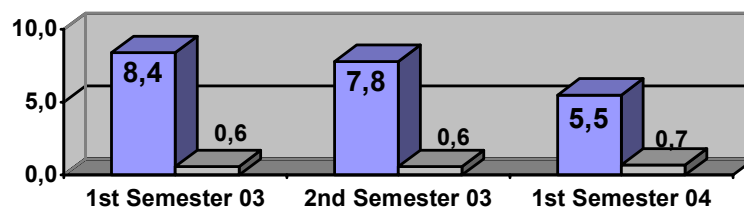


Figure 11: Average number of live chickens eaten (1st bar) and given (2nd bar).

- Unsold chickens due to low price in 2004.

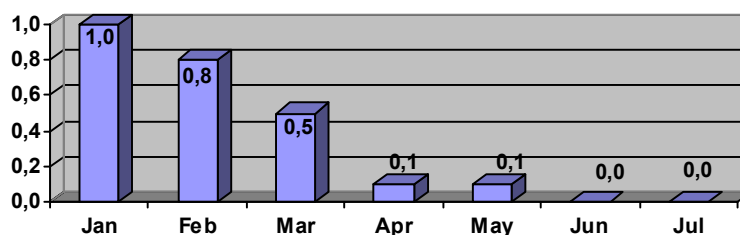


Figure 12: Average number of chickens unsold in 2004.

- **Eggs.** Both in 2003 and in 2004, there was no report of eggs being sold by the 83 farms. In small-scale / backyard poultry raising in Cambodia, eggs are usually to produce chicks for the farm. Few families eat a small number of eggs. During January & February 2004, no smallholders reported having eaten eggs. Consumption of eggs by the family seems to be quite irregular: the average numbers of eggs eaten by a farm during an entire semester were 4, 0 and 1.2 respectively for 1st semester 03, 2nd semester 03 and 1st semester 04.

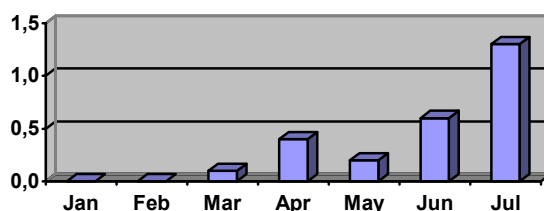


Figure 13: Number of eggs eaten per farm in 2004.

- **Profit** per one semester is presented in the graph below. To obtain the profit after depreciation of initial investment, 2,957 riels must be taken out for each semester. **There was a decrease of 28% in profit made from 1st semester 2003 to 1st semester 2004.**

	1S 03	2S 03	1S 04	2S 04
Sales of chickens	96 876	108 848	77 884	
Sales of eggs	0	0	0	
TOTAL OUTPUTS	96 876	108 848	77 884	
Purchase of chicks	723	723	2 014	
Purchase of chickens	1 940	500	2 695	
Feed costs	24 289	24 289	19 882	
Veterinary costs	1 312	1 312	2 442	
Disinfection	12	12	0	
Labour costs (not including family)	0	0	0	
Other costs	0	1	2	
TOTAL COSTS	28 276	26 837	27 035	
PROFIT	68 600	82 011	50 849	
PROFIT (including Depreciation Costs)	65 642,8	79 053,8	47 891,8	
Number of chickens eaten & given	9,0	8,3	6,2	
Number of chickens at the beginning of semester	42,0	43	39	24

Table 14: Calculation of poultry enterprise profit in 83 smallholders (riels).

- **Additional incomes.**
 - Only one farm (officially confirmed as infected by H5N1), in Siem Reap, received **compensation** from the State to destroy 10 chickens (60,000 riels / 15 USD). This is included in the above calculation.
 - An additional income was probably obtained due to the increased price per kilogramme of pig². We estimate that 50% of the smallholders sold one pig of 60kg at a price 500 riels higher than normal (at market, the price was up to 1,500 higher than normal). This means an additional income of 30,000 riels for these families, therefore **15,000 riels on average.**
- **Additional costs.** Between January & July, no additional costs were observed. However, since the number of chickens per farm in July 2004 is around 44% less than it was in July 2003, there is a loss in capital or there will be an additional cost to get back to the normal number. The loss of capital can be estimated to be around **190,000 riels** (19 chickens x 10,000 riels).

² In the design of this study, it was planned to measure this indicator, but a mistake was done in the writing of questionnaire and the question was not asked properly.

- **Food expense of household.** The average food expense (in cash) per month per household was similar in 2003 & 2004: around 200,000 riels / 50 USD. The average number of persons per household was 5,5 (3,7 adults & 1,8 children). The average food expense per month per person can therefore be estimated to be around 36,000 riels / 9 USD.
- On average, smallholders reported that the cash income from poultry represented 12,6% and 9,1% respectively in 2003 and 2004 of the household cash income.

I.B. Results of the survey on 15 smallholders raising chickens and ducks

- The following results gather the data from 15 “chickens & ducks” smallholders (less than 200 heads) interviewed. None of them was confirmed as infected by H5N1.

- The average number of ducks per farm seems to remain stable (between 5 & 13 heads), even in 2004.

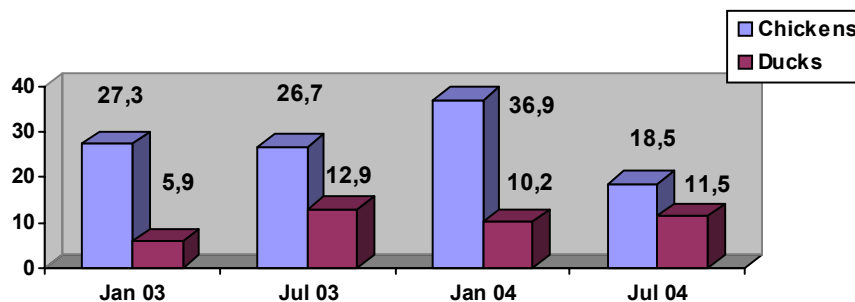


Figure 14: Average number of chickens and ducks per farm (heads)

- Profit.

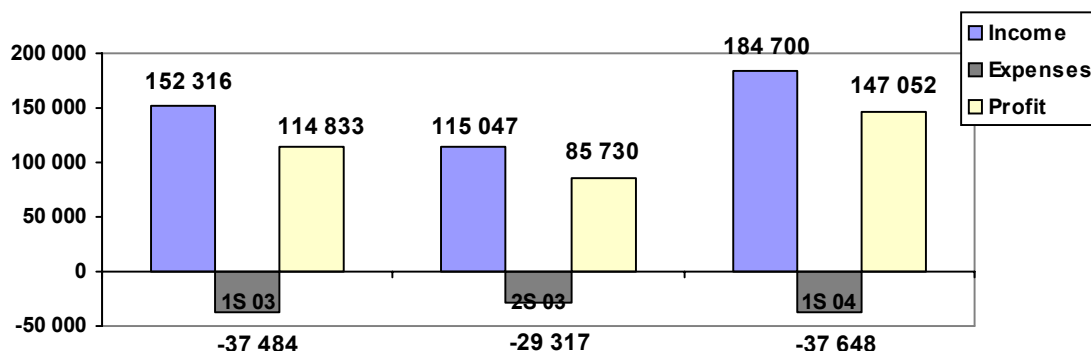


Figure 15: Average cash incomes, expenses and profit per farm raising both chickens and ducks (riels).

- It is difficult to comment the results of this analysis. The increase in profit might be biased by the small size of the sample. Alternatively, it could be explained by the increase observed in number of duck eggs sold in 2004.

I.C. Other results

- 36% of 100 interviewed smallholders reported to have changed their food habits during HPAI.
- 99% said that they would continue poultry activities.
- The table below presents the type of support that smallholders would have needed during HPAI, would need for the next few months and for the long term. Technical training and information, supply in veterinary products and provision of cash & credit are the most frequent answers. Prevention of HPAI and monitoring of the animal health situation in villages are also an expressed need.

	Jan-Jul 04		Jul-Dec 04		Long Term	
Money	6	6%	5	4%	4	3%
Credit low interest rate	1	1%	6	5%	9	7%
Credit in animals	5	5%	15	13%	15	11%
Technical information & training	10	10%	30	27%	46	34%
Prevention of HPAI	18	17%	4	4%	7	5%
Monitoring of AH in villages	6	6%	1	1%	4	3%
Veterinary products	22	21%	24	21%	23	17%
Animal Feed			1	1%	1	1%
Poultry building			1	1%	3	2%
Support the market				0%	2	1%
Land					1	1%
No idea	36	35%	25	22%	19	14%
Total	104	100%	112	100%	134	100%

Table 15: Type of support requested by poultry smallholders during and after HPAI.

- Around 80% of smallholders seem to conduct their livestock activity without asking or having access to any support from service providers for all animal health care, technical advice and credit. Still, for animal health care and technical advice, Village Animal Health Workers are the most frequently people called.

II. Results on commercial broiler farms.

- Data was analysed from 20 commercial broiler farms interviewed between end of July & mid-August 2004:
 - 12 private chicken broiler farms
 - 4 integrated chicken broiler farms
 - 4 private duck broiler farms.

Table 16: Distribution of 21 commercial broiler farms according to location & HPAI status

Province	District	Commune	Nb of private "chicken" farms	Nb of integrated "chicken" farms	Nb of "duck" farms	
Phnom Penh	Roeusey Koe	Chraing Chamres	1			
		Khmuonch	1			
		Kilometer 6	1			
	Dongkor	Prey Sar				1
		Kring Pon Ror			1	
		Dangkor				1
		Lorkambor				1
Kandal	Kien Svay	Prekthmey	1 (1)			
		Prek Eng	1			
	Takhmoa	Prek Ho	2			
	Angsnoul	Damnak Ampil		3		
Siem Reap	Siem Reap	Sla Krom	2			
		Sala Kamroek	1 (1)*			
		Kampong Kdey	1*			
		Kochek	3			
Takeo	Tramkak	Sronong			3	
			Total Interviewed	14	4	6
			Total analysed	12	4	4

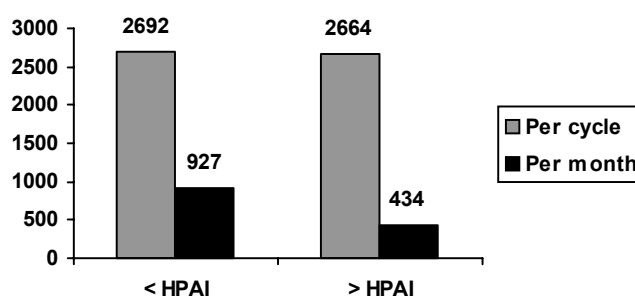
- In brackets is the number of farms officially confirmed as HPAI infected.*
- * = excluded from analysis.*
- Black boxes represent district or communes, officially confirmed with HPAI outbreak.*

II.A. Results of the analysis on 12 chicken broiler private farms

- 14 of these farms were interviewed. Two farms were excluded from analysis (one was not in activity in 2003; one provided unrealistic data on feed costs).
- In the following results, the “normal period” or “before HPAI” is the period that relates to the cycles that were completed between January 2003 and January 2004. The “HPAI period” or “during & after HPAI” is the period that relates to the cycles that started or that were completed after 1st January 2004.
- Before HPAI, 3.7 cycles were completed over a period of 10.5 months. During and after HPAI, 1.1 cycles were completed over a period of 7.4 months.
- Before HPAI, farmers were operating on a rate of 4.2 cycles per year. From January 2004 onwards, they were on a rate of 1.8 cycles per year.
- On average, farmers reported that in 2003 the duration of one cycle (period between entering of chicks and exit of broilers) was 55 days (2 months – ranging from 45 to 80 days).
- Farmers reported that the profit from the poultry activity represented **63%** of the family’s profit (ranging from 10 to 100%).
- **Manpower:** Before the HPAI epidemic, around 3 family members were working per farm. In addition, 2,2 persons were employed (always men). After HPAI, this number decreased to 1,3 employees. The cost for employees’ salaries decreased from 47 to 28 USD / month / farm.
- **Investment & Depreciation Costs.** Total initial investment was on average 2,697 USD. Depreciation Cost was estimated to 33 USD per month.
- **Animal purchased.** Nine farms (75%) buy chicks that are imported from Thailand through agents; 3 buy from CP.

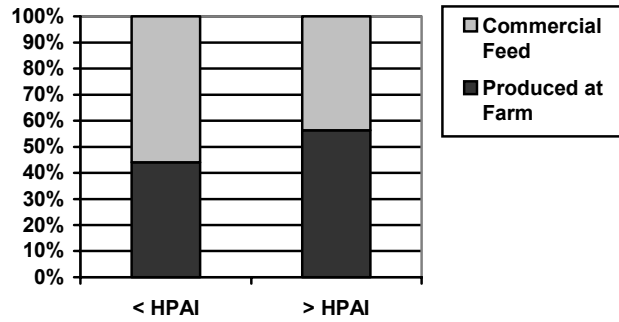
Before HPAI	Nb Mini Maxi Mean			
Nb of cycles	12	2	5	3,7
duration of period in months	12	7	12	10,5
After HPAI				
Nb of cycles	12	0	2	1,1
duration of period in months	12	7	9	7,4

Figure 16: Average number of chicks bought per farm (heads)



- **Feed.** As shown in the figure below, farmers seem to have increased the proportion of “made at the farm” animal feeds in order, and decrease the expenses on commercial feed, during HPAI.

Figure 17: Relative importance of “commercial feed” and “home-made feed” before and after HPAI.



- **Other costs include:** coal, electricity, gas, rice husk, water, transport, building rental costs, land rental costs, telephone, petrol.
- **Selling price of broilers.** The price per kg of broiler was stable in 2003 (around 4,000 riels). Then, it suddenly dropped to 1,500 riels during January & February. Few farms only sold broilers afterwards at a price equivalent or higher than before the epidemic.

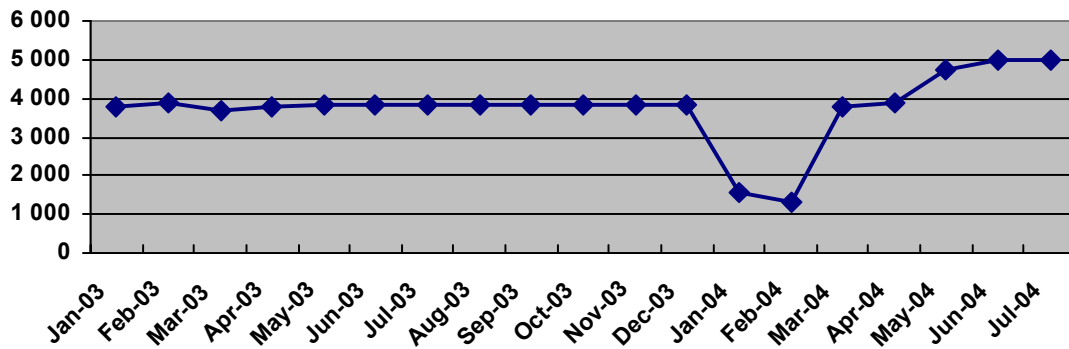
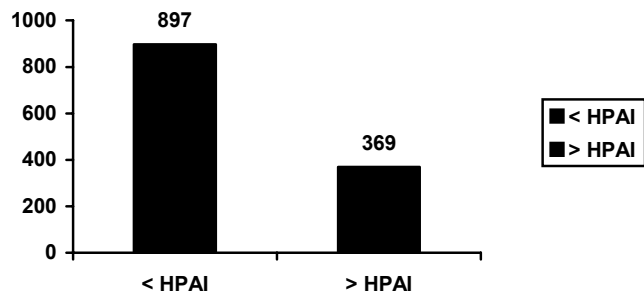


Figure 18: Price of chicken broilers sold by private farms (riels / kg)

- **Marketing broilers.** Most of the broilers are sold to middlemen, apart from one farm who sells to CP. The number of broilers sold per month after January 2004 dropped from 897 heads to 369 heads on average.

Figure 19: Average Number of Broilers sold per farm (heads)



- The figure below shows the variation of monthly profits before and after HPAI for each of the 12 farms. Only one farm managed to make profits from cycles conducted during and after HPAI. Two managed to keep a balance between expenses and incomes. For the majority (9 farms), cycles conducted during and after HPAI showed losses.

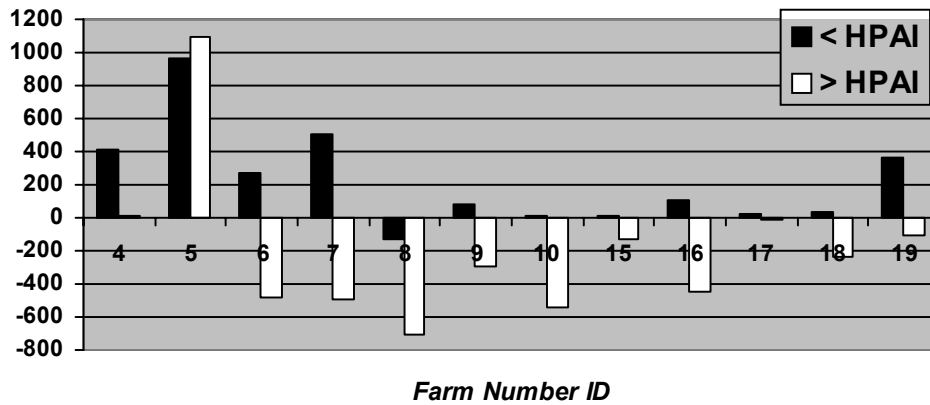


Figure 20: Average monthly profit for each of 12 private broiler farm before and after HPAI (USD)

	Per Month		Per Cycle	
	< HPAI	> HPAI	< HPAI	> HPAI
Sales of chickens & manure	1609	497	4652	2430
TOTAL OUTPUTS	1609	497	4652	2430
Chicks	361	168	1 035	1 020
Feed	849	400	2 511	2 539
Veterinary	58	39	175	260
Desinfection	6	4	17	29
Employees	47	28	141	154
Depreciation cost	33	33	11	207
Other	34	19	95	100
Biosecurity		1		5
TOTAL COSTS	1 388	691	3 984	4 315
PROFIT	221	-194	668	-1 885

Table 17: Calculation of poultry enterprise profit in 12 private broiler farms before and after HPAI (USD).

- After HPAI, the average duration of inactivity was 4,4 months (range from 0 to 6).

- 9 farms stopped and had not started again in July 2004. 6 out of 7 farms interviewed in Siem Reap.
- 2 farms stopped and are again in activity in July 2004. [Farms Number ID = 4 & 10]
- 1 farm did not stop. [ID = 5]
- However, all the farmers said that they wanted to continue or restart this activity.
- None of these 12 farms (included one infected farm) received a compensation for their losses. The infected farm (excluded from the analysis) received 6 USD in total.
- Additional costs: destruction of animal feed = 34.5 USD per farm
- Additional incomes: none.
- Out of 13 interviews, there was only one report for risky behaviour with poultry products that could have been infected (through eating, selling or giving).
- 6 (46%) reported to have change their food regime during the epidemic and 7 no.
- 9 (70%) reported that they wanted to continue or restart this activity. Two moved to pig raising; one does not know yet what he will do because he has no capital; another one is afraid that HPAI will occur again.
- The table below presents the requests from the farmers regarding what support they would have needed during and immediately after the HPAI crisis, what they would need in the short term and in the long term. Compensation & support to marketing were most frequent answers for the HPAI period; vaccine & support to marketing for the short term; technical training for the long term.

	Jan-Jun 2004		Jul-Dec 04		Long Term	
	Nb	%	Nb	%	Nb	%
Technical information / training			1	8%	5	25%
Compensation	4	29%		0%		0%
Support marketing of poultry	4	29%	2	15%	3	15%
Vet Products incl. vaccine against HPAI	2	14%	4	31%	3	15%
Prevention of HPAI	2	14%		0%	2	10%
More linkage with suppliers of feed / vet products		0%	1	8%		0%
Credit with low interest rate		0%		0%	1	5%
Transparency of law enforcement		0%		0%	2	10%
Ban import of poultry from abroad		0%		0%	1	5%
No idea	2	14%	5	38%	3	15%
Total	14	100%	13	100%	20	100%

Table 18: Type of support requested by broiler private farms during and after HPAI.

II.B. Results of the analysis on 4 chicken broiler integrated farms

USD	Per Month		Per Cycle		Per Broiler sold	
	< HPAI	> HPAI	< HPAI	> HPAI	< HPAI	> HPAI
Expenses	14	18	37	56	0,01	0,02
Incomes	77	67	185	218	0,07	0,08
Profit	63	49	148	162	0,05	0,06

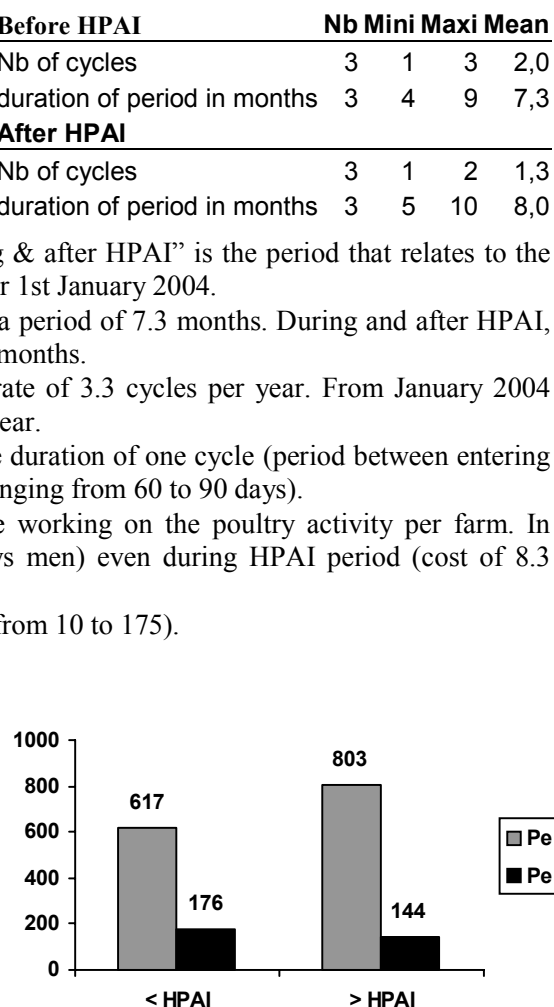
II.C. Results of the analysis on 4 duck broiler private farms

- 4 of these farms were analysed (2 in Phnom Penh and 2 in Takeo). None of these farms were infected by HPAI. Two others were interviewed and then excluded (no activity in 2003).
- Results were analysed separately between a group of 3 small farms and 1 bigger farm (ID 13).

3 SMALL DUCK FARMS

- In the following results, the “normal period” or “before HPAI” is the period that relates to the cycles that were completed between January 2003 and January 2004. The “HPAI period” or “during & after HPAI” is the period that relates to the cycles that started or that were completed after 1st January 2004.
- Before HPAI, 2 cycles were completed over a period of 7.3 months. During and after HPAI, 1.3 cycles were completed over a period of 8 months.
- Before HPAI, farmers were operating on a rate of 3.3 cycles per year. From January 2004 onwards, they were on a rate of 2 cycles per year.
- On average, farmers reported that in 2003 the duration of one cycle (period between entering of chicks and exit of broilers) was 75 days (ranging from 60 to 90 days).
- Manpower: Around 3,7 family members are working on the poultry activity per farm. In addition, 0.3 persons were employed (always men) even during HPAI period (cost of 8.3 USD / month / farm).
- Average investment cost = 67 USD (ranging from 10 to 175).
- Animal purchased. All 3 farms buy ducklings imported from Vietnam through middlemen. The price was 1,950 before HPAI and 2,400 riels from March 2004 onwards.

Figure 21: Average Number of Ducklings bought per farm (heads).



- Other costs include: coal, rice straw, petrol.
- **Cost of Inputs.** Expenses were not reduced during the HPAI period.

USD	Per Month		Per Broiler sold	
	< HPAI	> HPAI	< HPAI	> HPAI
Total Expenses	340	342	2.1	4.4

- **Selling price of broilers.** There was a drop in the price of duck broilers sold by these 3 farms during January & February. Then the price increased upto 5,000 riels (more than in 2003).

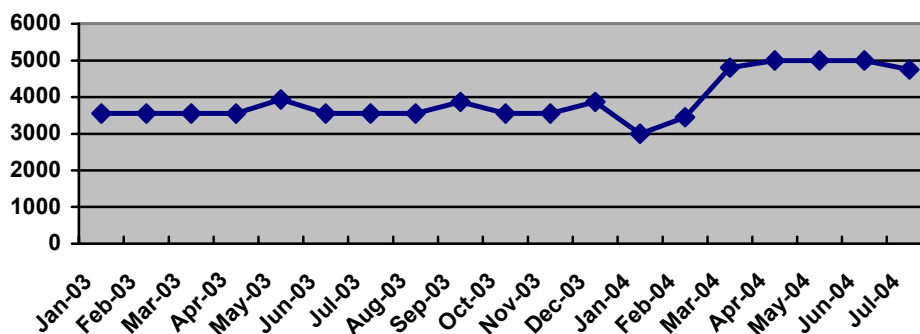


Figure 22: Price of duck broilers sold by private farms (riels / kg)

- **Marketing broilers.** All broilers are sold to middlemen. The number of broilers sold per month after January 2004 decreased from 164 to 111 heads.
- One farm reported 500 dead ducks in early 2004 from a batch of 600 bought in November 03.
- **Incomes** were calculated from selling broilers. A decrease was observed but not so important.

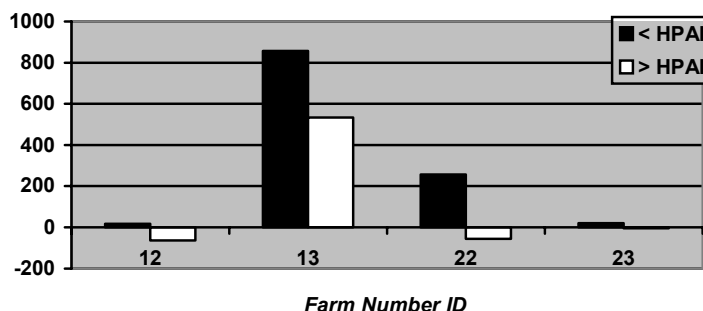
USD	Per Month		Per Cycle		Per Broiler sold	
	< HPAI	> HPAI	< HPAI	> HPAI	< HPAI	> HPAI
Incomes	439	303	1574	1549	2,9	2,6

- **Profit.**

USD	Per Month		Per Cycle		Per Broiler sold	
	< HPAI	> HPAI	< HPAI	> HPAI	< HPAI	> HPAI
Profit	98	-41	428	-279	0,83	-1,78

- The figure below shows the variation of monthly profits before and after HPAI for each of the 3 farms (plus the big farm).

Figure 23: Average profit per month for each of 4 commercial duck farms (USD)



- After HPAI, 2 farms stopped and one was still in activity.
- No compensation was received for losses.

1 BIGGER DUCK FARM

- Investment cost = 600 USD (10 times more than the 3 small farms)
- 4 family members working on this activity; no employees.
- The bigger farm had a contract with a middleman in Phnom Penh. The middleman bought the broilers at a price of 3,600 riels / kg from Jan 03 to March 04, then of 4,000 riels (although the market price at that time was around 6,000 riels, according to the farm’s owner).

USD	Per Month		Per Cycle		Per Broiler sold	
	< HPAI	> HPAI	< HPAI	> HPAI		
Expenses	1936	1405	5809	6323	1,67	1,82
Incomes	2815	1960	8444	8820	2,43	2,54
Profit	857	534	2572	2403	0,74	0,69

III. Results on commercial chicken layer farms

- Data was collected from 17 commercial chicken layer farms interviewed between end of July & mid-August 2004. 1 farm was excluded from data analysis due to incoherent data.
- 27 commercial duck layer farms were also interviewed but data could not be analysed (questionnaire not designed in an adequate manner; etc.).
- Nine farms buy day old chicks (mainly from Thailand except one from Vietnam), raise them when pullets and then raise them when layers. Eight farms buy pullets (mainly through CP) and then raise them when layers. These farms were not contracted, neither integrated with CP.
- 65 % of farmers did not stop their activity during 2004, 12% had an outbreak but restocked few months later, 23.5% had an outbreak and had not restocked yet.
- The average duration of laying is 14.8 months.
- Farmers reported that the profit from the poultry activity represented 87% of the family's profit (ranging from 30 to 100%).
- All farms except one use animal health and technical advice services from either State Veterinarians or Feed / Veterinary Company.

	For Animal Health		For Technical Advice		For Credit	
	Nb	%	Nb	%	Nb	%
Animal Health Worker						
State Veterinarian	7	41%	8	44%		
Company (Vet / Feed)	9	53%	9	50%		
NGO						
No one	1	6%	1	6%	8	57%
Relative					4	29%
Bank					2	14%
Total	17	100%	18	100%	14	100%

Table 19: Use of livestock-related services.

- As shown in the table below, the level of initial investment for these farms (especially for the ones starting with DOC) is very high.

	Nb	Mini	Maxi	Mean
Total Investment Cost for farms startiing with pullets (USD)	8	950	19300	10562
Total Investment Cost for farms startiing with DOC (USD)	8	5250	40250	16036
Depreciation Cost per month for farms startiing with pullets (USD)	8	8.3	133.3	66.3
Depreciation Cost per month for farms startiing with DOC (USD)	8	30.2	265.3	132.2

Table 20: Investment and depreciation of 16 commercial chicken layer farms.

- Eggs are sold to middlemen, market retailers, bakeries. Old layers are sold to middlemen. Most of the manure is sold.

- The egg production for the group of farms declared as HPAI infected started to decrease in December 2003. The group of farms not infected by HPAI experienced a decrease in egg production during January, February and March 2004 (Figure 25).
- The price of eggs was stable in 2003 (around 180 riels). Then, it suddenly and significantly dropped to 110 riels during January, February & March 2004. The average price started to increase again in April to reach a level (210 riels / egg) in July 2004 which was higher than in 2003 (Figure 26).
- The decrease in egg production for non-infected farms is probably due to reduction in feeding of animals. The high price of eggs after March 2004 can be explained by the shortage of egg supply while the market demand had recovered.

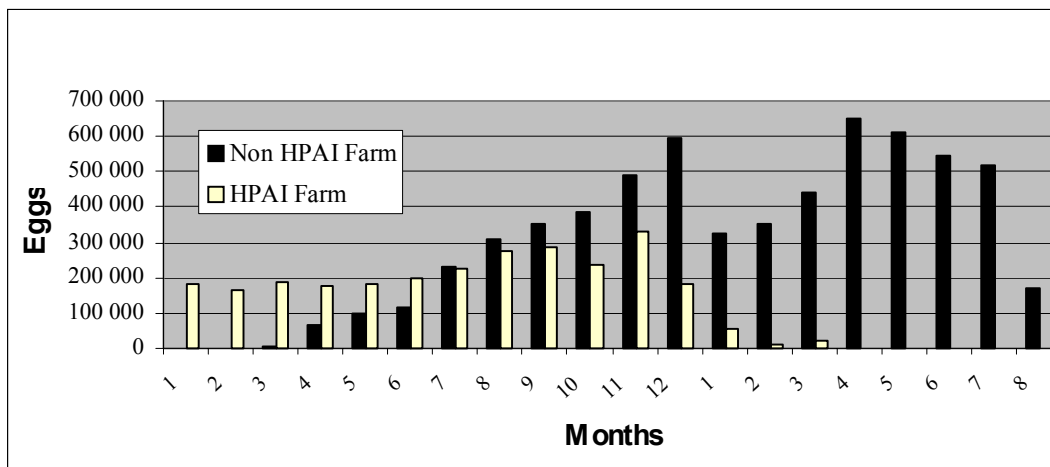


Figure 24: Average quantity of eggs produced according to HPAI statut of farms in 2003 and 2004.

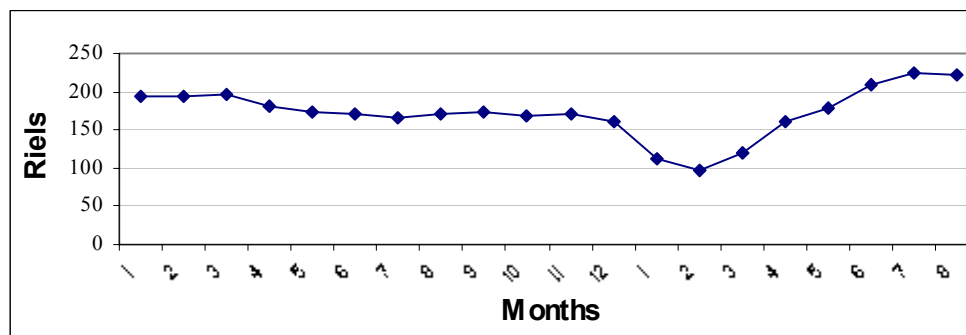


Figure 25: Evolution of price of eggs sold by commercial chicken layer farms in 2003 and 2004.

- Expenses were stable between July 2003 and July 2004, with a slight decrease during 1st quarter 2004. On the contrary, incomes greatly decreased in March, February and March 2004. During 2nd quarter 2004, incomes went back up again and reached a level higher than in 2003. The calculation of expenses and incomes is shown in Figure 27 below. This figure is useful to show the variation of incomes and expenses but the real monthly expenses might be different from the amounts indicated in the Figure. Indeed, the calculation of expenses for these farms was very difficult, in particular because this poultry activity runs over more than one year.

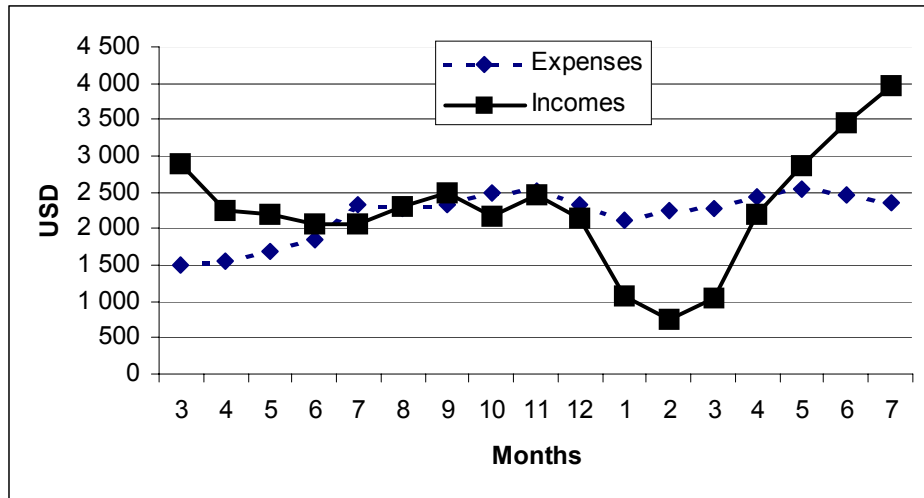


Figure 26: Average monthly expenses and incomes of commercial chicken layer farms in 2003 and 2004.

- None of these farms, even the infected ones, received a compensation for their losses.
- Out of 17 interviews, there were only two reports of risky behaviour with poultry products that could have been infected (through eating). However, the sale of manure was not reported as a risky behaviour (all the farms that had been infected sold the manure).
- 14 (82%) reported that they wanted to continue or restart this activity. One moved to crocodile raising; one does not have capital; another one is afraid that HPAI will occur again.
- As shown in the below table, Compensation & credit with low interest rate were most frequent answers for the HPAI period; prevention of HPAI for the short term; support marketing and technical training for the long term.

IV. Results on Middlemen and Market Retailers.

IV.A. Results on middlemen

Table 21: General information on the 22 middlemen interviewed

Id	Province	Type	Trade	Buy from who?	Buy from where?	Sell to who?	Sell where?
1	Prey Veng	By car	Chicken	Moto & Bicycle M	Prey Veng	Market retailer	Phnom Penh
2	Phnom Penh	By car	Chicken	Moto M	Svay Rieng	Market retailer	Phnom Penh
3	Kampong Chhnang	By car	Chicken	Moto M	Pursat	Market retailer	Phnom Penh
4	Kampong Chhnang	By car	Chicken	Moto M	Pursat	Market retailer	Phnom Penh
5	Kampong Thom	By car	Chicken	Moto M	Kampong Thom	Market retailer	Phnom Penh
6	Prey Veng	By moto	Chicken	Smallholder	Prey Veng	Market retailer	Phnom Penh
13	Kandal	By moto	Chicken	Smallholder	Kandal	Market retailer	Kandal
14	Kandal	By moto	Chicken	Smallholder	Kandal	Market retailer	Kandal
15	Kandal	By moto	Chicken	Smallholder	Kandal	Market retailer	Kandal
16	Kandal	By moto	Chicken	Smallholder	Kandal	Market retailer	Kandal
25	Siem Reap	By car & moto	Chicken + eggs	Commercial farm & CP	Siem Reap & PP	Market retailer, Moto M, Restaurant	Siem Reap
26	Siem Reap	By moto	Chicken + eggs	Commercial farm & CP	Siem Reap, PP, BB	Market retailer, Restaurant	Siem Reap
27	Siem Reap	By moto	Chicken	Smallholder & Bicycle M	Siem Reap	Market retailer	Siem Reap
28	Siem Reap	By moto	Chicken	Smallholder	Siem Reap	Market retailer	Siem Reap
29	Takoe	By moto	Chicken	Smallholder & Bicycle M	Takoe	Market retailer, Restaurant	Takoe
30	Takoe	By moto	Chicken	Smallholder & Bicycle M	Takoe	Car middlemen	Phnom Penh
31	Takoe	By moto	Chicken	Smallholder	Takoe	Car middlemen	Phnom Penh
32	Takoe	By moto	Chicken	Smallholder	Takoe	Car middlemen	Phnom Penh
37	Kampongcham	By moto	Chicken + Duck	Smallholder & Bicycle M	Kampong Thom	Market retailer	Kampongcham
38	Kampongcham	By moto	Chicken + Duck	Smallholder & Bicycle M	Kampongcham	Market retailer	Kampongcham
39	Kampongcham	By bicycle	Chicken + Duck	Smallholder	Kampongcham	Market retailer	Kampongcham
40	Kampongcham	By bicycle	Chicken	Smallholder	Kampongcham	Restaurant	Kampongcham

M= Middleman	PP= Phnom Penh	BB= Battambang
--------------	----------------	----------------

- 22 middlemen were interviewed. One was excluded from analysis (no activity in 2003).
- 21 traders in chicken; 2 in chicken eggs; 3 in ducks; 0 in duck eggs.
- Middlemen said that this activity represented 67% (21 answers) of the total family income in 2003, and 62% (20 answers) in 2004 (range from 10 to 100%).
- **Buying chickens.** In normal months of 2003, the average number of chickens bought per middlemen per month was around 4,600 heads (some bought 150, some 15,000). February & April (respectively Chinese & Khmer New Year) are months with higher trading.
- Prices were very stable (5,900 riels /kg, ranging from 3,900 to 7,000). A slight increase was noticed in April. Most of these middlemen buy chickens of local breed.

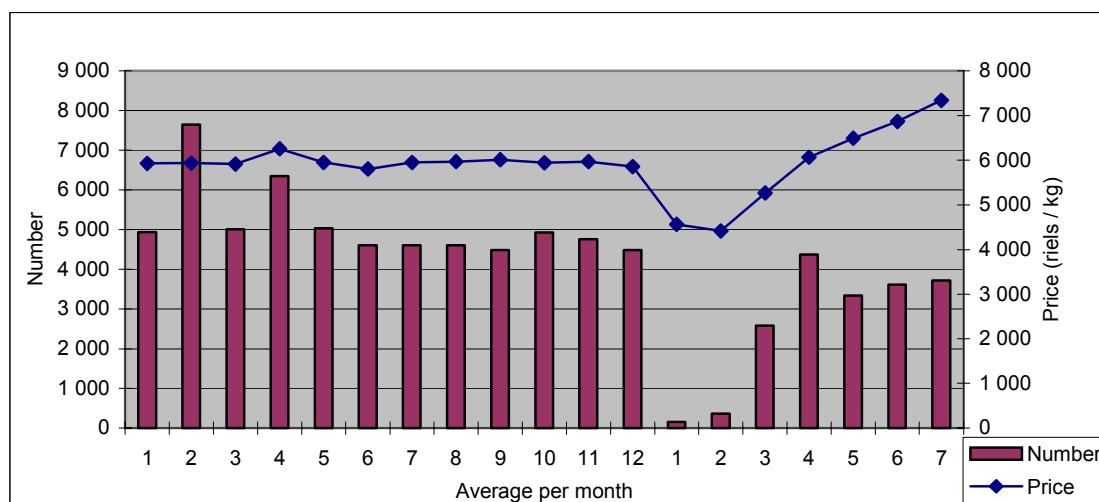


Figure 27: Average number and price of chickens bought by middlemen in 2003 & 2004.

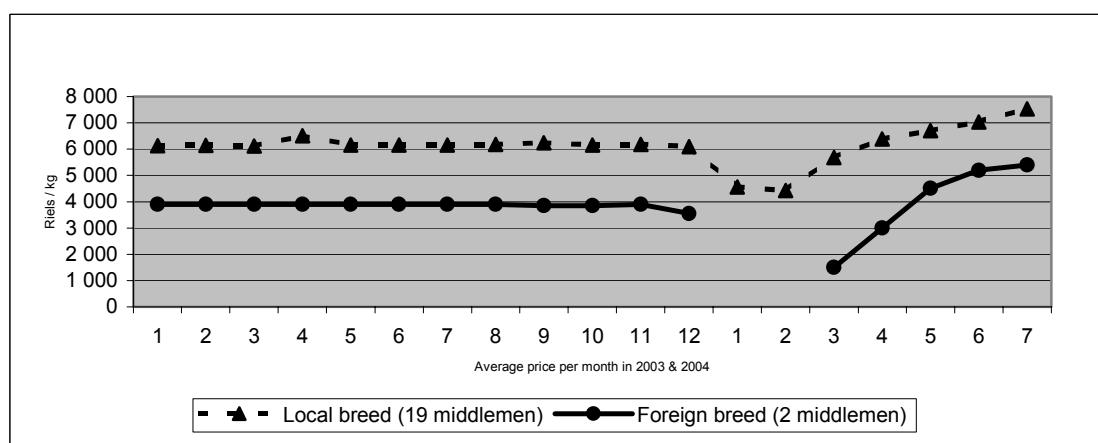


Figure 28: Buying price of chickens (by middlemen) according to breed in 2003 & 2004.

- Only 2 were trading chickens of foreign breed (ID25 & 26, from Siem Reap). In 2003, prices for local & foreign breeds were 5,000 - 7,000 riels and 3,900 riels/ kg respectively.
- **Buying ducks.** Only 3 duck middlemen (also trading chickens) were interviewed and therefore data is insufficient for proper analysis. All 3 from Kampong Cham province. Trading of ducks was mainly organised in April (around 140 heads on average during this month), both in 2003 & 2004, and non existent on most of the rest of the years. Prices also seem to increase in April.
- **Buying duck eggs.** None of the middlemen interviewed bought / sold duck eggs in 2003 & 2004.
- **Buying chicken eggs.** Only 2 middlemen were interviewed (also trading live chickens). Both were from Siem Reap, trading both “foreign breed” chickens and chicken eggs from commercial farms (including CP contracted farm). ID 25, a car middleman, stopped trading live chickens in January & February (then started again) and engaged into trading eggs: starting from 300 eggs / day in January to reach 1,500 eggs/ day in July 04. Price per egg

went from 50 riels in February 04 to 220 riels in July, i.e. 10% more than the price in 2003 (200 riels) reported in Siem Reap. ID 26's number of eggs bought per month went from 3,000 (2003), to 900 (January) to 4,000 (June). Middlemen reported to keep chickens between 0 & 1 day before selling them.

- **Selling chickens.**

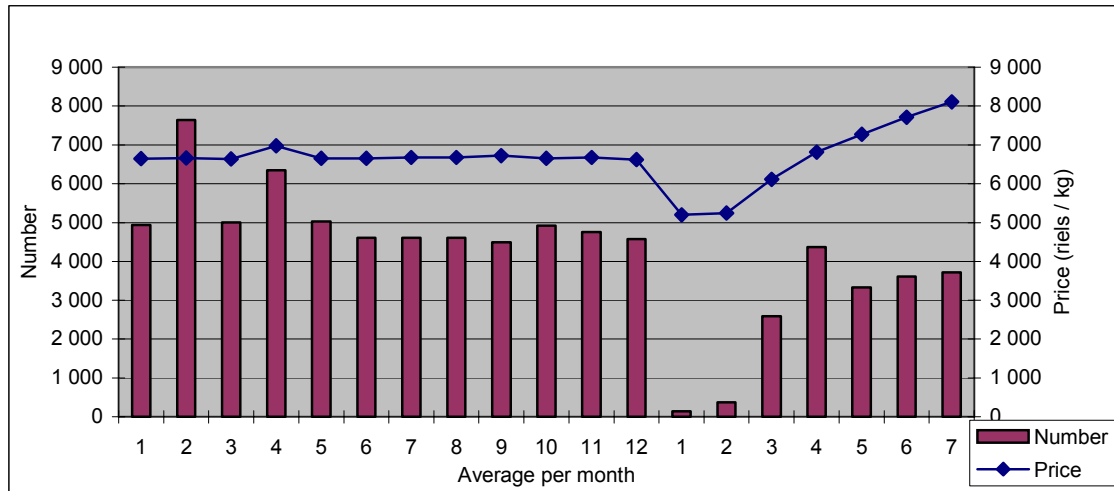


Figure 29: Average number and price of chickens sold by 21 middlemen in 2003 and 2004

- The **mortality rate of poultry** between the buying & selling was much higher in January & February 2004 (around 3.5 %) than compared to before and after (0.8%).

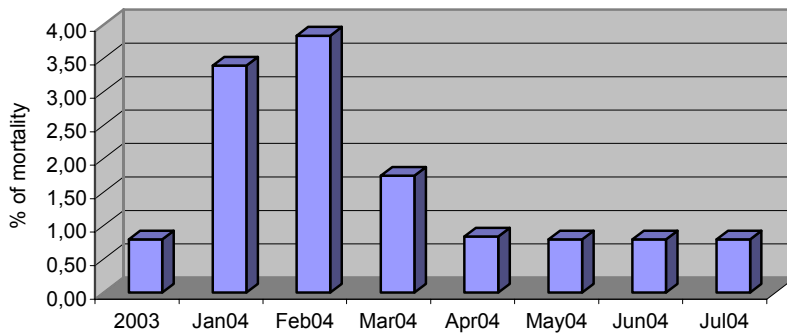


Figure 30: Percentage of poultry mortality between purchase & selling by middlemen.

- The **average profit** of 20 middlemen decreased by 55% between January & July 2003 and January & July 2004.

		Jan-Jul 2003	Jan-Jul 2004
		Mean	Mean
Total Expenses (riels)	20	315 566 085	170 465 421
Total Incomes (riels)	20	347 956 950	186 392 000
Profit (riels)	20	32 400 864	15 926 579
Average of % of profit margin of chicken traders	21	13	15
Total Expenses (USD)	20	78 892	42 616
Total Incomes (USD)	20	86 989	46 598
Profit (USD)	20	8 100	3 982

Table 22: Expenses, incomes and profits of middlemen in 2003 & 2004.

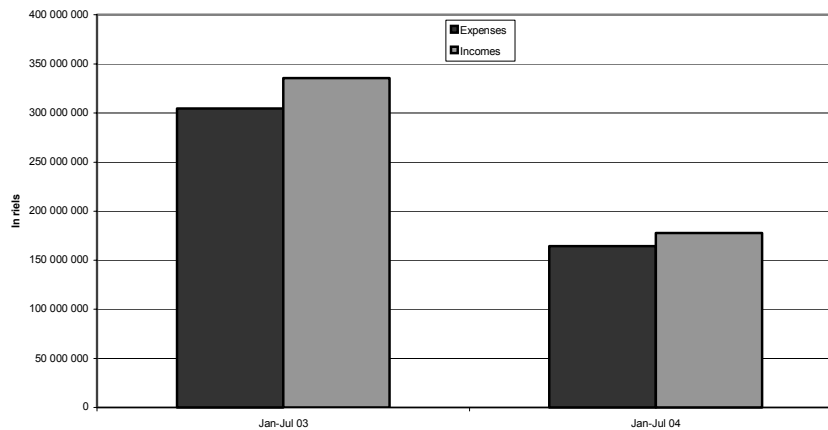


Figure 31: Comparison of average expenses & incomes of middlemen (poultry trading) between Jan-Jul 2003 and Jan-Jul 2004.

- Alternatives activities to compensate from the “poultry trading” decrease.

	Number	Percentage
No alternative activities	14	67%
Motorbike Taxi	4	19%
Pork Trading	2	10%
Egg selling	1	5%
Total	21	100%

Table 23: Alternative activities of middlemen to compensate from decrease in poultry trading.

- 16 (76%) out of 21 middlemen reported a stop in the poultry trade in January 04 (13 answers) or February (3 answers). 13 said that the poultry trade was banned by the State. Poultry trade restarted mainly in March for 14 middlemen (in February for one, in April for one). Five middlemen did not stop trading poultry.

	Jan-Jul 04		Jul-Dec 04		Long Term	
Money	3	14%	4	17%		
Credit			1	4%		
Support the marketing	1	5%	1	4%	2	9%
No idea	7	32%	3	13%	2	9%
Prevention of HPAI	7	32%	3	13%	7	30%
Eliminate corruption at "poultry" check point	4	18%	5	22%	5	22%
Decrease price of gasoline			2	9%	1	4%
Stable price for poultry in markets			2	9%	1	4%
Encourage farmers to restart / to develop			2	9%	3	13%
Ban import of infected poultry					1	4%
Transparency of trading					1	4%
Total	22	100%	23	100%	23	100%

Table 24: Type of support requested by middlemen during and after HPAI.

IV.B. Results on market retailers

Table 25: General information on the 22 market retailers interviewed.					
id	Province	Trade	Buy from who?	Buy from where?	Name of Market
7	Phnom Penh	Chicken egg	Commercial Farm + CP	Kampong Speu, PP	Oreoussey Market
		Duck egg	Car middleman	Takeo	Oreoussey Market
8	Phnom Penh	Chicken egg	Commercial Farm	Kampong Speu	Olympic Market
		Duck egg	Car middleman	Takeo	Olympic Market
9	Phnom Penh	Chicken egg	Car middleman	Kandal	Oreoussey Market
		Duck egg	Car middleman	Kampot	Oreoussey Market
10	Phnom Penh	Chicken	Car middleman	Kampong Cham	Olympic Market
11	Phnom Penh	Chicken	Car middleman	Prey Veng	Chba Ampov market
12	Phnom Penh	Chicken	Moto middleman	Svay Rieng	Chba Ampov market
17	Kandal	Chicken	Moto middleman	Kandal	Takhmoa
18	Kandal	Chicken	Moto middleman	Kandal	Takhmoa
19	Kandal	Chicken, Duck	Moto middleman	Kandal	Koky
20	Kandal	Chicken	Bicycle middleman	Kandal	Prek Phnov
21	Siem Reap	Chicken	Small holder & Bicycle M	Siem Reap	Kampong Kdey market
22	Siem Reap	Chicken	Small holder	Siem Reap	
23	Siem Reap	Chicken	Small holder & Moto M	Siem Reap	Phsa Chas
24	Siem Reap	Chicken egg	Small holder, Car M & CP	Siem Reap & PP	Phsa Leng
		Duck egg	Small holder & Car M	Siem Reap & PP	Phsa Leng
33	Takeo	Chicken	Bicycle & Moto M	Takeo	Takoe market
34	Takeo	Chicken	Moto middlemen	Takeo	Takoe market
35	Takeo	Chicken	Small holder & Bicycle M	Takeo	Angtasom market
36	Takeo	Chicken & Duck	Commercial Farm & Car M	Takeo	Angtasom market
41	Kampongcham	Chicken	Small holder & Bicycle M	Kampongcham	K.cham market
42	Kampongcham	Chicken	Small holder, Bicycle & Moto M	Kampongcham	Prey Chhor market
43	Kampongcham	Chicken & Duck	Small holder	Kampongcham	Phnom market
44	Kampongcham	Chicken & Duck	Small holder & Commercial Farm	Kampongcham	Skun market

- 22 market retailers were interviewed. 18 are trading chickens (including 4 trading also ducks); 4 are trading chicken and duck eggs. All these 18 trade products from local breed (except for chicken eggs).
- The 22 market retailers reported that this activity represented between 20 and 100% of the family income in 2003 (**average = 76%**) and between 10 and 100% in 2004 (average = 72%).
- **Buying chickens (18 retailers).** In 2003, the number of chickens bought per market retailer per month ranged between 240 and 12,000 heads (on average between 1,000 and 2,000 per retailer, per month). Highest level of activity is generally observed around February (Chinese New Year), April (Khmer New Year) and September (Festival of the dead). In 2003, average price per month went from 6,000 to 6,750 riels / kg. Again, the highest prices were observed in February, April and September 2003.
- **Buying ducks (4 of the 18 retailers).** In 2003, the number of ducks bought per market retailer per month ranged between 0 and 650 heads (on average between 150 and 313 per

retailer, per month). In 2003, price varied little according to season (average around 2,400 riels / kg).

- **Buying chicken eggs (4 retailers).** In 2003, the number and the price of chicken eggs bought by market retailer did not vary during the year. Number bought per market retailer and per month ranged between 4,500 and 45,000 heads (on average around 22,000 eggs / month). Price was on average 173 riels / egg (ranging from 160 to 200).
- **Buying duck eggs (4 retailers).** In 2003, the number and the price of duck eggs bought by market retailer did not vary during the year. Number bought per market retailer and per month ranged between 6,000 and 30,000 heads (on average around 22,000 eggs / month). Price was on average 240 riels / egg (ranging from 200 to 300).
- In brief, market retailers seem to be able to buy poultry and eggs at a very regular price during a normal year, except for chickens for which prices vary more.
- Market retailers reported to keep chickens between 0 & 1 day before selling them and chicken eggs between 1 & 2 days.
- **Year 2004 was obviously marked by great variations.** In January & February 2004, numbers sold by retailers and selling prices dropped dramatically. In March, numbers and prices were at a level close to normal. Numbers sold remain at a normal level until July 2004 (date of survey). But, selling prices continued to increase progressively to reach a much higher level than normal. In July 2004, these prices seem now to be stable (still at a higher level than normal).
- Variations were not observed for the price of ducks, but data was only available from 1 retailer in January & February and 2 afterwards.

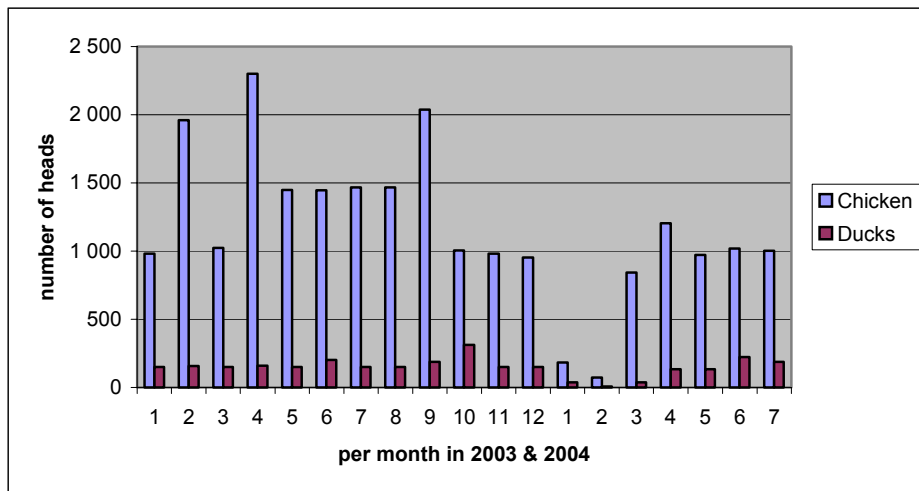


Figure 32: Average number of poultry sold by market retailers in 2003 & 2004.

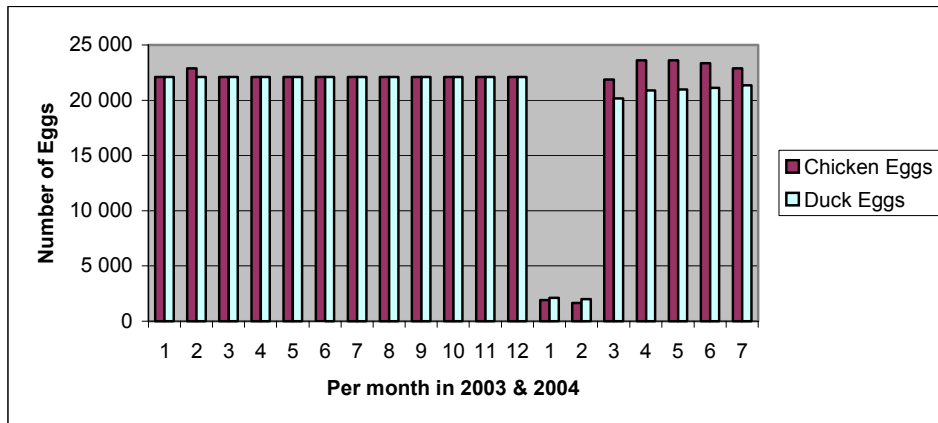


Figure 33: Average number of poultry eggs sold by 4 market retailers in 2003 & 2004.

- Prices of beef, pork and fish immediately started to increase and at the date of the survey (August 2004) they were still increasing.
- In July 2004, prices for consumers were still between 20 and 30% higher than in July 2003 (except for duck meat).

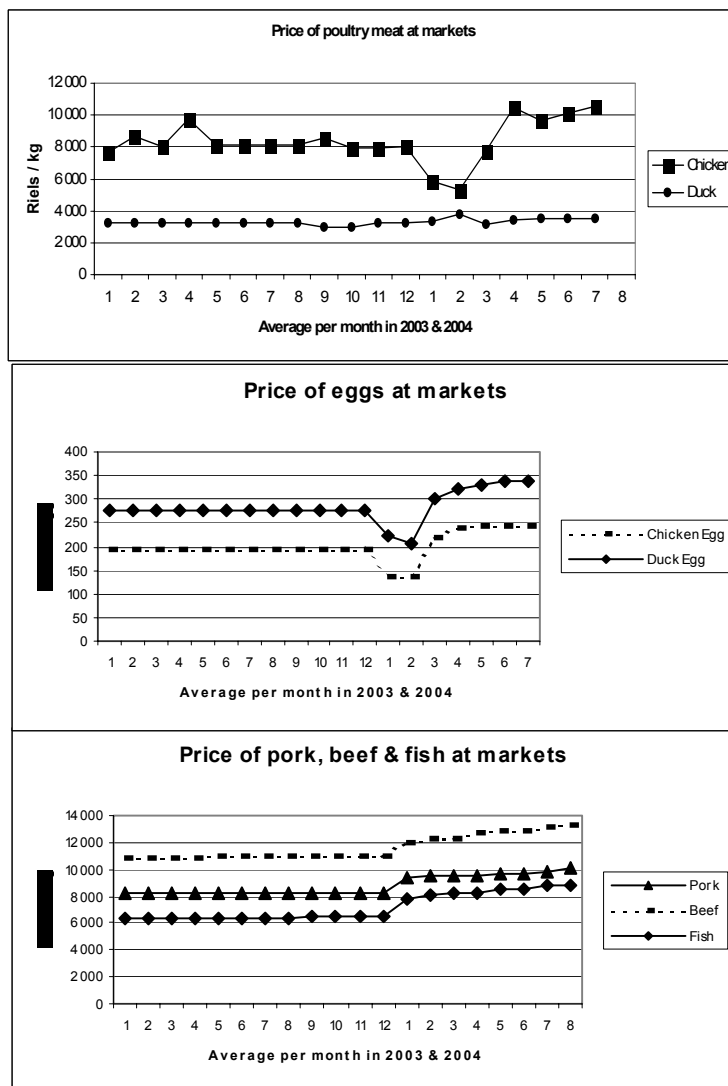


Figure 34: Evolution of prices of meat, fish and eggs sold by market retailers in 2003 and 2004.

- Margin made over sale of chicken by market retailers was slightly lower for each month of 2004 compared to equivalent months of 2003 (see graph below). The average margin for 2003, Jan-Jul 2003 and Jan-Jul 2004 were respectively 32, 34 and 31%. On the contrary (but only with data from 4 retailers), margin made over the sale of chicken eggs and duck eggs seem to have increased compared to 2003: from 12 to 25% (chicken eggs), from 15 to 21% (duck eggs). In July, margins on eggs were back to normal.

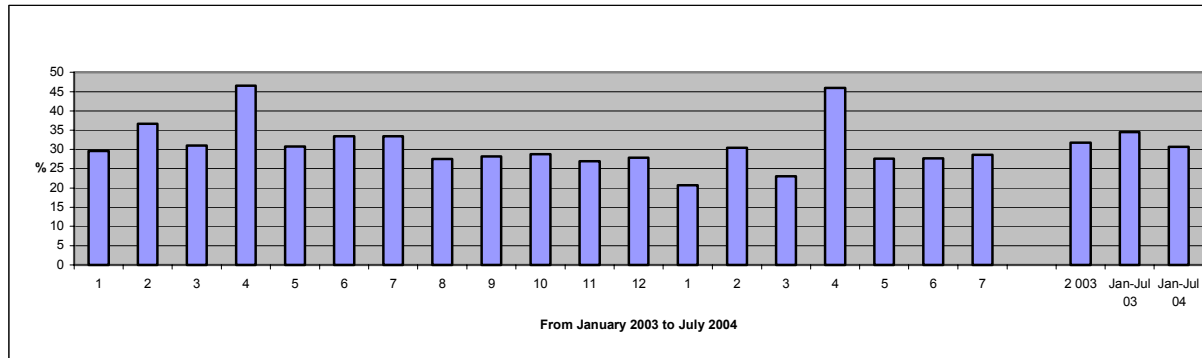


Figure 35: Average margin made by market retailers over chickens (%).

- Between January & July 2004, market retailers' profit decreased compared to the same period of 2003, as presented in the table and figure below. Data out of 22 market retailers indicates an average decrease in profit of 14%. However, there was great variation between market retailers: profit decreased for 14 of them (64%), increased for 6 (27%) and did not really change for 2 (9%).

	Total in 2003	Total Jan & Jul 2003	Total Jan & Jul 2004
<i>Riels</i>			
Total Expenses	134 691 212	83 104 957	51 709 344
Total Incomes	161 797 250	100 722 659	64 013 323
Profit	27 106 038	17 617 702	12 303 979
<i>USD</i>			
Total Expenses	33 673	20 776	12 927
Total Incomes	40 449	25 181	16 003
Profit	6 777	4 404	3 076

Table 26: Expenses, incomes and profits of market retailers in 2003 & 2004.

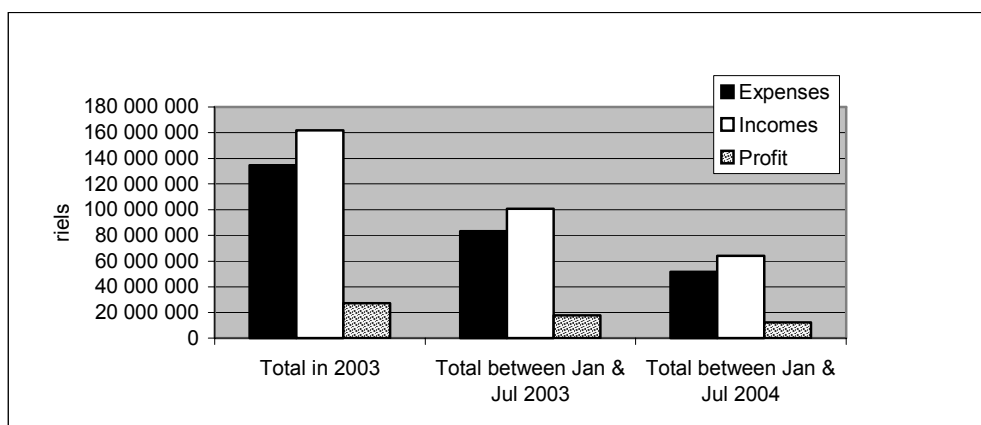


Figure 36: Expenses, incomes and profits of market retailers in 2003 & 2004.

- According to market retailers, the first need of support that would have been expected during HPAI and that would be expected in the short and long term is on prevention of HPAI in poultry.

	Jan-Jul 2003		Jul-Dec 2003		Long Term	
	Nb	%	Nb	%	Nb	%
Money	4	17%	4	17%	2	9%
Support marketing	1	4%			2	9%
No idea	7	29%	6	25%	6	26%
Prevention of HPAI in poultry	9	38%	9	38%	9	39%
Advice	1	4%				
Exemption of tax for 3 months	1	4%				
Equipmen for human protection	1	4%				
Stable prices at markets			4	17%	4	17%
Develop poultry raising			1	4%		
Total	24	100%	24	100%	23	100%

Table 27: Type of support requested by market retailers during and after HPAI.

V. Results on Service Providers.

- Providers of commercial services to poultry producers experienced an important decrease in their activity. Companies selling animal feed and veterinary products were severely affected.
- Below is presented as an example, how the poultry activity of CP Group was affected.
 - During the HPAI outbreak, CP asked the contracted broiler farms to increase the duration of raising from 2 to 3 or 3.5 months. The farms were compensated by CP for this increase, but they still lost 10-20% compared to the normal situation (2003).
 - CP asked the farms to apply strict biosecurity particularly through preventing introduction into the farm from other animals. These were conditions for the farmer to be able to continue under the CP contract. None of the farms were infected by HPAI. Recently, the breeding stock of layers at the farm owned by CP (Kandal province) have been vaccinated against avian flu.
 - All the eggs produced by the layer farms were bought by CP at the contracted price; some of eggs were sold (at a low price) but most were destroyed.
 - 2-3 contracted farms moved from raising poultry to raising pigs; 2 contracted farms stopped by themselves because of lack of manpower; CP stopped working with 4 contracted farms due to mistrust.
 - Poultry activities dropped from 70% to 50% of total CP turnover.
 - In August 04, the production of DOC is equivalent to the level it was before the outbreak (maximum capacity of CP) but proportion sold to private farms has increased. The booking list for DOC is full until September). 50% of broiler chicks are sold to contracted farms and 50% are sold to private farms. 40% of pullets for the contacted farm and 60% for private farms.
 - Feed production is in August 04 at a normal level.
 - During HPAI, mortality rate increased from 5 to 10 % because of longer cycle of production.
 - There was no impact on CP with regard to decrease in the number of employees.
 - Now the situation is almost the same as before the outbreak. Currently CP intends to maintain this production but not to increase it. The company is waiting for permission to use vaccines and is monitoring carefully the situation in Cambodia, Vietnam and Thailand.

PART FOUR: KEY FINDINGS & RECOMMENDATIONS

I. Description of Poultry Production and Stakeholders

- Poultry production in Cambodia is not sufficiently developed, does not meet the needs of the domestic market and this is likely to worsen (dependency from neighbouring countries, Vietnam & Thailand, is likely to increase).
- Small scale production needs to be developed as it has a great potential for improved food security, poverty reduction and will contribute to the rural development of the country.
- Medium and large scale production needs to be developed, while maintaining and improving its competitiveness with production in neighbouring countries, in order to supply the urban centers.
- More private enterprises should be encouraged to engage into production of day-old-chicks,. CP is currently the only one, and its capacity is insufficient to meet the demand.
- If private stakeholders are not interested yet in breeding management of local poultry breeds, the State should initially engage into this activity, which is vital for small scale farmers and for biodiversity.
- Although, there are solutions to improve biosecurity in most poultry systems, including small scale chicken farming, the biosecurity of duck farms (with ducks being raised in rice fields and migrating over long distances) should get more attention in order to safeguard this livestock system. Indeed, if biosecurity is not improved for this activity, control of HPAI could be even more difficult.
- Small scale poultry farms make very little use of support services (e.g. credit, animal health care, technical advice). Greater use of these services can only be done if poultry production is further developed by these families, through increased productivity and flock's size, and/or through organisation in groups of smallholders. Doing so, small-scale poultry will become more economically interesting and will therefore better justified "investment" in such services. Para-veterinarians (Village Animal Health Workers) should be involved in helping groups of smallholders develop small-scale poultry. The additional profit made by smallholders through poultry development should enable paiement of the para-vets' technical assistance.
- Para-vets are poorly linked with State Veterinary Services. The strengthening of the linkages between these two stakeholders is a pre-condition for the success of any animal health control program.
- The "agriculture product" (the chicken sold by the farmer) being identical to the "alimentary product" (the chicken bought by the consumer), the difference in price between these 2 products seems high (the margin of the market retailer is around 30%). Producers should be encouraged to set up some kind of organisations in order to access more directly to consumers.

II. Assessment of the socio-economic Impact of HPAI

- The direct impact of HPAI in Cambodia was very limited compared to the indirect impact. Indeed, the costs directly due to the disease (death of animals; disinfection of affected farms; etc.) only concerned few farms, officially infected. It is unlikely that many other commercial poultry farms were infected but not reported, but it is more likely with small-scale poultry farms. A epidemiological study was being conducted during the summer of 2004 by DAHP with support from FAO, and this study could bring information on the subject.
- Compensation for the farms which were officially declared as infected had not yet been organised.
- The epidemic had a very important indirect impact and to a large number of poultry producers and stakeholders. This impact can be attributed to the dramatic drop in the demand and in the prices of poultry and eggs during the first quarter of 2004.
- At the end of the 1st quarter 2004, demand and prices went up again, back to normal level, then higher than normal. In July 2004, the price was almost stable again, but still higher than in July 2003. The monitoring of the evolution of these prices during the rest of 2004 would help to tell further on the impact both for poultry stakeholders and consumers. This study is therefore an incomplete economic assessment.
- This increase in prices, subsequent to the shortage in poultry products, helped some producers to limit their losses or even to recover from the losses experienced during 1st quarter.
- Table 27 gives an indication of the lack of profit that was experienced by “poultry enterprises”.

Type of “poultry enterprise”	Sample Size	Number of Poultry	Profit / month in 2003 (USD)	Profit /month in 2004 (USD)	Lack of Profit during 1 st semester 2004 (USD)
Small-scale Chickens	83	40 Flock’s size	3	2.1	5.4
Commercial Broiler Chickens	12	2,700 Per cycle	221	-195	2,496
Commercial Broiler Chickens (integrated)	4	2,850 Per cycle	63	49	84
Commercial Broiler Ducks	4	600 Per cycle	98	-41	834
Middleman	21	5,000 Per month	1,157	568	3,534
Market Retailer	18	1,500 Per month	629	439	1140

Table 28: Comparison of estimated lack of profit according to type of poultry enterprise.

- An attempt to extrapolate data from the study sample to the entire provinces was made for smallholders and commercial chicken broiler farms only and is presented in Table 28. This extrapolation would indicate that, for a given province, an important share of the total lack of profit in poultry production occurred in the group of small-scale farms.

	Lack of Profit	Kandal		Phnom Penh		Kampong Cham		Takeo		Siem Reap	
		Nb of Farms	Total Lack of Profit	Nb of Farms	Total Lack of Profit	Nb of Farms	Total Lack of Profit	Nb of Farms	Total Lack of Profit	Nb of Farms	Total Lack of Profit
Small-Scale Chickens	5.4	196,000	1,058,400	76,000	410,400	304,600	1,644,840	148,000	800,000	106,000	572,000
Commercial Broiler Chickens	2,496	18	44,928	10	24,960	4	9,984	5	12,480	18	44,928

Table 29: Estimation of lack of profit in 2 types of poultry enterprises in the 5 provinces.

- It has to be noted that prices of other meat products and fish also increased during and after HPAI. Producers who had another livestock activity in addition to poultry, benefited from this increase in other meat products. On the contrary, producers who were too specialised in poultry had no ways to recover from their losses.
- The economic impact on the whole farm enterprise (poultry and other activities) mainly depends on the following factors:
 - Level of losses / lack of profit during HPAI.
 - Ability to restart or continue poultry activity after March 2004 : farms with poultry activity after March 2004 have made a profit higher than normal during 2nd (and maybe 3rd) quarter 2004 (due to increase in selling price). Farms that were infected and did not restock could not.
 - The level of livestock specialisation: farms that also had a pig activity made a profit higher than normal on the pig activity (due to increase in price). Farms specialised on poultry could not.

The same probably applies to other stakeholders (companies, middlemen, market sellers).

- Consumers, especially in urban areas, paid a high cost for the HPAI epidemic: prices of all animal products (except poultry) were significantly much higher from January to July 2004 (and possibly afterwards) than prices over the same period in 2003; prices of poultry were much higher from April 2004 onwards.
- This study did not assess the impact in other provinces.

III. Ways to reduce the economic impact of HPAI on poultry producers

1. In the short term through “support to producers affected by HPAI in 2004 to recover from their losses / lack of profit”.

Recommandations:

- Support to poultry producers who have reported high mortality in poultry. To encourage disease reporting in the future, it is important that the producers who have reported in 2004 are rewarded. Support should be in proportion of the losses observed, whether is through compensation grants, loans or through other types of support (e.g. training sessions on how to restock, etc.).
- It is in the interest of the Cambodian’s consumers that medium and large scale poultry farms restart their activity, to maintain normal supplies of poultry products at a reasonable cost. In parallel, poultry farms should only be entitled to received financial support (subsidised loans with technical assistance) when they can bring guarantee that they will reduce risks of HPAI. DAHP in collaboration with Banks or other credit institutions (NGOs, etc.) should provide a package to help these farms: loan + technical assistance. When there is a need for improved biosecurity, the cost could be paid by the State. The State could then recover this cost from a temporary tax on poultry products sold.
- Poultry numbers in small scale poultry decreased by 50% between January & July 2004. It is likely that small scale farms will restock progressively through the eggs produced by the remaining hens rather than through buying day old chicks. Support could be organised for these farms via the dissemination of technical information (possibly using the Village Animal Health Workers) that advise on methods to improve hatching rates, to limit death of chicks, etc. Training is indeed the most frequent support requested by smallholders. They also request “credit in animals” which may indicate that rather than just compensation, smallholders want to be able to buy animals from a safe source.

2. In the short term through “Prevention and Control of future HPAI outbreaks”.

- This is basically what the Task Forces (implemented by DAHP with support from FAO and donors) have been doing in collaboration with stakeholders during 2004. These Task Forces seem to have brought clear advantages in the prevention and control of HPAI. It would be useful to document and assess the operations of these TF and to make results available to other countries in the region who may not have followed the same approach.

Reccomandations:

- To document the TF’s operations and to organise a national workshop to discuss the benefits of the Task Forces and to suggest ways to sustain, if necessary, these Task Forces. This workshop should involve representatives from all stakeholders of the poultry sector (including Animal Health Workers’ Associations, poultry smallholders, private sector, etc.).
3. In the long term through “Design and implementation of a national strategy to develop and secure the development of poultry production”.
- HPAI has further affected the capacity of poultry producers to supply poultry products to the Cambodian population. The current unability of Cambodia to be self-sufficient in poultry and poultry products is not acceptable in a country where most of the population consist of poor

rural farmers. There is a high risk that Cambodia will depend even more on imports of poultry and of poultry products from neighbouring countries in the near future:

- Further HPAI outbreaks (or other poultry disease) will affect poultry production.
 - Demand for poultry products to supply the domestic market will continue to increase due to population growth and increase in incomes.
 - Entry in World Trade Organisation may further affect the development of poultry in Cambodia.
- The HPAI experience shows once again the need to consider poultry production within a comprehensive framework, which goes far beyond the animal health issue. Inter-disciplinary collaboration is essential.

Recommandations:

- To design and implement a national strategy to secure the development of poultry production. The design of this strategy could be the responsibility of a Task Force 4 to be created. This TF4 should facilitate the discussions of opinions from various stakeholders, and prepare papers to help the Ministry of Agriculture to design the “National Strategy for Poultry”. This TF4 could consist of a few number of experts and link with:
 - *The Cambodian Livestock Development Committee (CLDC³), or a sub-group of this existing committee.*
 - *Private companies.*
 - *Associations of Village Animal Health Workers.*
 - *Representatives from medium & large scale poultry farms.*
 - *Some Village Heads, some poultry smallholders, etc.*
- This strategy should be approved by the National Assembly by end of 2005 and be implemented during a 1st phase of 5 years (between 2006 & 2010).
- Support for both design and implementation should be requested to projects and institutions that have a commitment towards livestock development for the next 5 years in Cambodia. For example: the Smallholder Livestock Production Project (SLPP), funded by European Union (2005- 2009); the Agriculture Productivity Improvement Project (World Bank); Vétérinaires Sans Frontières; Heifer; Vétérinaires Ruraux du Cambodge; etc. Private companies should be included.

³ CLCD was set up in Cambodia more than 5 years ago and organise meetings attended by most of the international NGOs working in the field of animal production and health.

CONCLUSION

The description of the poultry sector in Cambodia is an essential tool to understand the disease patterns and to suggest appropriate measures for the prevention and control of the disease. This is particularly important in areas where poultry density is high since this is where HPAI outbreaks are more likely to occur. The update of this work on an annual basis, especially for the commercial units, is a pre-condition for disease control programs. In addition, this description of the poultry sector is essential to understand the patterns of poultry production and of the market demand, and therefore, the only way to be able to design appropriate policies for poultry development.

The assessment of the socio-economic impact of HPAI was a difficult exercise, as this was done over a short period and it included a large number of various types of poultry enterprises. Most of the poultry enterprises (whether of small or large scale, producers, service producers, middlemen, market retailers, whether infected by HPAI or not) had a lack of profit because of HPAI. However, if the poultry prices remain at the level they were in July 2004 (much higher than normal), the increased profit made during the 2nd, 3rd and 4th quarters of 2004 could make 2004 a “normal” year in terms of profit for poultry enterprises, except for farms that stopped their activity and that have not been able to start again. This hypothesis applies even more when the “whole farm enterprise” is considered rather than just the “poultry activity / enterprise”. Indeed, farms with other livestock activity will have benefited from increase in prices for pig meat, etc. If these elements are being taken into account, an HPAI-specific compensation program should only support the farms that were officially declared as infected by HPAI (and this should be done since it may encourage disease reporting in the future).

Any support to be provided to poultry producers affected by HPAI should aim at helping poultry enterprises to secure their activity. For example, if grants or loans were given to commercial farms, this should only be done as part of the grant / loan if it is used to upgrade biosecurity and technical assistance / monitoring from veterinarians. Specific schemes should be offered for groups of poultry smallholders, and loans should only be provided to these groups if they have contracts with local or para-veterinarians for a monitoring, advice and animal health care services.

The poultry production in Cambodia is insufficiently developed, considering the growth of the domestic market and the food insecurity of many households. All types of poultry production enterprises (whether small or large units, whether with local or exotic breeds, etc.) can potentially be developed. However, it is advised that this poultry production development is encouraged in areas that currently have a low or medium poultry density. In addition, this development of production should only happen at the same time as an effective strengthening of services, in particular: animal health services; marketing chains; etc. It is essential that this strengthening is put in place in the short term in areas with high poultry density. This is what DAHP, with support from FAO and donors, has started to do in 2004 (3 Task Forces).

There is an urgent need for the design of a national policy to give orientations and support for the secure development of poultry production. It is advised that a 4th Task Force is created in 2005 to coordinate this process, under supervision from DAHP and with the involvement of the national and international projects / institutions, including the private sector.

ANNEXES

ANNEXE 1: Terms of Agreement

1. Background

At the beginning of 2004 the first outbreaks of Highly Pathogenic Avian Influenza have been detected in Cambodia. Donors have answered to the request of the Royal Government of Cambodia for support to control the epidemic.

In spite of the low development of the poultry sector in Cambodia compared to neighboring countries, poultry production plays an important role in the economy of poor farmers. Commercial farms are also starting to develop.

Since the outbreak of the disease, no exhaustive assessment of the socio-economic impact has been conducted.

Improved understanding of the impact that AI had on different farming systems, the coping strategies, the farmers' ambitions to improve or their constraints to abandon the sector and the implications for food security, will provide AIERP (Avian Influenza Emergency Rehabilitation Project) with useful insights to help identify beneficiaries and design this intervention.

The objectives of the study are:

- to review the poultry industry in Cambodia and to assess the importance of poultry production for smallholders,
- to assess the socio-economic impact of the epidemic for commercial farms and smallholders, and for other stakeholders involved in the poultry sector,
- to provide recommendations for policies related to zoning and surveillance, public information, compensation and restocking.

The primary questions that the study will try to answer are the following:

- What is the poultry production system in Cambodia and what are the stakeholders?
- What has been the direct economic impact on farmers due to death of animals, stamping out and compensation?
- What has been the indirect economic impact on farmers and other stakeholders related to the ban of production, the market restriction and the variation of demand and prices?
- What has been the social impact on different stakeholders?
- How could concerned authorities improve the management of the crisis in order to alleviate/soften the economic impact on smallholders and commercial farms?

FAO contribution will provide Vétérinaires Sans Frontières (VSF) with the necessary resources to carry out the study.

2. Terms of Reference

2.1 Activities

2.1.1 Activities undertaken under the letter of agreement are part of the TCP/RAS/3010 project "Emergency regional support for post avian influenza rehabilitation". They consist of:

- **Analysis of documentation:** VSF will analyze all available documents and information: official information from DAHP, specific studies, general and specific statistics.
- **Sampling:** see 2.2.1
- **Elaboration of an assessment matrix:** VSF will elaborate a matrix for the analysis of primary and secondary questions, identifying indicators, sources and methods of collection. The same information will be collected from different stakeholders for cross-checking. The matrix will be used as reference for the creation of a statistic database (SPSS) for rapid and effective data processing and analysis. The database will be used for graphic representation of results and mapping.
- **Survey preparation:** Different questionnaires will be prepared for each category of stakeholder to be interviewed. Surveyors will be trained to the use of questionnaires and efficiency of tools will be tested before validation. Data will be processed as soon as they are collected and centralized.
- **Data collection:** will be implemented by a team of 5 surveyors under the supervision of the VSF international veterinary experts.
- **Data analysis and report writing:** Information collected at field level and processed in the database will be immediately available for analysis and report writing.
- **Restitution of survey results:** results will be presented to the concerned authorities and partners, supported by a "PowerPoint Presentation".

2.1.2 For the implementation of the above activities, VSF will make available the necessary resources including the following human resources:

Team Leader: Patrice Gautier, veterinary doctor, experienced in the development of the livestock sector in Vietnam; involved recently in 2 studies on Avian Influenza in Vietnam funded by AFD and WB; knowledge of Cambodian context.

Animal Production Specialist: Nicolas Dumont : veterinary doctor, currently working for VSF in Cambodia for the assessment of performance of VAHW; knowledge of Cambodian context.

Surveyors: Five national specialists in animal production with knowledge of traditional and commercial farming systems, poultry trading circuits and contacts with different kinds of service providers of the poultry sector.

2.2 Outputs

2.2.1. Data collected through questionnaires

The study will focus on 5 zones: 4 provinces (Kandal, Takeo, Kompong Cham and Siem Reap) and 1 municipality (Phnom Penh), based on the existing records of outbreaks of the epidemic and on the relative progress of the poultry industry in this areas.

The sampling for interview aims to collect valid information for extrapolation at provincial and national levels and to have an overall view of all stakeholders of the sector. The sample size depends on the total population size and on the variability within the population.

The study will concern a sample made of:

- a) Commercial farms

- 18 commercial and semi-commercial broiler farms i.e. 20% of total registered,
- 17 commercial and semi-commercial layer farms i.e. 30% of total registered,
- 30 commercial and semi-commercial ducks farms i.e. 5% of total registered.

The sample is weighted on the base of the relative importance of each kind of production within each province/municipality. Results will be extrapolated in the 5 provinces/municipality aggregated.

b) Smallholders

- 100 smallholders equally distributed among the five targeted provinces/municipality

The sample is selected according to localization of declared outbreaks. Extrapolation of results will be based on the number of rural households in each zone.

c) Middlemen

- 20 middlemen and 20 market retailers

The sample is selected according to localization of declared outbreaks.

d) Services providers

- At least 10 services providers

Interviews will be organized with staff from the DAHP at district and provincial offices, of animal health and production, NAHPIC as well as other key persons.

All filled questionnaires will be given to the FAO in Cambodia at the end of the analysis.

2.2.2. Technical reports

VSF will prepare the following reports in both English and Khmer:

- (a) A Medium Term Progress Report to be submitted no later than the third week after contract signature,
- (b) A Final Report to be submitted 7 weeks after the beginning of the study including: executive summary, methodology, description of poultry sector in Cambodia, results of socio-economic impact assessment for the different groups, coping mechanisms for different group, gender issues related to A.I., selected case studies, most relevant statistical data and recommendations.
- (c) Power Point Presentation in support of the restitution of the survey results to the concerned authorities and partners.

2.2.3. Database

All data collected through questionnaires will be captured in an electronic database designed for this purpose and submitted together with the final report.

2.3 Duration and Timing

The activities will start at signature of the Letter of Agreement and the report will be delivered, at the latest seven week after.

Time line

A. Steps	w1	w2	w3	w4	w5	w6	w7
analysis of documentation	x						
sampling	x						
questionnaires	x						
training of surveyors		x					
test of questionnaires		x					

questionnaires review		x					
database creation		x					
surveys		x	x	x	x	x	
data processing					x	x	x
data analysis						x	x
report writing						x	x
restitution							
translation							x

2.4 Monitoring and Progress Reporting

TCP/RAS/3010 International Coordinator will supervise the preliminary phase (questionnaire design and sampling strategy). Monitoring of the activities undertaken in Phnom Penh will be undertaken by FAO-Cambodia.

VSF will provide a mid term progress report three weeks after contract signature (30th/July/04) and a final report 7 weeks after the beginning of the study (30th/August/04). Reports will be in English and in Khmer in three copies each.

Electronic copies of the reports will be sent to Mr. Jean-Claude Levasseur, FAO-Cambodia and to Ms GuerneBleich AGAP, FAO headquarters.

By August 31st, prior to receiving final payment for the service, VSF will submit a final audited statement of accounts (or certified as to its correctness by the officer responsible for maintaining it) to Mr. Levasseur.

3. **Inputs to be provided free of charge by VSF**

In addition of the inputs detailed as in paragraph 5 below, VSF will provide, free of charge, any additional inputs required for ensuring the achievement of the survey with a high quality of outputs. This may include:

- additional transport and accommodation for field trips,
- additional human resources,
- use of VSF equipments and premises,
- overhead expenditures,
- meeting and training costs.

4. **Inputs to be provided in kind by FAO**

FAO will provide technical and methodological guidance through the TCP/RAS/3010 project coordinator, for questionnaire design and for the sampling procedure and during the implementation of the whole survey if required by VSF and deemed necessary.

5. **Budget: 18,450 USD**

6. **Monitoring/Certifying Officer**

Mr. Sopheap, FAO Cambodia, is designated to monitor the proper implementation of the Agreement and to certify to Mr. Jean-Claude Levasseur, FAO Representative in Cambodia, that the terms of the Agreement have been satisfactorily met and that appropriate payments can be made.

ANNEXE 2: List of people / organizations met

PROVIDERS OF LIVESTOCK-RELATED SERVICES			
Sen Sovann	Vice Director (Animal Health)	Department of Animal Health & Production	
Meng Kosal - - 2 people	Vice Director District Vet District Vet VAHWs	OAHP Kandal Province OAHP Kien Svay District OAHP Ponhea Leu District All Province	
Hay Ly Mey Hoch Meas Rath Ek Sam An Bou An 2 people	Vice Director Administrator District Vet Chief Drug Seller VAHWs	OAHP Takeo Province OAHP Takeo Province OAHP Don Keo District Office of Agriculture of Samrong District VAHW Association in Trankak district All province	
Sieng Soneang Khien Marith Taing Ratha Hang Soheang	Vice Director District Vet District Vet District Vet	OAHP Phnom Penh Province OAHP Roessey Koe District OAHP Roessey Koe District OAHP Toul Kork District	
Lom Sopha Poan Sambat Meng Heang Teang You Song	Staff Staff District Vet District Vet	OAHP Kampong Cham OAHP Kampong Cham OAHP Chengprey District OAHP Preychhor District	
Suon Sam Ang Men Siphoch 2 people	Director District Vet VAHWs	OAHP Siem Reap Province OAHP Chikreng District All province	
Sawai Tangtanaporn Parinya Comphonsiri	General Manager Feed Technical Manager	CP Group	Production, Breeding, Feed & Veterinary Products, Services.
Yves Froelich	Director	Thom Thom Co. Ltd	Distributor of vet products
Tray Bun Lay	Manager Vet Division	VE Cambodia Co. Ltd	Distributor of vet products
Chea Kimsan	Sales & Marketing Manager	Medivet Co. Ltd	Distributor of vet products
Lee Try	Director	Lee Try shop	Distributor of vet products
Deng Sovanvuthy	Director	Earth	Producer of vet products & feed
Koly Neang	Director	Phall Ly Neang Trading Co. Ltd	Distributor of feed
Chan Rithy	Director	Phall Ly Neang Trading Co.,Ltd	Distributor of feed
Chun Lina	Owner	Chivapheap Thmey	Sub-distributor of feed
	Owner	Lucky Shop	Sub-distributor of vet products
	Owner	Mam Sophal Shop	Sub-distributor of feed and vet products
POULTRY PRODUCERS			
100 smallholders, 24 broiler commercial farms, 44 commercial layer farms, 2 hatcheries, 22 middlemen, 22 market retailers spread in Kandal, Takeo, Phnom Penh, Kampong Cham, Siem Reap provinces.			
FAO			
Tum Sothyra, Yves Froelich, Stéphanie Desvaux – Consultants for FAO in Cambodia			

ANNEXE 3: Documents consulted.

<i>Author</i>	<i>Organization</i>	<i>Title</i>	<i>Date</i>
D'Andlau G, Cardinale E, Gautier P., Porphyre V.	AFD / CIRAD / VSF	Mission d'appui "Grippe aviaire au Vietnam" Diagnostic et proposition à court terme et à long terme.	March 2004
Borin K.	DAHP	Report on Innovation Community-Based Animal Health Worker in Cambodia. (draft version)	2004
Borin K	UTA	Chicken Production, Food Security and Renovative Extension Methodology in the SPFS Cambodia	
Brun JM. & Hyvernat E.	VSF / ISARA	Analyse de la filière canard au Cambodge: quel avenir pour les éleveurs de Takéo?	1994
Dolberg F	FAO	Consultancy Report on Mission to Vietnam. Emergency Regional Support for Post Avian Influenza Rehabilitation.	May 2004
FAO	FAO	Emergency Regional Support for Post Avian Influenza Rehabilitation. TCP/RAS/3010. Project Document.	2004
FAO	FAO	Emergency Assistance for the Control of Avian Influenza in Cambodia. TCP/CMB/3002. Project Document.	2004
FAO	FAO	Review of the Livestock sector in the Mekong Countries	November 2003
Gauthier L, Lelandasi B,	VSF/CNEARC- ESAT/ENITA	Place de l'Aviculture Traditionnelle Dans le District de Tramkak (Cambodge)	October 1995
Geale D.	FAO	Technical Report. Emergency Regional Coordination Assistance for Control of Avian Influenza in South East Asia (Cambodia).	2004
Gleeson JL	FAO	Technical Report. Emergency Regional Coordination Assistance for Control of Avian Influenza in South East Asia (Vietnam).	March 2004
Rawdon T	FAO	Emergency Assistance For the Control of Avian Influenza (Cambodia)	June 2004
Sothoeun S	DAHP	Domesticated Animal Genetic Resources in Cambodia	August 2003
Sovann S	DAHP	Linear Animal Health Strategy and Policy Development	December 2001
Sovann S	DAHP	A National Strategic plan For Animal Health And Production	December 2000
Otte, M.J., Nugent, R., McLeod, A.	FAO	Transboundary Animal Diseases: Assessment of Socio-Economic Impacts and Institutional Responses	February 2004
VEERU	University of Reading, UK.	Animal Health Economics in Livestock Development.	
VSF	VSF	Evolution and Impact of Avian Influenza Epidemic and Description of the Avian Production in Vietnam.	2004
VSF	VSF	Mid Term Progress Report. HPAI Study in Cambodia.	2004

ANNEXE 4: Questionnaires (examples)

QUESTIONNAIRE FOR POULTRY SMALLHOLDERS (< 50 poultry)																																																									
INVESTMENT COSTS																																																									
How much did you spend for the building (riels)																																																									
When was it? (year & month)																																																									
How many more years this building will last? (years)																																																									
How much did you spend in equipment? (riels)																																																									
How many more years this equipment will last? (years)																																																									
Data Manager to calculate the monthly absorption cost (riels)																																																									
<table border="1" style="width: 100%;"> <tr> <td colspan="2"></td> <td>DUCK</td> <td>CHICKEN</td> <td>(circle)</td> <td></td> </tr> <tr> <td>Owner:</td> <td>Name:</td> <td>Age</td> <td>Sexe</td> <td></td> <td></td> </tr> <tr> <td>Interviewed Person:</td> <td>Name:</td> <td>Age</td> <td>Sexe</td> <td>Position</td> <td></td> </tr> <tr> <td>Commune</td> <td>District</td> <td></td> <td>Province</td> <td></td> <td></td> </tr> <tr> <td>Date of interview:</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Name of interviewer</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>															DUCK	CHICKEN	(circle)		Owner:	Name:	Age	Sexe			Interviewed Person:	Name:	Age	Sexe	Position		Commune	District		Province			Date of interview:						Name of interviewer														
		DUCK	CHICKEN	(circle)																																																					
Owner:	Name:	Age	Sexe																																																						
Interviewed Person:	Name:	Age	Sexe	Position																																																					
Commune	District		Province																																																						
Date of interview:																																																									
Name of interviewer																																																									
INPUTS																																																									
		<table border="1" style="width: 100%; text-align: center;"> <tr> <td></td> <td></td> <td colspan="12">2003</td> <td colspan="8">2004</td> </tr> <tr> <td></td> <td></td> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>														2003												2004										1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
		2003												2004																																											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8																																				
Data Manager to enter the monthly absorption cost (riels) =>																																																									
total number of chicks and chicken ?																																																									
total number of ducks and ducklings ?																																																									
how many chicks do you buy in both semester of 2003?																																																									
what was the price per chick																																																									
how many chicks do you buy in 2004?																																																									
what was the price per chick																																																									
whom do you buy the chicks from? (circle)																																																									
how many chicken do you buy in both semester of 2003 ?																																																									
what was the price per adult chicken																																																									
how many adult chicken do you buy in 2004 ?																																																									
what was the price per adult chicken																																																									
whom do you buy the adult chicken from? (circle)																																																									
how many ducklings do you buy in both semester of 2003 ?																																																									
what was the price per duckling?																																																									
how many ducklings do you buy in 2004 ?																																																									
what was the price per duckling?																																																									
whom do you buy the ducklings from? (circle)																																																									
how many adults duck do you buy in both semester of 2003 ?																																																									
what was the price per adult duck?																																																									
how many adult duck do you buy in 2004 ?																																																									
what was the price per adult duck?																																																									
whom do you buy the adults duck from? (circle)																																																									
what kind of feed produced on the farm do you give to the poultry ? (circle)																																																									
what is the percentage of each feed you give for the poultry (average) ?																																																									
in average how many food produced on the farm do you give per day ? (kg) (1 hand=50g)																																																									
how much poultry feed do you buy in 2003 and in 2004? (riel)																																																									
How much do you spend in VETERINARY COST in 2003 and in 2004? (riel)																																																									
How much do you spend in DESINFECTATION in 2003 and in 2004? (riel)																																																									
How many MEN help with the poultry activity in 2003 and in 2004?																																																									
How many WOMEN help with the poultry activity in 2003 and in 2004?																																																									
How much do you spend in EMPLOYEES in 2003 and in 2004?																																																									
Other cost 1: (e.g. straw)																																																									
Other 2: (e.g. males given to producers)																																																									
How much do you spend in STAMPING-OUT?																																																									
How much do you spend in BIOSECURITY in 2003 and in 2004?																																																									

INCOMES	2003												2004												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8					
how many chickens have been sold in both semester of 2003 and in 2004?																									
what was the price you sold them in 2003 and in 2004?																									
whom do you sell the chickens to ? (circle)																									
How many chicks and chicken died in both semester of 2003 and in 2004?																									
which month do they die? (put one cross in the month)																									
How many died chickens have been eaten in both semester of 2003 and 2004?																									
How many died chickens have been given in both semester of 2003 and 2004?																									
how many chickens have been eaten in total in both semester of 2003 and 2004?																									
how many chickens have been given in total in both semester of 2003 and 2004?																									
How many chickens you wanted to sell but you don't because of the low price?																									
what did they become ? (circle)																									
how many ducks have been sold in in 2003 and 2004?																									
what was the price you sold them in 2003 and in 2004?																									
How many ducklings and ducks died in 2003 and in 2004?																									
which month do they die?																									
How many died ducks have been eaten or given in 2003 and 2004?																									
how many ducks have been eaten or given in total in 2003 and 2004?																									
whom do you sell the ducks to ? (circle)																									
How many ducks you wanted to sell but you don't because of the low price?																									
what did they become ? (circle)																									
how many chicken egg have been sold in 2003 and 2004?																									
what was the price per egg																									
how many duck egg have been sold in 2003 and 2004 ?																									
what was the price per egg																									
whom do you sell the eggs to ? (circle)																									
how many chicken egg have been eaten in 2003 and 2004?																									
how many duck egg have been eaten in 2003 and 2004 ?																									
How many eggs you wanted to sell but you don't because of the low price?																									
what did they become ? (circle)																									
BENEFITS																									
what is the part of the poultry production in the cash income of the household (percentage)																									
Data Manager to calculate the % of poultry's benefit out of total benefit																									
ADDITIONAL INCOMES SINCE JANUARY 2002																									
How much COMPENSATION did you receive for Avian Flu?																									
did you sell something to compensate the impossibility of selling chickens to get cash ? (circle)																			Yes	no					
if yes, what kind of product did you sell ? (circle)																			pig	beef	fish	other			
how much did you get from this selling ?																									
SERVICES TO YOUR POULTRY FARM																									
Who do you call to help you with animal health problems?																			No one	Neighbour	VAHW	Public Vet	Company	Other	
Who do you call for technical advise?																			No one	Neighbour	VAHW	Public Vet	Company	Other	
Who can you borrow money from?																			No one	Neighbour	Relative	Bank	Company	NGO	Other
ADDITIONAL QUESTIONS / SOCIAL IMPACT																									
How much does your family spend for food per month? (average in 2003 and 2004) (in riel)																									
Have you changed your food habits due to the epidemic? (circle)																			yes	no					
Do you want to continue poultry activity ? (circle)																			yes	no					
if no, what else do you intend to do?																									
how many adults are in the household (more than 14 years) ?																									
how many children are in the household (less than 14 years) ?																									
NEEDS FOR SUPPORT																									
What kind of support would have been needed between Jan & Jul 04?																									
What kind of support would be needed between now Dec 04?																									
What kind of support would be needed in the long term?																									

QUESTIONNAIRE FOR BROILER FARMS

INVESTMENT COSTS

How much did you spend for the building (riels)		<input type="checkbox"/> DUCK	<input type="checkbox"/> CHICKEN	<input type="checkbox"/> integrated	<input type="checkbox"/> private	<input type="checkbox"/> (circle)
When was it? (year & month)		Owner:	Name:	Age:	Sex:	
How many more years this building will last? (years)		Interviewed Person:	Name:	Age:	Sex:	Position:
If 0 ask the value of the building today		Commune		District		Province
How much did you spend in equipment? (riels)		Date of interview:				
How many more years this equipment will last? (years)		Name of interviewer			Number of family member help poultry raising	
If 0 ask the value of the equipment today						
Data Manager to calculate the monthly abortion cost (riels)						

INPUTS

	2003												2004							
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
Data Manager to enter the monthly absorption cost (riels) =>																				
What is the BREED of the chicks / ducklings you purchase? (name of breed)																				
How long is one cycle (days)																				
Which PROVINCE / COUNTRY do they come from? (initial of province)																				
Do you buy them from a MIDDLEMAN? (Yes / No / ?)																				
Do you buy them directly from the PRODUCER? (Yes / No / ?)																				
What is the name of the producer of chicks / ducklings ?																				
How many chicks / ducklings do you buy for one cycle?																				
How many cycle each year																				
What is total cost to buy chicks / ducklings ?																				
What is the value of the FEED PRODUCED by the farm, given to the poultry each cycle?																				
In addition, how much do you BUY each cycle in FEED?																				
What is the NAME of the feed you buy?																				
How much do you spend each cycle in VETERINARY COST?																				
How much do you spend in DESINFECTATION each cycle?																				
How many employees MEN / MONTHS help with the poultry activity?																				
How many employees WOMEN / MONTHS help with the poultry activity?																				
How much do you spend each month in EMPLOYEES?																				
Other cost 1: (e.g. straw)																				
Other 2: e.g. males given to producers)																				
How much do you spend in STAMPING-OUT?																				
How much do you spend in BIOSECURITY?																				

INCOMES

	2003												2004							
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
BROILERS																				
How many broilers do you produce each cycle?																				
How many broilers alive do you take for your usage each cycle (family consumption or gift) ?																				
How many broiler die not eaten each cycle?																				
How many broiler die eaten each cycle?																				
What is the PRICE of broiler per kg?																				
If integrated, how much money do you get each month ?																				
Do you sell broilers to (circle)? How many percent for each? (%)																				
	a middleman				layer farm				smallholder				directly to market seller							
	directly to bakery/factory/etc.				directly to consumers				directly to processors											
In which province?																				
MANURE																				
How many kilograms do you produce each month?																				
What do you do with manure? (%)	Use				Sell				Nothing											
What is the PRICE of one kilogram of manure?																				
Other incomes from poultry activity 1:																				
Price per unit (.....)																				
Other incomes from poultry activity 2:																				
Price per unit (.....)																				

BENEFITS													
BENEFITS FROM OTHER ACTIVITIES													
TOTAL BENEFITS OF FAMILY													
Data Manager to calculate the % of poultry 's benefit out of total benefit													
ADDITIONAL INCOMES SINCE JANUARY 2002													
	2003												2004
	1	2	3	4	5	6	7	8	9	10	11	12	1
How much COMPENSATION did you receive for Avian Flu?													
How many kilograms of live PIGS do you sell?													
At what price per kilogram do you sell these pigs?													
What would have been the normal price per kg at this period of year?													
How many kilograms of live BOVINE do you sell?													
At what price pe kilogram do you sell these bovines?													
What would have been the normal price per kg at this period of year?													
How many kilograms of FISH do you sell?													
At what price per kilogram do you sell the fish?													
What would have been the normal price per kg at this period of year?													
ADDITIONAL COSTS SINCE JANUARY 2004													
Cost of poultry feed destroyed?													
SERVICES TO YOUR POULTRY FARM													
Who do you call to help you with animal health problems?	No one	Neighbour	VAHW	Public Vet	Company	Other							
Who do you call for technical advise?	No one	Neighbour	VAHW	Public Vet	Company	Other							
Who can you borrow money from?	No one	Neighbour	Relative	Bank	Company	NGO	Other						
ADDITIONAL QUESTIONS / SOCIAL IMPACT													
How much does your family spend for food each month?													
Have you eaten poultry products that could have been infected? (Yes / No / ?)													
Have you sold / given poultry products that could have been infected? (Y/N/?)													
Have you changed your food habits due to the epidemic? (Y/N/?)													
Do you want to continue / restart poultry activity (Yes / No / ?)													
If no, what else do you intend to do?													
NEEDS FOR SUPPORT													
What kind of support would have been needed between Jan & Jul 04?													
What kind of support would be needed between now Dec. 04?													
What kind of support would be needed in the long term?													

ANNEXE 5: Decisions issued by the Government of Cambodia in relation with HPAI (not an official translation).

**KINGDOM OF CAMBODIA
Nation Religion King**

**Ministry of Agriculture, Forestry and Fisheries
Number: 114**

DECLARATION ON THE PREVENTION OF HIGHLY PATHOGENIC AVIAN INFLUENZA

The Ministry of Agriculture, Forestry and Fisheries would like to inform all citizens, purchase and sale traders, companies serving for transporting birds, eggs, fresh or frozen bird meat, all animal products originated from wild or domestic birds and animal feed that recently the neighboring countries are facing to the epidemic of avian influenza of virus subtype H5.

This disease has a very quick propagation and causes high mortality, and no drug is effective and efficient. The disease result the negative socio-economic impact of stakeholders, country and human health.

To prevent the introduction of the epidemic into Cambodia, the Ministry of Agriculture, Forestry and Fisheries declares the temporary prohibition of importation, purchase-sale of birds, eggs, fresh or frozen bird meat all animal products originated from wild or domestic birds from the infected countries until new declaration.

The Ministry of Agriculture, Forestry and Fisheries strongly hopes that the citizens, traders, local authorities and authorities of all levels collaborate the implementation of this declaration in an effective and efficient way.

Phnom Penh, January 12, 2004
Minister

Chan Sarun

Copy to:

- Council of Ministers
- Ministry of Information
 “For broadcasting”
- Ministry of Economic and Finance
- Ministry of Health
- Ministry of Commerce
- Ministry of Environment
 “For information”
- All Municipalities of Provinces-Cities
 “For information and collaboration”
- Department of Animal Health and Production
- Provincial Departments of Agriculture,
Forestry and Fisheries of all provinces-cities
 “For implementation”
- Documents-Archive

**Ministry of Agriculture, Forestry and Fisheries
Number: 014**

PRAKAS ON ESTABLISHMENT OF TEMPORARY INSPECTION CHECK POINT OF ANIMAL HEALTH AND ANIMAL PRODUCTS

Minister of Agriculture, Forestry and Fisheries

... / ...

Hereby decides

Article 1: Establishment of temporary inspection checkpoint of animal health and animal products at international entries, international border entries, bilateral border entries and other border entries in case of necessity.

Article 2: The objective of establishment of temporary inspection check point of animal health and animal products is to control and prevent the avian influenza epidemic, which is spreading in neighboring countries and Asia, from being introduced to kingdom of Cambodia.

Article 3: The name of officers specialized in animal health and production who will be based and work at temporary control check points are attached in the annex of this Prakas.

Article 4 : General Executive Director of the ministry, directorate officer, cabinet, director of department of agricultural law, director of department of administration affairs, director of department of planning-statistics and international corporation, director of department of accounting and finance, director of department of animal health and production, director of provincial department of agriculture, forestry and fisheries of Kandal province and director of provincial department of agriculture, forestry and fisheries of Siem Reap province have to be responsible for implementation of this Prakas in an efficient way according to their duties from the date of signature.

Phnom Penh, January 16, 2004
Minister

Chan Sarun

Reception places:

- Council of ministers
- Ministry of Interior
- Ministry of Defense
- Ministry of Economics and Finance
- Ministry of Justice
- Ministry of Environment
- Ministry of Health
- Ministry of Information
- Cabinet of Prime Minister Hun Sen
- Provincial Hall of Kandal province
- Provincial Hall of Siem Reap province
- The same to Article 6
- Documents-Archive

Ministry of Agriculture, Forestry and Fisheries
Number: 015

PRAKAS ON THE PREVENTION OF AVIAN INFLUENZA EPIDEMIC
Minister of Agriculture, Forestry and Fisheries

... / ...

Hereby decides

Article 1: Temporary prohibition of importation, transportation, purchase-sale of birds, eggs, fresh or frozen bird meat and all animal products originated from wild or domestic birds of countries currently infected within the epidemic until new declaration.

Article 2: Whoever violates the Article 1 of this Prakas is penalized in accordance with the Article 31 of the sub-decree Number 16 OrNorKror.BorKor dated March 13, 2003 on animal sanitary inspection and animal products.

Article 3: : General Executive Director of the ministry, directorate officer, cabinet, director of department of agricultural law, director of department of administration affairs, director of department of planning-statistics and international corporation, director of department of accounting and finance, director of department of animal health and production, director of provincial department of agriculture, forestry and fisheries of Kandal province and director of provincial department of agriculture, forestry and fisheries of Siem Reap province have to be responsible for implementation of this Prakas in an efficient way according to their duties from the date of signature.

Phnom Penh, January 16, 2004
Minister

Chan Sarun

Reception places:

- Council of ministers
- Ministry of Interior
- Ministry of Defense
- Ministry of Economics and Finance
- Ministry of Justice
- Ministry of Environment
- Ministry of Health
- Ministry of Information
- Cabinet of Prime Minister Hun Sen
- Provincial Hall of Kandal province
- Provincial Hall of Siem Reap province
- The same to Article 6
- Documents-Archive

Ministry of Agriculture, Forestry and Fisheries
Number: 343

DECLARATION ON HIGHLY PATHOGENIC AVIAN INFLUENZA

The inter-committee of avian influenza epidemic prevention would like to inform citizens and people in Cambodia that recently some countries in Asia are facing to avian influenza epidemic and those countries are taking the veterinary control measures to slaughter millions of birds to prevent the epidemic of this highly pathogenic disease to other herds of birds and to humans.

With regard to Cambodia, every year especially at the beginning of hot season, fowl cholera, Newcastle and other bird infectious diseases always attack and kill significantly the birds. But in accordance with the situation of avian influenza outbreak in the neighboring countries, to prevent the introduction of disease to the country, the Ministry of agriculture, forestry and fisheries has prohibited temporarily the transportation, purchase-sale of birds, eggs, fresh or frozen bird meat and animal products originated from wild or domestic bird from the infected and assigned specialized officers to follow up and

make the surveillance and research and found that a farm in Pong Peay village, Phnom Penh Thmey commune, Roeusey Koe district, Phnom Penh had the high mortality. The ministry of agriculture, forestry and fisheries have strictly taken the veterinary measures on that farm and gotten the sampling to be analyzed at Pasteur Institute of France.

On January 23, 2004, the analysis result from Pasteur Institute of France confirmed that it was the avian influenza with virus subtype H5N1. The virus subtype H5N1 is the virus that could transmit from birds to humans and cause life incident. Until now, we have not found yet the case of avian influenza on humans in the Kingdom of Cambodia.

To prevent the transmission of avian influenza from birds to birds and from birds to humans, the inter-committee would like to provide some advices as follow:

1. Symptoms of avian influenza:
 - Standstill, anorexia.
 - Low egg production and egg shell is soft.
 - Swelling head, eyelid, comb, wattle and leg
 - Comb, wattle and leg become violet.
 - Cough, nasal discharge, difficult to breath
 - Panache stand up, bruised leg and abdomen.
 - Diarrhea from the color clear green to white
 - Nervous system
 - High mortality
2. The farms with the case as mentioned above must be taken the control measures as follow:
 - Sanitary and hygiene measures
 - Prohibition of entry-take out, across and stop all transport circulation in the infected zones.
 - The veterinary measures should be taken as follow:
 - + Stamp out all infected birds and virus strained birds
 - + Disinfect the pens, building, material and equipments using for raising activities and wastes.
 - + The specialized officers must make regularly the control, follow up and surveillance.
3. For the small scale raising, if seeing the above symptoms, it is prohibited to sell, purchase, eat or touch the animal or feces.
4. For the people who are suspected infected and have the symptoms as follow:
 - Fever with temperature more than 38 centigrade with cough, hurt at oesophage and difficult to breath or painful at muscle.
 - Including some following symptoms:
 - + There is the certification from hospital there is the presence of flu virus A or
 - + Direct contact with people infected of flu virus A or
 - + Direct contact with the infected birds or dead birds 7 days before apparition of above symptoms.
5. In case that there are the above symptoms:
 - Please all the citizens having the birds with above symptoms inform the animal health and production officers and the close authorities to take urgently the veterinary measures.
 - For the people, please contact and make the consultation with the doctors nearby.

Receiving this declaration, the inter-committee of avian influenza epidemic prevention strongly hopes that all the citizens and people keep the fiability and collaborate with the all levels of authorities.

Phnom Penh, January 23, 2004
Minister of Agriculture, Forestry and Fisheries and Also the present of
inter-committee of avian influenza epidemic prevention

Chan Sarun

PRAKAS ON ZONING OF HIGHLY PATHOGENIC AVIAN INFLUENZA

Minister of Agriculture, Forestry and Fisheries

- Having seen the constitution of the Kingdom of Cambodia;
- Having seen the Royal Decree Number NorSor/RorKorTot/1198/72 dated November 30, 1998 on the appointment of the Royal Government of Cambodia;
- Having seen the Royal Kram Number 02/NorSor/94 dated July 20, 2004 enacting the law on the preparation and functioning of Council of Ministers;
- Having seen the Royal Kram Number NorSor/RorKorMor/0196/13 dated January 24, 1996 enacting the law on the establishment of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 17 OrNorKror.BorKor dated April 07, 2000 on the organization and working process of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 16 OrNorKror.BorKor dated March 13, 2003 on the animal sanitary inspection and animal products;
- With reference to the letter dated January 23, 2004 on the result from lab of Pasteur Institute of France;
- In accordance with the necessity of Ministry of Agriculture, Forestry and Fisheries;

Hereby decides

Article 1: One zone is determined infected by avian influenza with virus group H5N1 in Pong Peay village, Phnom Pehn Thmey commune, Roousey Koe district, Phnom Penh

Article 2: The director of the department of Animal Health and Production has to take the veterinary measures in the infected zones as mentioned in article 1 of this Prakas as follow:

- Destroy all kinds of bird species in infected zones in accordance with veterinary measure way.
- Stop temporarily the sale and purchase or transport of all kinds of birds in, out or across the radiator of 3 km from the point of disease outbreak. This zone is the protected area.
- Follow up and conduct the research study on the origin of avian influenza within thirty (30) days and make the regular surveillance the bird circulation in a radiator of ten (10) km from the point of outbreak.

Article 3: The raising of all kinds of birds in the zones of avian influenza outbreak aforementioned in Article 1 is prohibited. The restocking authorization and the termination of being zoned as avian influenza areas would be defined in new Prakas.

Article 4: Whoever violates the Article 1, Article 2 and Article 3 of this Prakas is penalized in accordance with the Article 31 of the sub-decree Number 16 OrNorKror.BorKor dated March 13, 2003 on animal sanitary inspection and animal products.

Article 5: The Prakas or decisions of which the meaning is contraire to this Prakas will be rejected.

Article 6: General Executive Director of the ministry, directorate officer, cabinet, director of department of agricultural law, director of department of administration affairs, director of department of planning-statistics and international corporation, director of department of accounting and finance, director of department of animal health and production, director of provincial department of agriculture, forestry and fisheries of Kandal province and director of provincial department of agriculture, forestry and fisheries of Siem Reap province have to be responsible for implementation of this Prakas in an efficient way according to their duties from the date of signature.

Phnom Penh, January 23, 2004
Minister

Chan Sarun

Reception places:

- Council of ministers
- Ministry of Interior
- Ministry of Defense
- Ministry of Economics and Finance
- Ministry of Justice
- Ministry of Environment
- Ministry of Health
- Ministry of Information
- Cabinet of Prime Minister Hun Sen
- Provincial Hall of Kandal province
- Provincial Hall of Siem Reap province
- The same to Article 6
- Documents-Archive

Ministry of Agriculture, Forestry and Fisheries**Number: 020****DIRECTIVE ON THE PREVENTION OF HIGHLY PATHOGENIC AVIAN INFLUENZA**

The Ministry of Agriculture, Forestry and Fisheries have issued gradually the declarations and Prakas on the control measures of avian influenza epidemic notably: the declaration Number 114 SorChorNor.KorSor.Kor dated January 12, 2004 on the prevention of highly pathogenic avian influenza epidemic, Prakas Number 014 BroKor. KorSro.Kor dated January 16, 2004 on the establishment of temporary control check points of animal sanitary and animal products, Prakas Number 015 BroKor.KorSor.Kor dated January 16, 2004 on the prevention of avian influenza epidemic.

On January 23, 2004, the Ministry of Agriculture, Forestry and Fisheries received the analysis result from Pasteur Institute of France confirming that the avian influenza with virus subtype H5N1 was found in a farm in Pong Peay village, Phnom Penh Thmey commune, Roeusey Koe district, Phnom Penh of Kingdom of Cambodia.

So, to prevent and eliminate the epidemic of avian influenza, the Ministry of Agriculture, Forestry and Fisheries would like to give the direction and control measures as follow:

1. All levels of animal health and production officers have to make regular surveillance and control by prohibiting the import-export, circulation of bird, bird waste , bird feed and other means of transport cross or from the infected area.
2. The officers of animal health and production at provincial and city level have to advise and insist the farm owner to take strictly the sanitary and veterinary measures to prevent the disease epidemic.
3. The officers of animal health and production at provincial and city level have to carry out the research and follow up regularly the situation of avian influenza around the infected zone and then report to department of animal health and production.
4. The officers of animal health and production at provincial and city level have to make the extension to advise and explain the owners of bird farm about the avian influenza , consequence and measures and provide report urgently to the department of animal health and production in case of suspecting of avian influenza.
5. The officers of animal health and production at provincial and city level have to make more examinations and researches, when seeing the farms or places of raising have the avian influenza outbreak, report immediately the case and suggest the ministry of agriculture, forestry and fisheries to declare the zoning of avian influenza.

Receiving this directive, the director of department of animal health and production, director of provincial departments of agriculture, forestry, fisheries and chief of office of animal health and production of all provinces-cities and other involved institutions have to make largely the extension and try the best to apply this measures in a high effective and efficient way.

Phnom Penh, January 26, 2004
Minister

Chan Sarun

Copy to:

- Council of Ministers
- Ministry of Information
 “For broadcasting”
- Ministry of Economic and Finance
- Ministry of Health
- Ministry of Commerce
- Ministry of Environment
 “For the information”
- All Municipalities of Provinces-Cities
 “For the information and collaboration”
- All the departments under the ministry of
agriculture, forestry and fisheries
 “For the information”
- Documents-Archive

Ministry of Agriculture, Forestry and Fisheries
Number: 545

DECLARATION ON HIGHLY PATHOGENIC AVIAN INFLUENZA SITUATION

The inter-committee of avian influenza prevention would like to let all citizens in Cambodia know that previously the ministry of agriculture, forestry and fisheries as well as inter-committee have gradually informed about the avian influenza outbreak situation both in the region and in Cambodia and have also put in place the control measures through the specialized authorities and all levels of involved authorities to prevent and eliminate the epidemic.

In accordance with the declaration and Prakas of ministry of agriculture, forestry and fisheries and inter-committee, the specialized authorities in collaboration with citizens found two new infected zones:

1. In Boeung Chuok village, Kilometer 6 commune, Roeusey Koe district, Phnom Penh where there are 43 birds. The result was confirmed by Pasteur Institute of France on January 31, 2004 it was infected by avian flu with virus group H5N1.
2. In national zoo and wild aid center, the sampling of a heron and two cormorants were sent to Pasteur Institute of France for analysis. The result shows that two cormorants are not infected with avian influenza but the heron has virus of avian influenza (H5) but we do not know yet which sub-group of N it is to be.

Within the presence of these two new cases of bird flu and the precaution of epidemic from the infected ones to other birds or from infected birds to humans, the inter-committee would like to confirm all citizens:

1. With regard to these two cases, the officers specialized in animal health and production have already taken correctly the veterinary measures.
2. The citizens whose birds have diseases have to confirm the animal health and production officers or the local authorities very close to the farms, so that they could take the veterinary measures on time.
3. The visit at national zoo and wild aid center of Phnom Tamoa is temporarily prohibited until there is a new declaration.

With this declaration, the inter-committee of prevention of avian influenza epidemic strongly hopes that the all citizens and people keep fiability and still continue the collaboration with all levels of

authorities. The inter-committee of avian influenza epidemic prevention will issue the declarations of avian influenza evolution.

Phnom Penh, February 04, 2004
Minister of Agriculture, Forestry and Fisheries also the president
of inter committee of avian influenza epidemic

Chan Sarun

Copy to:

- Council of Ministers
- Ministry of Economic and Finance
- Ministry of Health
- Ministry of Environment
“For the information”
- Ministry of Information
“For broadcasting”
- All Municipalities of Provinces-Cities
“For the information and collaboration”
- Department of Animal Health and Production
- Provincial Departments of Agriculture,
Forestry and Fisheries of all provinces-cities
“For implementation”
- Documents-Archive

Ministry of Agriculture, Forestry and Fisheries

Number: 030

**DECLARATION ON TEMPORARY PROHIBITION OF VISIT AT BIRD ZOO
IN NATIONAL ZOO AND WILD AID CENTER PHNOM TAMOA**

- Having seen the constitution of the Kingdom of Cambodia;
- Having seen the Royal Decree Number NorSor/RorKorTor/1198/72 dated November 30, 1998 on the appointment of the Royal Government of Cambodia;
- Having seen the Royal Kram Number 02/NorSor/94 dated July 20, 2004 enacting the law on the preparation and functioning of Council of Ministers;
- Having seen the Royal Kram Number NorSor/RorKorMor/0196/13 dated January 24, 1996 enacting the law on the establishment of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 17 OrNorKror.BorKor dated April 07, 2000 on the organization and working process of Ministry of Agriculture, Forestry and Fisheries;
- With reference to the Prakas Number 313 BroKor.KorSorKor.ChorTor dated May 22, 1996 on the establishment of zoo;
- With reference to the Prakas Number 313 BroKor.KorSorKor dated September 26, 2002 on the determination of ticket price to visit the zoo Phnom Tamoa;
- In accordance with the necessity of Ministry of Agriculture, Forestry and Fisheries;

Hereby decides

Article 1: It is temporarily prohibited to pay a visit at the national zoo and wild aid center Phnom Tamoa until new declaration is issued.

Article 2: The General Executive Director of the ministry, Directorate Officer, Cabinet, President of Forestry Administration, Director of Department of Animal Health and Production, Director of Department of Administrative Affaires, Director of Department of Planning-Statistics and International Corporation and

other Involved Organism have to put in force this Prakas in accordance with their responsibilities from the date of signature.

	Phnom Penh, February 04, 2004 Minister Chan Sarun
--	---

Reception places:

- Council of ministers
- Ministry of Economics and Finance
- Ministry of Health
- Ministry of Environment
- Ministry of Tourism
- Ministry of Information
- Cabinet of Prime Minister
- Halls: Provinces-Cities
“For the information”
- The same to Article 2
“For implementation”
- Documents-Archive

Ministry of Agriculture, Forestry and Fisheries

Number: 067

PRAKAS ON ZONING OF HIGHLY PATHOGENIC AVIAN INFLUENZA

- Having seen the constitution of the Kingdom of Cambodia;
- Having seen the Royal Decree Number NorSor/RorKorTor/1198/72 dated November 30,1998 on the appointment of the Royal Government of Cambodia;
- Having seen the Royal Kram Number 02/NorSor/94 dated July 20, 2004 enacting the law on the preparation and functioning of Council of Ministers;
- Having seen the Royal Kram Number NorSor/RorKorMor/0196/13 dated January 24, 1996 enacting the law on the establishment of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 17 OrNorKror.BorKor dated April 07, 2000 on the organization and working process of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 16 OrNorKror.BorKor dated March 13, 2003 on the animal sanitary inspection and animal products;
- With reference to the letter Number 039/IPC/Dir/2004 dated February 06, 2004 on the result from lab of Pasteur Institute of France;
- In accordance with the necessity of Ministry of Agriculture, Forestry and Fisheries;

Hereby decides

Article 1: Two (2) zones are determined infected by avian influenza with virus group H5N1:

- 1- National zoo wild aid center of Phnom Tamoia located in, Trapeang Sap, Trapeang Sap commune, Bati district, Takoe province.
- 2- Boeung Chhouk village, Kilometer 6 commune, Roeusey Koe district, Phnom Penh.

Article 2: The director of the department of Animal Health and Production has to take the veterinary measures in the infected zones as mentioned in article 1 of this Prakas as follow:

- Destroy all kinds of bird species in infected zones in accordance with veterinary measure way.

- Stop temporarily the sale and purchase or transport of all kinds of birds in, out or across the radiator of 3 km from the point of disease outbreak. This zone is the protected area.
- Follow up and conduct the research study on the origin of avian influenza within thirty (30) days and make the regular surveillance the bird circulation in a radiator of ten (10) km from the point of outbreak.

Article 3: The raising of all kinds of birds in the zones of avian influenza outbreak aforementioned in Article 1 is prohibited. The restocking authorization and the termination of being zoned as avian influenza areas would be defined in new Prakas.

Article 4: Whoever violates the Article 1, Article 2 and Article 3 of this Prakas is penalized in accordance with the Article 31 of the sub-decree Number 16 OrNorKror.BorKor dated March 13, 2003 on animal sanitary inspection and animal products.

Article 5: The Prakas or decisions of which the meaning is contraire to this Prakas will be rejected.

Article 6: General Executive Director of the ministry, directorate officer, cabinet, director of department of agricultural law, director of department of administration affairs, director of department of planning-statistics and international corporation, director of department of accounting and finance, director of department of animal health and production, director of provincial department of agriculture, forestry and fisheries of Kandal province and director of provincial department of agriculture, forestry and fisheries of Siem Reap province have to be responsible for implementation of this Prakas in an efficient way according to their duties from the date of signature.

Phnom Penh, February 11, 2004
Minister

Chan Sarun

Reception places:

- Council of ministers
- Ministry of Interior
- Ministry of Defense
- Ministry of Economics and Finance
- Ministry of Justice
- Ministry of Environment
- Ministry of Health
- Ministry of Information
- Cabinet of Prime Minister Hun Sen
- Provincial Hall of Kandal province
- Provincial Hall of Siem Reap province
- The same to Article 6
- Documents-Archive

Ministry of Agriculture, Forestry and Fisheries
Number: 079

PRAKAS ON ZONING OF HIGHLY PATHOGENIC AVIAN INFLUENZA

- Having seen the constitution of the Kingdom of Cambodia;
- Having seen the Royal Decree Number NorSor/RorKorTor/1198/72 dated November 30, 1998 on the appointment of the Royal Government of Cambodia;
- Having seen the Royal Kram Number 02/NorSor/94 dated July 20, 2004 enacting the law on the preparation and functioning of Council of Ministers;

- Having seen the Royal Kram Number NorSor/RorKorMor/0196/13 dated January 24, 1996 enacting the law on the establishment of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 17 OrNorKror.BorKor dated April 07, 2000 on the organization and working process of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 16 OrNorKror.BorKor dated March 13, 2003 on the animal sanitary inspection and animal products;
- With reference to the letter Number 034/IPC/Dir/2004 dated February 05, 2004 and the letter Number 040/IPC/DIR/2004 dated February 09, 2004 on the result from lab of Pasteur Institute of France;
- In accordance with the necessity of Ministry of Agriculture, Forestry and Fisheries;

Hereby decides

Article 1: Two zones are determined infected by avian influenza with virus group H5N1:

- 1-Prekthom village, Kbal Koh commune, Kien Svay district, Kandal province.
- 2- Boeung Daunpa village, Slor Krom commune, Siem Reap district, Siem Reap province.

Article 2: The director of the department of Animal Health and Production has to take the veterinary measures in the infected zones as mentioned in article 1 of this Prakas as follow:

- Destroy all kinds of bird species in infected zones in accordance with veterinary measure way.
- Stop temporarily the sale and purchase or transport of all kinds of birds in, out or across the radiator of 3 km from the point of disease outbreak. This zone is the protected area.
- Follow up and conduct the research study on the origin of avian influenza within thirty (30) days and make the regular surveillance the bird circulation in a radiator of ten (10) km from the point of outbreak.

Article 3: The raising of all kinds of birds in the zones of avian influenza outbreak aforementioned in Article 1 is prohibited. The restocking authorization and the termination of being zoned as avian influenza areas would be defined in new Prakas.

Article 4: Whoever violates the Article 1, Article 2 and Article 3 of this Prakas is penalized in accordance with the Article 31 of the sub-decree Number 16 OrNorKror.BorKor dated March 13, 2003 on animal sanitary inspection and animal products.

Article 5: The Prakas or decisions of which the meaning is contraire to this Prakas will be rejected.

Article 6: General Executive Director of the ministry, directorate officer, cabinet, director of department of agricultural law, director of department of administration affairs, director of department of planning-statistics and international corporation, director of department of accounting and finance, director of department of animal health and production, director of provincial department of agriculture, forestry and fisheries of Kandal province and director of provincial department of agriculture, forestry and fisheries of Siem Reap province have to be responsible for implementation of this Prakas in an efficient way according to their duties from the date of signature.

Phnom Penh, February 26, 2004
Minister

Chan Sarun

Reception places:

- Council of ministers
- Ministry of Interior
- Ministry of Defense
- Ministry of Economics and Finance
- Ministry of Justice
- Ministry of Environment
- Ministry of Health

- Ministry of Information
- Cabinet of Prime Minister Hun Sen
- Provincial Hall of Kandal province
- Provincial Hall of Siem Reap province
- The same to Article 6
- Documents-Archive

Ministry of Agriculture, Forestry and Fisheries
Number: 102

PRAKAS ON ZONING OF HIGHLY PATHOGENIC AVIAN INFLUENZA

- Having seen the constitution of the Kingdom of Cambodia;
- Having seen the Royal Decree Number NorSor/RorKorTor/1198/72 dated November 30, 1998 on the appointment of the Royal Government of Cambodia;
- Having seen the Royal Kram Number 02/NorSor/94 dated July 20, 2004 enacting the law on the preparation and functioning of Council of Ministers;
- Having seen the Royal Kram Number NorSor/RorKorMor/0196/13 dated January 24, 1996 enacting the law on the establishment of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 17 OrNorKror.BorKor dated April 07, 2000 on the organization and working process of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 16 OrNorKror.BorKor dated March 13, 2003 on the animal sanitary inspection and animal products;
- With reference to the letter dated March 02, 2004 on the result from lab of Pasteur Institute in Cambodia;
- In accordance with the necessity of Ministry of Agriculture, Forestry and Fisheries;

Hereby decides

Article 1: Three (3) zones are determined infected by avian influenza with virus group H5N1:

- 1- Snor village, Rokar commune, Daun Koe district, Kandal province.
- 2- Trapaing Kror Bem village, Srerong commune, Trankak district, Takoe province.
- 3- Bos Angkanh village, Prek Thmey commune, Kiensvay district, Kandal province.

Article 2: The director of the department of Animal Health and Production has to take the veterinary measures in the infected zones as mentioned in article 1 of this Prakas as follow:

- Destroy all kinds of bird species in infected zones in accordance with veterinary measure way.
- Stop temporarily the sale and purchase or transport of all kinds of birds in, out or across the radiator of 3 km from the point of disease outbreak. This zone is the protected area.
- Follow up and conduct the research study on the origin of avian influenza within thirty (30) days and make the regular surveillance the bird circulation in a radiator of ten (10) km from the point of outbreak.

Article 3: The raising of all kinds of birds in the zones of avian influenza outbreak aforementioned in Article 1 is prohibited. The restocking authorization and the termination of being zoned as avian influenza areas would be defined in new Prakas.

Article 4: Whoever violates the Article 1, Article 2 and Article 3 of this Prakas is penalized in accordance with the Article 31 of the sub-decree Number 16 OrNorKror.BorKor dated March 13, 2003 on animal sanitary inspection and animal products.

Article 5: The Prakas or decisions of which the meaning is contraire to this Prakas will be rejected.

Article 6: General Executive Director of the ministry, directorate officer, cabinet, director of department of agricultural law, director of department of administration affairs, director of department of planning-statistics and international corporation, director of department of accounting and finance, director of

department of animal health and production, director of provincial department of agriculture, forestry and fisheries of Kandal province and director of provincial department of agriculture, forestry and fisheries of Siem Reap province have to be responsible for implementation of this Prakas in an efficient way according to their duties from the date of signature.

Phnom Penh, March 12, 2004
Minister

Chan Sarun

Reception places:

- Council of ministers
- Ministry of Interior
- Ministry of Defense
- Ministry of Economics and Finance
- Ministry of Justice
- Ministry of Environment
- Ministry of Health
- Ministry of Information
- Cabinet of Prime Minister Hun Sen
- Provincial Hall of Kandal province
- Provincial Hall of Siem Reap province
- The same to Article 6
- Documents-Archive

Ministry of Agriculture, Forestry and Fisheries
Number: 136

PRAKAS ON ZONING OF HIGHLY PATHOGENIC AVIAN INFLUENZA

- Having seen the constitution of the Kingdom of Cambodia;
- Having seen the Royal Decree Number NorSor/RorKorTor/1198/72 dated November 30, 1998 on the appointment of the Royal Government of Cambodia;
- Having seen the Royal Kram Number 02/NorSor/94 dated July 20, 2004 enacting the law on the preparation and functioning of Council of Ministers;
- Having seen the Royal Kram Number NorSor/RorKorMor/0196/13 dated January 24, 1996 enacting the law on the establishment of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 17 OrNorKror.BorKor dated April 07, 2000 on the organization and working process of Ministry of Agriculture, Forestry and Fisheries;
- Having seen the Sub-Decree Number 16 OrNorKror.BorKor dated March 13, 2003 on the animal sanitary inspection and animal products;
- With reference to the letter dated March 26, 2004 on the result from lab of Pasteur Institute in Cambodia;
- With reference to the letter dated April 02, 2004 on the result from lab of Pasteur Institute in Cambodia;
- In accordance with the necessity of Ministry of Agriculture, Forestry and Fisheries;

Hereby decides

Article 1: Two (2) zones are determined infected by avian influenza with virus group H5N1:

- 1- Phum Ti Praimmuoy village, Koh Samrong commune, Kampong Siem district, Kampong Cham province.
- 2- Kap Nim village, Chum Reah Porn commune, Samrong district, Takoe province.

Article 2: The director of the department of Animal Health and Production has to take the veterinary measures in the infected zones as mentioned in article 1 of this Prakas as follow:

- Destroy all kinds of bird species in infected zones in accordance with veterinary measure way.
- Stop temporarily the sale and purchase or transport of all kinds of birds in, out or across the radiator of 3 km from the point of disease outbreak. This zone is the protected area.
- Follow up and conduct the research study on the origin of avian influenza within thirty (30) days and make the regular surveillance the bird circulation in a radiator of ten (10) km from the point of outbreak.

Article 3: The raising of all kinds of birds in the zones of avian influenza outbreak aforementioned in Article 1 is prohibited. The restocking authorization and the termination of being zoned as avian influenza areas would be defined in new Prakas.

Article 4: Whoever violates the Article 1, Article 2 and Article 3 of this Prakas is penalized in accordance with the Article 31 of the sub-decree Number 16 OrNorKror.BorKor dated March 13, 2003 on animal sanitary inspection and animal products.

Article 5: The Prakas or decisions of which the meaning is contraire to this Prakas will be rejected.

Article 6: General Executive Director of the ministry, directorate officer, cabinet, director of department of agricultural law, director of department of administration affairs, director of department of planning-statistics and international corporation, director of department of accounting and finance, director of department of animal health and production, director of provincial department of agriculture, forestry and fisheries of Kandal province and director of provincial department of agriculture, forestry and fisheries of Siem Reap province have to be responsible for implementation of this Prakas in an efficient way according to their duties from the date of signature.

Phnom Penh, April 09, 2004
Minister

Chan Sarun

Reception places:

- Council of ministers
- Ministry of Interior
- Ministry of Defense
- Ministry of Economics and Finance
- Ministry of Justice
- Ministry of Environment
- Ministry of Health
- Ministry of Information
- Cabinet of Prime Minister Hun Sen
- Provincial Hall of Kandal province
- Provincial Hall of Siem Reap province
- The same to Article 6
- Documents-Archive