Production systems and poultry genetic resources utilized by small producers in areas of West Java and Central Java, Indonesia

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&

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GCP/RAS/228/GER Working Paper No. 11

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ABBREVIATIONS

AI	Avian Influenza
DOC	Day old chick
FAO	Food and Agriculture Organization
HPAI	High Pathogenic Avian Influenza
Rp	Indonesian Rupiah, 1 US Dollar (USD) ≈ 9 360 Indonesian Rupiah
Stdev	Standard Deviation

Recommended Citation

FAO. 2009. Production systems and poultry genetic resources utilized by small producers in areas of West Java and Central Java, Indonesia. Prepared by Muladno Muladno and O. Thieme. *GCP/RAS/228/GER Working Paper No. 11.* Rome.

PREFACE

The preparation of this report was part of the activities for the FAO project "Future prospects for the contribution of village poultry production to food security in developing Asian economies" (GCP/RAS/228/GER) that was funded by the "Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ)". The production systems of small poultry producers show a significant variety from very low input systems with scavenging birds to those with improved genetic resources, supplementary feeding and animal health interventions. In many countries the exact type of poultry used in the small production systems is presently not well understood. Investigating how local birds are affected by disease outbreaks will help to understand potential specific characteristics of the genetic resources. A good understanding of the production systems of small poultry producers including their priorities and constraints is also required to design and implement appropriate control strategies for the small poultry producers. This will help to achieve cooperation and proper involvement of small farmers in disease prevention and control programmes. It will also assist Governments to make appropriate plans for designing and implementing their disease control strategies. The present report summarizes information about the chicken production systems in four districts of West and Central Java, Indonesia. It is based on field investigations with selected producers in these districts. We hope it will provide accurate and useful information to its readers and any feedback is welcome by the authors and the Animal Production Service (AGAP)[1] of the Food and Agriculture Organization of the United Nations (FAO).

Disclaimer

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Acknowledgement

We are grateful to all the interviewees who have shared their information. We also wish to acknowledge the hard working of the enumerators who have worked to collect the information for this study. Our special thanks go to Mr. José Luis Campo Chavarri for characterizing the plumage types and identifying plumage gene frequencies for the surveyed Kampung chickens.

Keywords

Poultry management, Poultry nutrition, Poultry breeds, Plumage types, Marketing, Disease control, Poultry and Culture

Date of publication: August 2009

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EXECUTIVE SUMMARY

The consumption patterns of poultry products in Yogyakarta and its surroundings and in the Jabodetabek region that includes Jakarta, Bogor, Depok, Tangerang, and Bekasi cities were investigated through interviews with 200 selected consumers by using structured questionnaires. The respondents were grouped by their gender, age, education and monthly household income. They were dominated by housewives aged 36-49 years, by elementary school graduates, and by those with an average monthly income of Rp. 2 647 000.

The aim of the study was to investigate the change of poultry consumption patterns before and after the major outbreaks of Avian Influenza. The types of birds purchased and their forms of products and purchase location are examined. The results show only limited influence of the risks from Highly Pathogenic Avian Influenza (HPAI) on consumption patterns. Consumers continue buying live poultry and its products in traditional markets and from street vendors. Eating outside the home from street stall is common and is now become increasingly trendy. Exotic poultry and cooled chicken meat have a bad image because people believe that they contain preservatives, antibiotics and chemicals. Most results of the survey results are in general similar for consumers in both Jabodetabek and Yogyakarta but few difference have been highlighted

1. INTRODUCTION

Since the bird flu outbreaks in mid 2003, millions of chickens have died in Indonesia. Death of chicken resulting from bird flu occurred in almost all areas of Indonesia. The negative impacts of the bird flu outbreaks in Indonesia included (a) a decrease in the chicken population between 40 and 60 percent in certain areas; (b) fear of the public from chickens; (c) decrease in consumption of chicken meat, and (d) economic loss for the chicken farmers. Until 2009, the death of chickens due to bird flu in Indonesia was still going on. The people however, do not seem to be any more concerned about news from bird flu. Currently, most people are not afraid of eating more chicken meat in its various forms of processing.

A survey was carried out in areas of West Java and Central Java to better understand the chicken production practices of small producers and how they have been affected by the outbreaks of Highly Pathogenic Avian Influenza (HPAI).The main purpose of this study was to (a) understand the chicken production systems of small-scale producers; (b) understand the priorities and constraints experienced by small farmer, (c) make this information available to assist the development of control strategies of HPAI for small farmers. It is expected that this information will help to achieve better cooperation and proper involvement of small farmers in disease prevention and control programmes. It will also assist Governments to make appropriate plans for designing and implementing their disease control strategies

2. MATERIALS AND METHODS

Study locations

The districts, sub districts and villages selected for both of the two areas in West and in Central Java are presented in Table 1. In each sub district, five villages were selected, and in each village randomly five respondents. The total number of respondents from both areas was 200 farmers. Staffs from the districts livestock service assisted the survey team to identify farmers as respondents. All selected farmers had experiences with keeping chickens. The Geographic Position System (GPS) was used to record the exact location of the responding farmers in each village. The map 1 shows the location of the selected respondents.

Table 1 Villages selected for survey in West Java and Central Java

Areas	Districts	Subdistrict	Village	Respondents
WEST JAVA	SUKABUMI	CICURUG (CIC)	Bangbayang, Cisaat, Kutajaya, Pesawahan, dan Tenjolaya	25
		NAGRAK (NAG)	Cihanjawar, Cisarua, Nagrak Selatan, Nagrak Utara, dan Pawenang	25
	PURWAKARTA	BUNGURSARI (BUN)	Bungursari, Cibening, Cibungur, Dangdeur, dan Wanakerta	25
		PURWAKARTA (PUR)	Cisere, Citalang, Negeri Kidul Negeri Tengah, dan Tegal Munjul	25
SPECIAL REGION OF YOGYAKARTA	BANTUL	BANGUNTAPAN (BAN)	Banguntapan, Jambidan, Potorono, Singosaren, dan Wirokerten	25
		IMOGIRI (IMO)	Giri Rejo, Karang Tengah, Selopamioro, Sriharjo, dan Wukirsari	25
CENTRAL JAVA	MAGELANG	NGLUWAR (NGL)	Blongkeng, Ploso Gede, Bligo, Jamus Kauman, dan Sumokaton	25
		SALAM (SAL)	Gulon, Sucen, Sumukerto, Tirto, dan Tresan Gede	25

Map 1 Location of the surveyed poultry owners in West and Central Java

Data recording

All information and data of the survey were collected by enumerators. They were trained before the main survey and guided by a supervisor. The tasks of the enumerators included interviews with the selected farmers, with the farmer's leader, with staffs of the district livestock service, as well as the weighing and measuring of chickens and taking their photographs. Each enumerator was responsible for 25 farmers in a sub district or 5 farmers per village. There were two supervisors assisting and guiding four enumerators each. Individual information for chickens was collected for five birds from each respondent. The data sheets that were used for the survey are given in the Annexes 1-3.

Data analysis

All data were recorded and tabulated in the Excel computer program. Simple statistical analysis was used to describe a variety of traits by using the tools of the Excel program.

3. RESULTS

General information about the surveyed villages

In West Java the number of inhabitants in each village ranged from 1 908 to 29 932 people and the number of households from 209 to 837. The average household had 4 members.

Table 2 Number of inhabitants, households, main crops and agricultural areas in surveyed villages in West Java

Village	Inhabitants	Households	Main crop	Agric. area (ha)
BUNGURSARI				
Bungursari	3 177	911	Rice	64.0
Cibening	6 200	1 773	Litchi fruit	433.5
Cibungur	3 346	992	Rice	103.0
Dangdeur	1 908	600	Litchi fruit	615.3
Wanakerta	3 102	209	Rice	79.5
PURWAKARTA				
Ciseureuh	29 932	8 373	Rice+corn	38.0
Citalang	6 280	1 723	Rice	347.6
Negeri Kidul	1 3818	3 660	Rice	92.0
Negeri Tengah	9 204	2 365	Rice	48.0
Tegal Munjul	19 000	4 172	Rice	82.0
CICURUG				
Bangbayang	5 467	1 278	Rice	66.0
Cisaat	8 266	2 484	Rice	220.5
Kutajaya	15 887	3 863	Rice	45.0
Pesawahan	8 330	2 175	Rice	504.1
Tenjolaya	5 795	1 494	Rice	175.0
NAGRAK				
Cihanjawar	5 179	1 443	Rice+vegetable	388.0
Cisarua	11 323	2 856	Rice	591.5
Nagrak Selatan	6 496	1 624	Rice	87.2
Nagrak Utara	14 106	3 900	Rice	221.7
Pawenang	5 117	1 472	Rice+vegetable	297.2

The average agricultural area of each village was 224.9ha, ranging from 38 to 615.3 ha. The main crop commonly cultivated in the surveyed villages is rice. There were only two villages that had litchi fruits as the main crop (See Table 2)

The average family size in the surveyed villages of Central Java was similar to that in West Java. The average agricultural area per village is approximately 254.2 ha with a range from 39 to 803.3 has. Although rice is still dominant the variety of crops is larger than in West Java (see Table 3).

Table 3 Number of inhabitants, households, main crops and agricultural areas in surveyed villages in Central Java

Village	Inhabitants	Households	Main crop	Agric. area (ha)
BANGUNTAPAN				
Banguntapan	32 894	8 554	Rice	803.3
Jambidan	8 019	2 127	Rice	337.4
Potorono	10 122	2 520	Rice	441.4
Singosaren	3 251	572	Rice	71.8
Wirokerten	11 014	2 547	Rice and corn	392.2
IMOGIRI				
Girirejo	4 582	906	Rice	52.0
Karang Tengah	5 042	1 530	Rice, corn, bean	449.0
Selopamioro	13 656	4 157	Rice, peanut	335.3
Sriharjo	9 791	2 420	Rice, bean	170.8
Wukirsari	3 858	989	Rice, corn	73.3
NGLUWAR				
Bligo	5 358	1 347	Rice, corn, chilli, peanut	392.0
Blongkeng	2 941	788	Rice, corn, chilli	151.0
Jamus Kauman	4 198	1 185	Rice, corn, chili	366.0
Ploso Gede	4 000	1 040	Rice, corn, chili	126.0
Sumokaton	2 585	807	Rice, corn, chili	126.0
SALAM				
Gulon	7 309	2 030	Rice	269.2
Somokerto	1 123	345	Rice	39.0
Sucen	4 176	1 180	Rice	198.0
Tersan Gede	3 054	936	Rice	178.0
Tirto	2 260	708	Rice	112.0

In the 40 surveyed villages there were paravets in 19 villages, veterinary medical shop in 3 villages, feedshop in 10 villages, chicken farms in 8 villages, chicken hatcheries in 5 villages, duck hatcheries in 2 villages, and quail hatcheries in 2 villages. In those villages the number of paravets ranged from 1 – 7; the number of veterinary medical shop from 1-4; the number of feedshop 1-4; the number of farms 1-14; the number of chicken hatchery 1-15; the number of duck hatcheries 3-4; and in the Potorono village of Banguntapan sub district in Bantul district, there were more than 40 quail hatcheries.

Chicken farms in the villages can generally be categorized as extensive and semi-intensive systems with an ownership of not more than 200 heads or an average of 15 chickens per farmer. In the extensive production system, chickens

are kept freely during the day while they return to the house during the night. No chicken house is available and chickens sleep everywhere around the farmer's house. In the semi-intensive system, a simple chicken house is constructed. During the day chickens remain within a fenced area but they are housed during the night. Only few farmers keep their chickens in intensive system. This was found only in the Tenjolaya village, of Cicurug district in West Java. One of the surveyed farmers had a breeding farm where he kept 600 productive females and 75 productive males. The production of day old chicks (DOC) was approximately 1500 heads per week.

Farmers' household characteristics

The general characteristics of the 200 interviewed respondents are summarized in Table 4. It shows that the majority was male and older than 35 years of age. The majority of the respondents in both locations was male. Their education was mostly elementary or junior High School and their families had up to five members. More than 60 percent of the respondents have access to phones and to radio with a larger proportion in Central Java than in West Java.

Table 4 General characteristics of respondents

Characteristics		West Java	Central Java
Gender	Male	72%	88%
	Female	28%	12%
Age	< 35 years	16%	8%
	35-50 years	37%	45%
	> 50 years	47%	47%
Education	No school	13%	7%
	Elementary-Junior H.S	58%	72%
	Senior High School	22%	18%
	University	7%	3%
Family Size	1-5 persons	83%	85%
	6-7 persons	14%	12%
	>8 persons	3%	3%
Access to radio	Yes	61%	73%
Mobile phone	Yes	64%	80%

About 30 percent of the respondents do not own any agricultural land and another 42 percent less than 0.3 hectare. None had more than 5 hectares which clearly indicates that the respondents were not only smallholders with respect to poultry production but also with respect to other agricultural resources (Figure 1).

Crops grown

Paddy is the most common crop cultivated by the respondents both in West and Central Java. In West Java, 39 respondents plant paddy on an average area of 0.62 ha; in Central Java, 40 respondents plant paddy on an average area of 0.31 ha. There were 15 crops commonly planted in West Java and 18 crops in Central Java. Some respondents use their land for cultivating more than one crop on the same land such as bananas, litchis or mangos. The agricultural products are mostly used for home consumption and for sale (Table 5 and 6).

Figure 1 Land owned by respondents (Percentages)

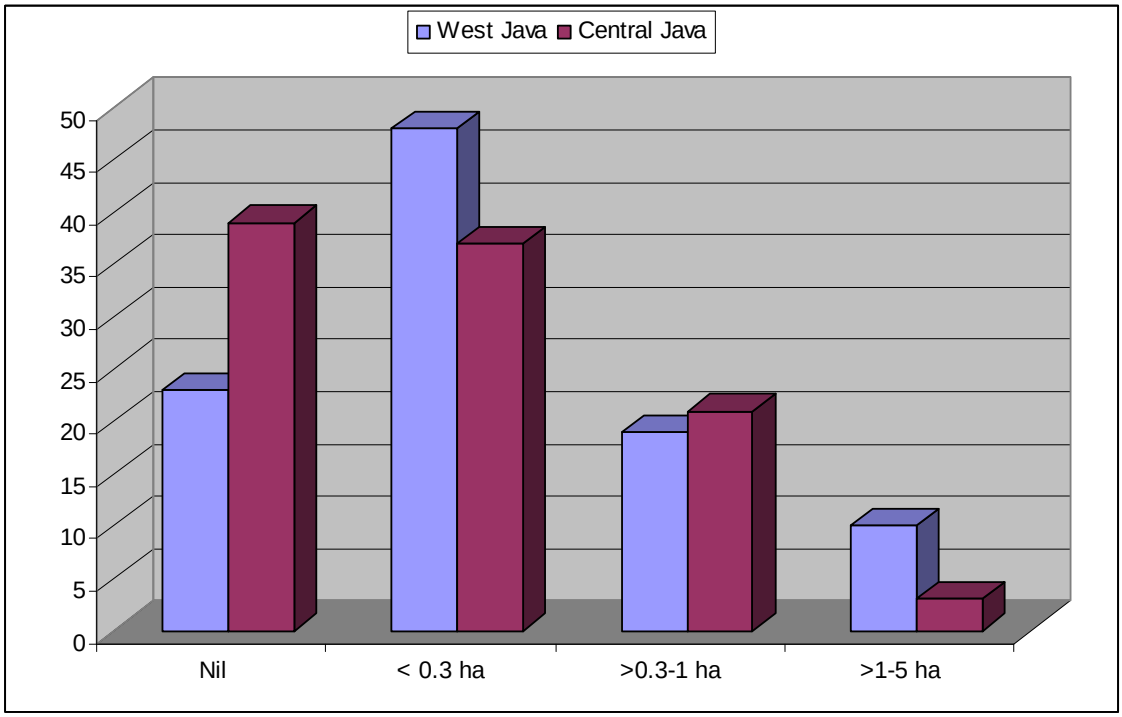


Table 5 Main crops, land used and main purpose of these crops for respondents in West Java

Main Crops (no of respondents)	Average Land used (range) (ha)	Number of Respondents Using Crops for		
		Market	Consumption	Market+Consume
Paddy (39)	0.62 (0.02 - 4)	1	5	33
Litchi (18)	0.62 (0.20 – 1)	0	0	6
Cassava (14)	0.41 (0.02 – 1)	0	2	12
Banana (7)	0.29 (0.00 – 1)	1	3	3
Fish (5)	0.02 (0.00 - 0.05)	1	0	4
Banana. Litchi (2)	0.09 (0.04 - 0.14)	0	0	2
Long Green Bean (2)	0.18 (0.05 - 0.30)	1	0	1
Bamboo (1)	1.0	0	0	1
Banana. Litchi. Mango (1)	0.70	0	0	1
Coconut (1)	1.0	0	0	1
Coconut/Mango (1)	0.063	0	1	0
Flowers (1)	0.05	1	0	0
Secondary crop (1)	2.0	0	0	1
Strawberries (1)	0.03	1	0	0
Vegetables (1)	0.05	0	0	1

Table 6 Main crops, land used and main purpose of these crops for respondents in Central Java

Main Crops (no of respondents)	Average Land used (range) (ha)	Number of Respondents Using Crops for		
		Market	Consumption	Market+Consume
Paddy (40)	0.31 (0.05 - 1.25)	6	4	30
Maize (10)	0.26 (0.05 – 1)	9	0	1
Paddy. Maize (8)	0.34 (0.10 – 1)	3	0	5
Chili (6)	0.07 (0.05 - 0.10)	4	1	1
Banana (3)	0.53 (0.30-1)	2	0	1
Beans (3)	0.23 (0.10-0.30)	3	0	0
Coconut (3)	0.37 (0.30 - 0.50)	1	1	1
Peanuts (3)	0.57 (0.20 – 1)	3	0	0
Cassava (1)	0.02	0	0	1
Chili/Maize (1)	0.05	1	0	0
Chili/Vegetables (1)	0.10	0	0	1
Grape (1)	1.0	1	0	0
Mango (1)	1.0	1	0	0
Tobacco (1)	0.25	1	0	0
Vegetables (1)	0.05	0	1	0
Zalacca (1)	0.40	0	0	1
Paddy/Maize/Chili (1)	0.20	0	0	1
Paddy/Vegetable (1)	1.0	1	0	0

Role of livestock

The use of livestock in the villages reflects their importance in the life of the farmers' family. Animals have several important roles for farmers and their families such as (1) source of food; (2) being a business unit; (3) a means for savings; (4) a source of energy/power/strength (large ruminants); (5) a source of fertilizers and; (6) part of the socio cultural life of the village community.

In all the surveyed villages, chickens are the most common animals owned by the respondents. There were 21 percent of the respondents using chickens only for market purposes and 12 percent only for home consumption, the remaining keep them for both purposes. Chickens dominate the livestock production because their investment requirements are small; they are easy to raise and to sell. Ducks were kept by 6 percent and 11 percent of the respondents in West Java and in Central Java, respectively. There were only 9 respondents owning cattle or buffaloes. The respective figures for small ruminants were 24 respondents owning sheep and 22 owning goats. All respondents possessing large ruminants use them for commercial purpose only (Figure 2). The priority of the different livestock species for the interviewed families is shown by Figure 3. Chickens and ducks have a low to medium priority for most of the respondents.

Figure 2 Main uses of different animal species owned (percentage of respondents)

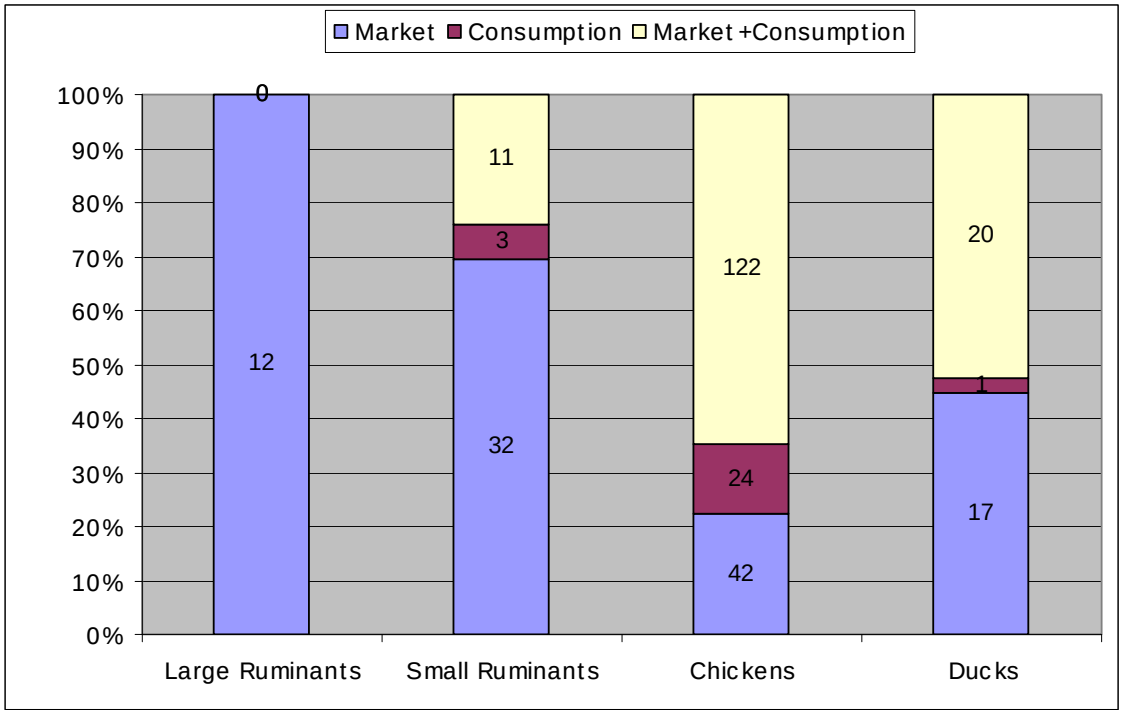
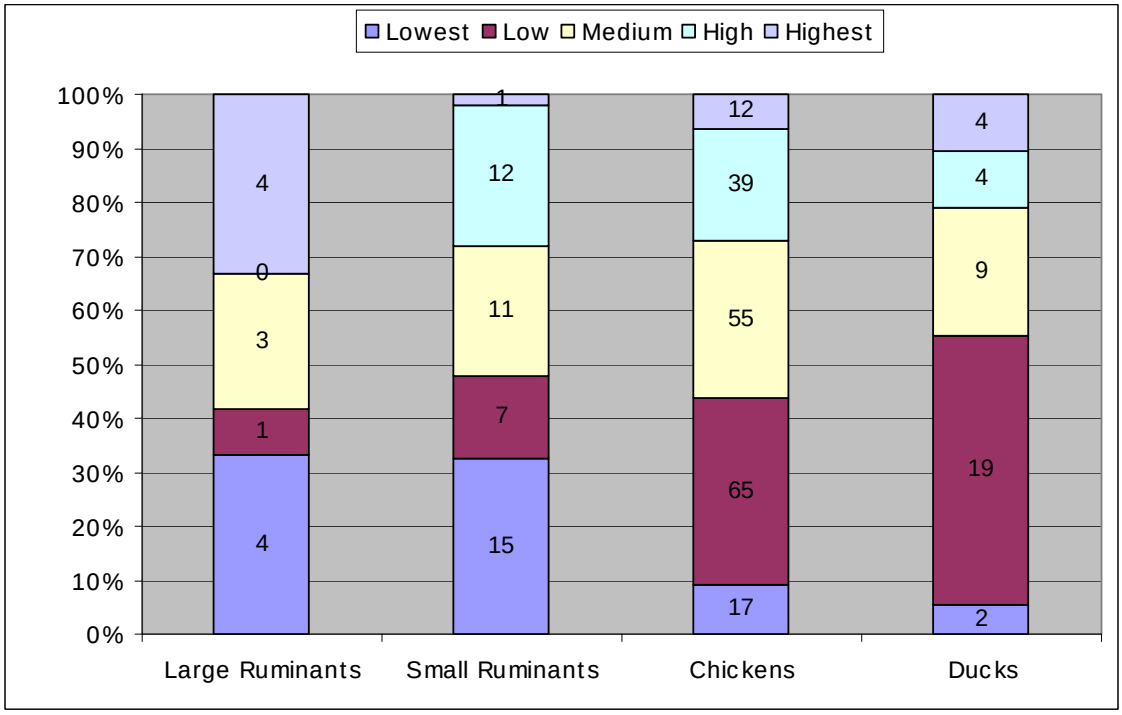


Figure 3 Priority of different animal species for the family (percentage of respondents)



Chicken numbers and flock management

Local chickens are the most common poultry owned by the respondents. Only 12 respondents possessed crossbred chickens. The average number of local and crossbred chickens owned by the respondents in different age groups is shown by

Table 7. The highest numbers of chicken are those with an age below one month. Chickens are usually sold between three to six months of age. In addition to local ducks, crossbred ducks were found with three respondents only in Central Java. They are known as *Mandalung* duck which are the result of crossbreeding between *Anas plynthyrinchos* and *chairna muschata* ducks.

Table 7 Average numbers of local and crossbred chickens and ducks maintained by the respondents in West and Central Java

Age group	Local Breed				Crossbred
	West	Central	All	Proportion	All
Chickens *	90	93	183		12
< 1 month	14.2	8.4	11.3	38.4%	13.6
Female < 6 months	5.9	5.6	5.8	19.6%	1.8
Female > 6 months	6.7	3.7	5.1	17.5%	6.5
Male < 6 months	4.9	3.8	4.3	14.6%	4.0
Male > 6 months	4.5	1.4	2.9	9.9%	1.9
Total	36.2	22.8	29.4		27.8
Ducks*	11	22	33		3
< 1 month	14.4	3.4	7.3	32.3%	0.0
Female < 6 months	5.9	4.2	4.8	21.2%	0.0
Female > 6 months	9.3	6.3	7.3	32.5%	4.0
Male < 6 months	2.2	0.7	1.2	5.4%	3.3
Male > 6 months	2.3	1.8	1.9	8.6%	1.7
Total	34.1	16.4	22.5		9.0

* Number of respondents, one poultry and one duck farmer had extraordinary large flock sizes and were therefore excluded from the average values

Most respondents reported that the number of their chickens decreased during the five years preceding the survey but there were also those who reported an increase or stable flock size (Figure 4). During AI outbreaks, most respondents sold their chickens and were afraid to keep larger numbers of chickens for years. This situation continued until 2008 when the survey was conducted. Overall, the numbers of chickens decreased in all surveyed villages.

The numbers of birds in the respondent's poultry flocks change with the season. The poultry populations are largest during the dry season, both for chickens and ducks while they are lowest during the rainy season (Figure 5). In Indonesia the dry season usually last from April to September while the rainy season is usually from October to March. Regardless of AI outbreaks, death of chickens often happens during the rainy season or before the onset of the rainy season. Many respondents stated that the death of chickens was usually caused by Newcastle Disease (ND) and *Gumboro*. In anticipation of these losses farmers usually sell their chickens before the onset of the rainy season which reduces the population of chickens during this season. A similar situation exists for the duck population.

Figure 4 Development of flock sizes during the five years preceding the survey (percentage of respondents)

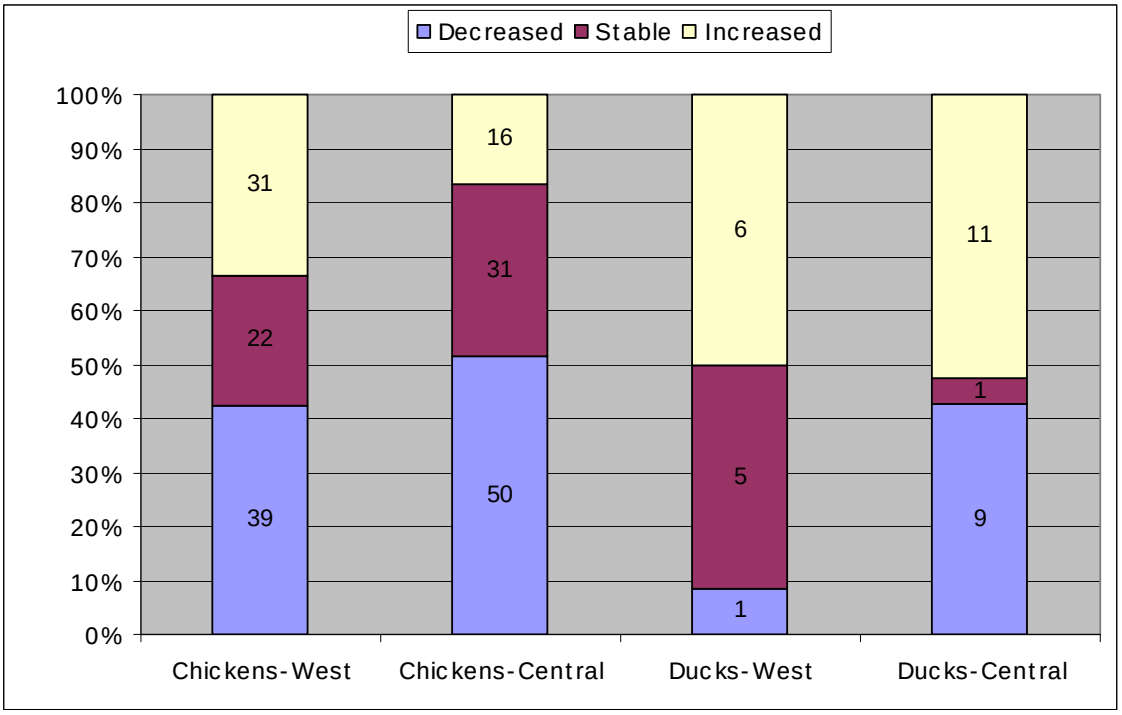
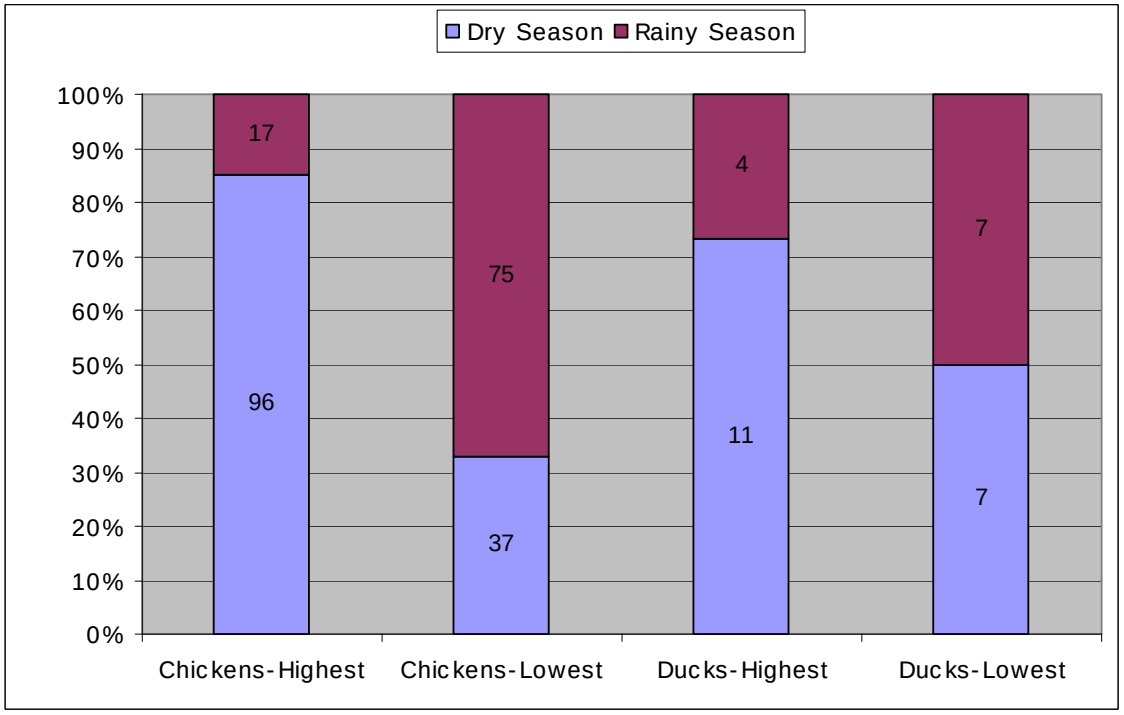


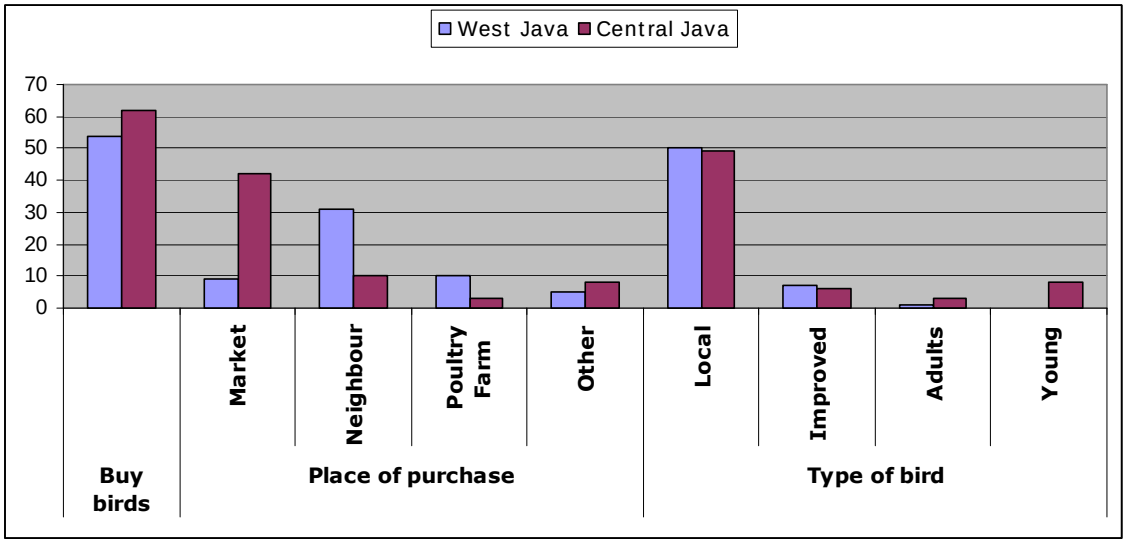
Figure 5 Seasons with highest and lowest flock numbers for chickens and ducks (percentage of respondents)



Respondents in West Java and in Central Java have a slightly different approach regarding buying of birds. In West Java they buy from their neighbours while in Central Java usually from markets (Figure 7). The respondents in West Java believe that it is safer to buy birds from their neighbours because of quality and resistance to disease. They usually buy local birds. Most respondents do not have specific criteria for selecting chicken individually, but usually check the health condition of

the local chickens. Sometimes phenotypic characteristics such as feather colours or head shape are also considered. Other characteristics that were asked like longevity, ability to live on its own, number of eggs laid, colour of eggs, taste of meat, disease resistance, and good mothering qualities are rarely considered. Some respondents said that it is difficult to consider such individual characteristics and therefore just use their own impression while buying birds. In addition, there usually exist no records of individual chicken.

Figure 6 Proportion of respondents buying birds, places of purchase and type of birds that are bought (percentage of respondents)



Production technology

Most respondents are small scale farmers who have less than 50 heads of chickens. The reasons for not having larger flocks include among others:

(a) Limited space in their house's yard;
(b) Not enough money to invest in a chicken farm and;
(c) Limited work power which allows only for part-time activities.

They usually grow the chickens from Day Old Chicken until they reach market age between 3 and 6 months. Some respondents construct a simple chicken house attached to their own house or within the yard of their house, but some respondents do not have a chicken house at all. The chicken house is usually surrounded by a fence. Those who have no chicken house keep their chickens in the backyard. Detailed information from the respondents about their chicken houses is summarized in Table 8. The answers from the farmers in West and Central Java are similar. Only 25 percent of the respondents reported to house their birds permanently, but most house them during the night. The respondents gave no clear and specific answers why they do not house their birds but they feel that letting the chickens roam freely in the yard without cage is no problem. However, there were also a few respondents who always caged their chicken in a good and proper manner since they started to keep chickens.

For the construction of simple chicken houses, respondents in Central Java had used "on farm material", while those in West Java used purchase materials. This indicates that respondents in Central Java have more space in the yard than those in West Java. Some typical chicken houses are shown by the Photo 1. The majority of chicken owners use the manure as fertilizer and the second largest group (22 percent) has no special use for it.

Table 8 Housing practises for chickens in West and Central Java

Characteristics	West Java	Central Java	Both
Birds are housed day and night			
Yes	27%	23%	25.0%
No	73%	77%	75.0%
Birds are housed at night			
Yes	71%	64%	67.5%
No	6%	16%	11.0%
No answer	23%	20%	21.5%
Housing types			
Simple construction with on farm material	20%	59%	39.5%
Simple construction with purchased materials	74%	25%	49.5%
Improved construction	5%	0%	2.5%
No answer	1%	16%	8.5%
Manure disposal			
No special disposal or storage	7%	37%	22.0%
Feed to other animals	4%	7%	5.5%
Used as fertilizer	79%	35%	57.0%
Sold	1%	3%	2.0%
Others	3%	0%	1.5%
No answer	6%	18%	12.0%
Reason for not housing birds			
Not enough money to build	0%	6%	3%
Not necessary. birds do well without	5%	11%	8%
Others	1%	0%	0.5%
No answer	94%	83%	88.5%

Photo 1 Chicken houses for local birds of smallholders

Even though the rearing system is generally either extensive or semi-intensive, almost all respondents feed the birds. The feed is mostly purchased from the rice millers or from the market. In West Java, 45 percent of the respondents purchased all feed for their bird, but only 4 percent in Central Java. The proportions of farms purchasing different amounts of feed are shown separately for West and Central Java in Table 9. The most common feed purchased for the birds is usually rice bran

bought from the rice millers. Commercial concentrate feed with various compositions is also supplemented to the feed given. Most respondents also feed their birds with household waste and other agriculture wastes.

Table 9 Feeding practises for chickens in West and Central Java

Characteristics	West Java	Central Java	Both
Birds are fed			
Yes	99%	92%	95.5%
No	1%	8%	4.5%
Feed for birds is purchased			
Yes	90%	85%	87.5%
No	10%	7%	8.5%
No answer	0%	8%	4.0%
How much feed is purchased for birds			
100%	45%	4%	24.5%
75%	21%	19%	20.0%
50%	15%	36%	25.5%
25%	9%	26%	17.5%
0%	10%	15%	12.5%
Type of feed for birds			
Concentrate feeds produced on farm	26%	5%	15.6%
Purchased concentrate feeds	17%	15%	16.1%
Purchased rice brand	33%	21%	26.9%
Other feed not specified	15%	46%	30.6%
No purchase and no answer	9%	13%	10.8%
Source of purchased feed for birds			
Market	10%	43%	26.5%
Neighbour	8%	7%	7.5%
Others (rice miller)	50%	29%	39.5%
Market and rice miller	19%	6%	12.5%
No answer	13%	15%	14.0%

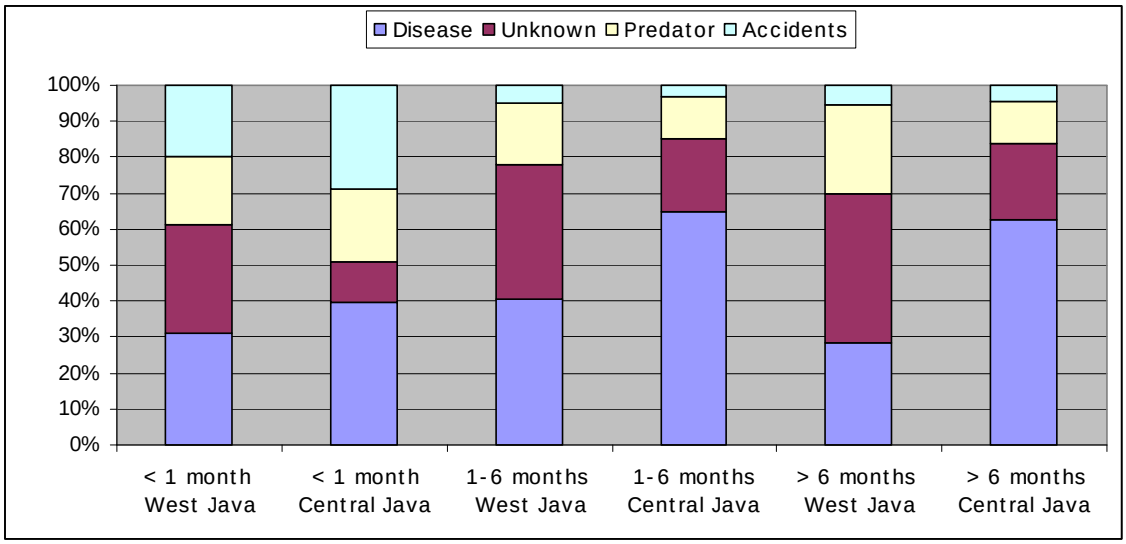
As respondents never record the mortality of their birds information about that subject is based on their memory and what usually happens to their birds. Such information is summarized in Table 10. If eggs are incubated by a broody hen, the average number of chicks hatched is 9.6. From those the numbers surviving are 7.6 until the first month of age and 6.2 chicks until six months of age. If Day Old Chicks are bought from commercial shops, which are usually hatched by incubators, the proportion of chick surviving the first month is 81 percent and up to six months is 79.1 percent. Only few respondents purchase DOCs and the amount that is purchased is not stable.

Table 10 Reports from poultry owners about survival of chicks born through natural and artificial incubation

Characteristics	Hatched by broody hen n=198	Calculated mortality	Artificial Incubation n=11
Chicks hatched	9.6 ± 3.77		-
Chicks surviving until 1 month of age	7.6 ± 3.29	20.6%	81.0% ± 18.47%
Chicks surviving until 6 months of age	6.2 ± 3.51	35.4%	79.1% ± 30.84%

The most important reason for losses in the periods until one and six months of age is usually disease. Accidents are more common during the first month of age than later. Disease is also the most important reason for losses of chickens from the laying age onwards. Unknown reasons for losses were also a frequent answer by the respondents. The importance of reasons for losses in the different age groups and locations are shown by Figure 7.

Figure 7 Reasons for chicken losses in the two locations for different age groups (percentage of respondents reporting)



According to information from the respondents the highest number of chickens is lost almost every year during the rainy season (Figure 8). Despite these losses most respondents do not use veterinary services for their birds. Instead they usually sell all their birds before the onset of the rainy season and then restart keeping birds after the end of the rainy season. Vaccination of birds is also not frequently done by the respondents (Figure 9). Vaccination was reported from respondents for Avian Influenza (40 in the West, 8 in Central), Newcastle Disease (20 in the West, 15 in Central) and *Gumboro* or Infectious Bursal Disease (9 in the West).

Figure 8 Season of chicken losses (percentage of respondents reporting)

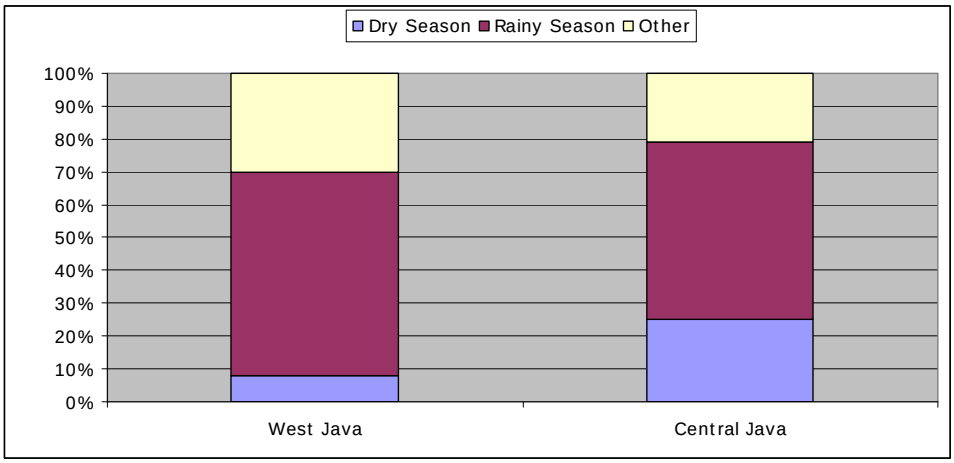
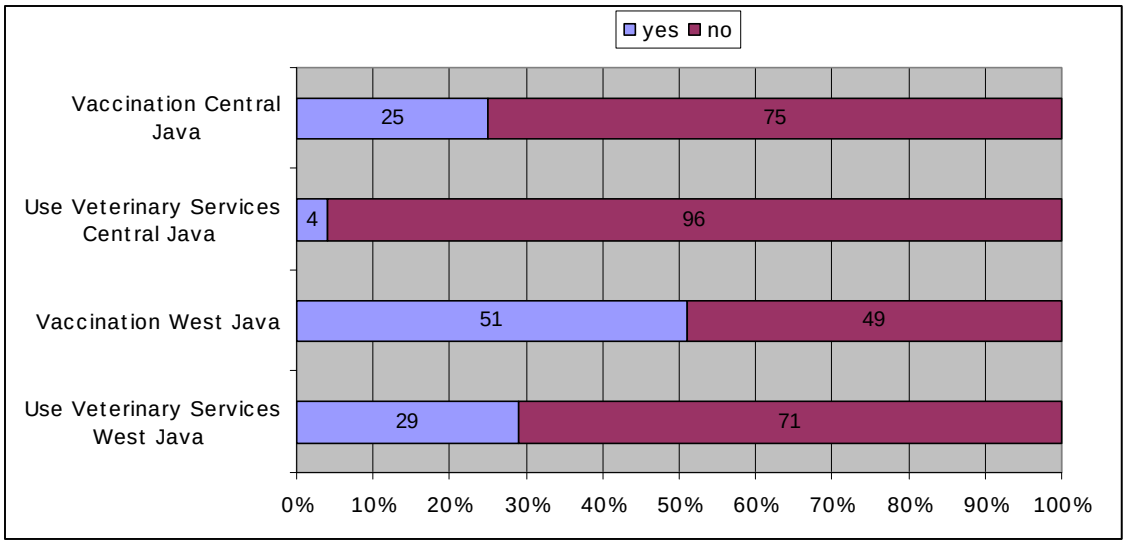


Figure 9 Use of veterinary service and vaccination (percentage of all respondents)



Marketing and work responsibilities

The products generated for selling from the chicken farms are mainly the bird itself and rarely eggs (Figure 10). Respondents don't need to go to markets for selling. Almost all sell their birds to traders who come to their villages to buy the chickens. These buyers then sell on the chicken to larger scale traders. Apart from selling to traders chicken producer in West Java also commonly sell to their neighbours (Figure 11). Because most respondents are only engaged in fattening of chickens almost nobody sells eggs. Eggs produced by the hens are usually used for hatching and the chicks are then reared until the slaughter age. The few cases where respondents reported selling eggs included those of selling for the Rahayu Group in the case of a farmer in Purwakarta and other that sell the eggs in the village market.

Figure 10 Marketing of birds and eggs (percentage of all respondents)

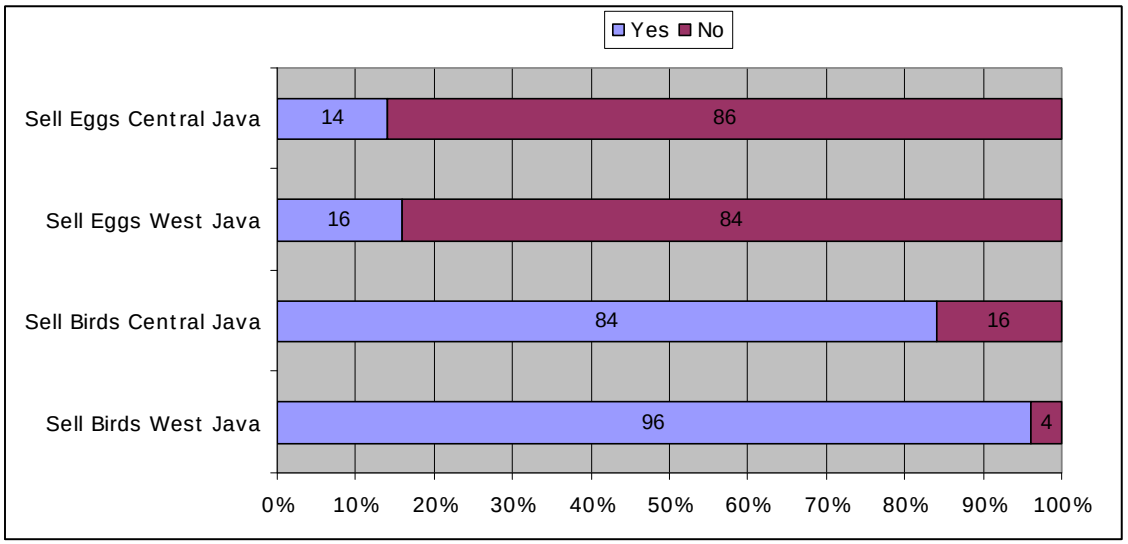
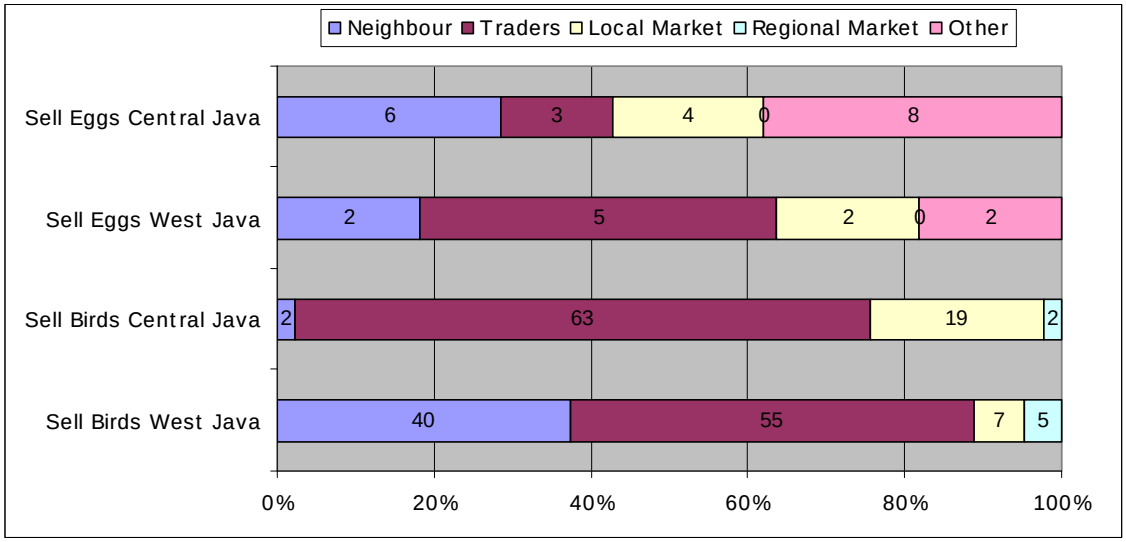
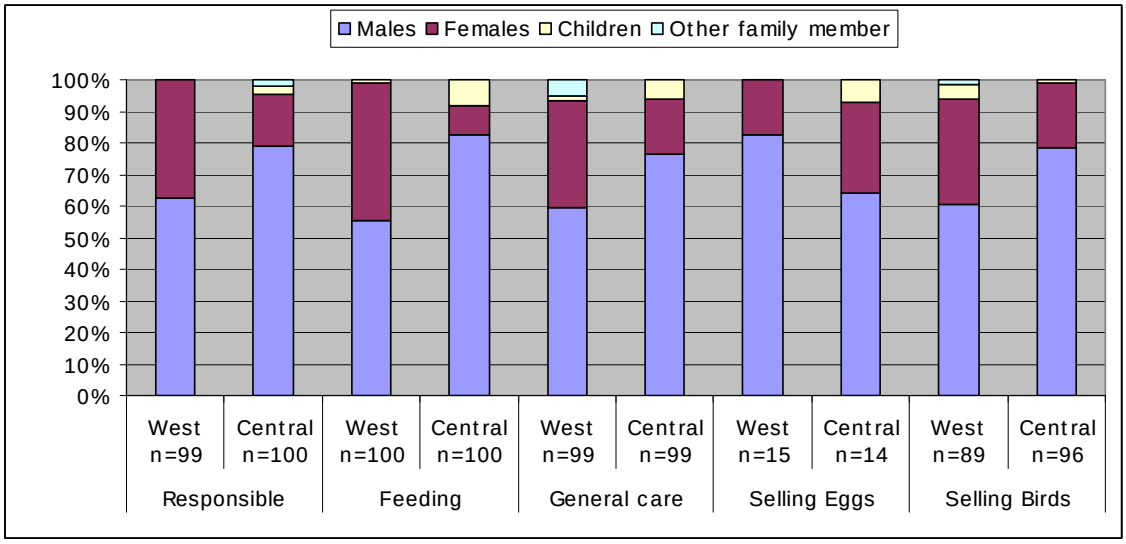


Figure 11 Ways of marketing birds and eggs (percentage of respondents)



In the surveyed villages mostly the male family members are responsible for all activities with the chickens including for rearing, feeding, caring, and cleaning up the cage. The men were also those who mainly answered the questions of the survey team and it is not clear whether this influenced the results about the role of the different family members. Results from other countries show a much higher involvement of female family members in small poultry production than found in this survey. The responsibility and involvement of the female members in the different poultry activities was larger in West Java than in Central Java (Figure 12). Some of the respondents reported joint responsibilities of different family members but which for purpose of analysis was allotted in the Figure 12 to the different groups. According to the survey results the role of children and other family members than husband and wife is not very important. None of the surveyed producers had employed workers to take care of their chickens. Selling of chickens and eggs is also mainly done by the men (Figure 12).

Figure 12 Responsibility of different family members for activities with chickens (percentage of respondents)



Chicken cages and general poultry health management

Of the 200 surveyed respondents 32.5 percent declared that they quarantine newly purchased chickens. Quarantine means for the respondents to put those birds in a separate places for a certain time before mixing them with the existing birds. A few farmers (3.5 percent) clean and sanitize their poultry cages before they receive new birds but a very large proportion of the farmers (40 percent) do not take any special action to deal with newly received birds. Some farmers (18.5 percent) also mix the newly arrived birds with the existing birds in the cages. These results show that farmers in general do not worry about disease transmission from birds entering the flock. The extensive type of keeping the *Kampung* chicken[2] and lack of facilities including limited space to keep chickens may reasons for this careless behaviour with respect to disease transmission.

Table 11 Respondent's opinion on their activities in poultry house

Farmers' Activity	Respondents	Percentage
Time of cleaning the shed		
When needed	133	66.5
During presence of birds	16	8.0
No action	10	5.0
After birds removed	2	1.0
Other practise	39	19.5
Way of cleaning the shed		
Clean with broom	147	73.5
Clean with water	12	6.0
Use disinfectant	10	5.0
Wait time before putting new birds	1	0.5
Other practise	30	15.0
Use of litter		
Use on own land	93	46.5
Store and sell	8	4.0
Use as fish feed	8	4.0
Other practise	54	27.0
Combination of above	37	18.5
Control of predators in shed		
Poison	8	4.0
Traps	11	5.5
Have no problems	163	81.5
Other practise	18	9.0

The cages where many chickens are kept are in general very simple in construction and made with materials from the surrounding areas such as bamboo and sago palm (see Table 8 and Photo 1 above). The cages are made and used for keeping chickens in a semi intensive production system. Farmers who keep chickens in an extensive production system do not require cages because chicken can sleep in the house of farmers or on the trees. Different practises related to hygiene and management of the cages and respondents' opinions are presented in Table 11. Farmers do not have a regular schedule for cleaning the cages and do this only when needed (66.5 percent of respondents). The surface of the cages is usually cleaned by using only a broom (73.5 percent of respondents) and few use water (6 percent) and disinfectant (5 percent) for cleaning. The litter from the

[2] Kampung is the term used for the local chickens of West and Central Java

cages is usually used on the farmers' own land (46.5 percent) but sometimes saved for selling (4 percent) or for feeding fish (4 percent). However, as chickens are kept semi intensively the amount of manure produced by the chicken that could be collected is limited. Most farmers (81.5 percent) have no problem with predators entering the cages and killing chickens, but few apply poison (4 percent) or traps (5.5 percent) as a precaution against predators.

Disease prevention and handling of dead birds

In case of disease in their farms the most common action by the surveyed poultry owners is to treat the sick chickens by themselves without assistance from veterinarians (45.5 percent of respondents). Only 2 percent ask for help from veterinarians or veterinary workers. There are also farmers who quarantine (9.5 percent), sell (2 percent) or slaughter the sick chicken (14.5 percent). If farmers have chickens that died 87.5 percent of the respondents reported that they burry or burn them. Sometimes died chicken are given to pets (6.5 percent) but they are rarely used as food (Table 12).

Table 12 Dealing with sick and dead chickens

Farmers' Activity	Respondents	Percentage
Action in case of sick chickens		
Treat birds with medicine	91	45.5
Slaughter sick birds	29	14.5
Quarantine sick birds	19	9.5
Sell sick birds	4	2.0
Get help from veterinarian	2	1.0
Get help from veterinary worker	2	1.0
Other practise	53	26.5
Dealing with dead birds		
Burry or burn them	175	87.5
Allow to be eaten by pets	13	6.5
Use them	2	1.0
Other practise	10	5.0

HPAI impacts and information sources about poultry diseases

HPAI disease cases have been found in Indonesia since mid 2003. The Indonesian Government officially declared presence of HPAI in early 2004 after the death of many commercial chickens including broilers and layers. The HPAI disease is still present in Indonesia and had also various impacts on *Kampung* chicken farmers. However, of the surveyed respondents 47.7 reported that Avian Influenza did not cause them any significant loss. Another 40.9 percent mentioned that AI cases had caused death of their chickens and 11.3 percent of them reported that their chicken were culled due to HPAI. It appears that the surveyed producers in West Java were less affected by HPAI than those in Central Java (Table 13).

Table 13 Impact of HPAI on surveyed poultry producers (percent of respondents)

Impact	West Java	Central Java	Both
Chicken died	12.7%	65.0%	40.9%
Chicken culled	3.9%	17.5%	11.3%
No losses	83.3%	17.5%	47.7%

Only 16 percent of the respondents did not receive information about AI but with a larger proportion of 29 percent in Central Java. The other respondents knew about the disease AI after receiving information through various channels. The most important information source was TV followed by local veterinary workers, neighbours or a combination of information sources (Table 14).

Table 14 Information sources of respondents about HPAI (percentage of respondents)

Sources of information	West Java	Central Java	Both
Television	31%	11%	21.0%
Local veterinary worker	13%	11%	12.0%
Neighbour	15%	8%	11.5%
District veterinarian	14%	5%	9.5%
Sub DAH	5%	5%	5.0%
Commercial company	3%	0%	1.5%
Combination of sources above	16%	30%	23.0%
No information	3%	29%	16.0%
No comment	0%	1%	0.5%

Efforts to control and prevent HPAI were reported by 35.5 percent of the respondents with no significant differences between the two regions. However, a larger proportion of respondents reported specific interventions. The most common measures that were taken were better cleaning of the premises, vaccination and disinfection. The use of other interventions is shown by Table 15. The proportion of respondents that had used vaccination was 39 percent. For 13 percent of the producers vaccination was applied once within a year, for 12.5 percent twice and for 7 percent three times. The prevention of HPAI through vaccinations or disinfectants is supported by the local government with technical facilitates and financial supports. It is worth noting that respondents in West Java have more awareness about HPAI prevention than those in Central Java, as indicated by the applied measures of cleaning the area of birds and vaccination of birds.

Table 15 Measures taken by the respondents to protect their chicken from HPAI disease (percentage of respondents)

Intervention	West Java	Central Java	Both
Better cleaned the area of birds	76%	44%	60.0%
Vaccination of birds	53%	25%	39.0%
Disinfection of premises	35%	34%	34.5%
Kept fewer birds	5%	42%	23.5%
Asked for technical advice	20%	25%	22.5%
Constructed or improved poultry housing	17%	23%	20.0%
Bought birds from secure sources	17%	17%	17.0%
Separated chicken from ducks	6%	20%	13.0%
Only allowed family members near birds	4%	15%	9.5%

The poultry producers were asked to prioritize for their own conditions on a scale from 1-5 (5=highest importance) specific measures for the control of Avian Influenza. At the same time they were also asked whether they already implemented those measures. The results are presented in Table 16. Almost all suggested approaches were ranked as lowest priority. Among the more popular

ones were disinfection and hand washing, probably a result of media campaigns and also easier to implement by the individuals than other approaches.

Table 16 Respondent's opinion on the best way to prevent AI disease

Approach	Percentage of Priority*					Applied %
	1	2	3	4	5	
Disinfections	23.4	7.6	17.4	19.0	17.9	14.7
Wash hands	20.7	14.5	14.5	21.2	12.3	16.8
Vaccination	34.8	13.0	13.0	22.3	9.8	7.1
Avoid contact with wild birds	41.3	20.1	12.5	11.4	9.8	4.9
Good supply of chicks	28.4	30.0	16.3	12.1	7.9	5.3
Restrict entry of visitor to farm	46.6	20.2	15.0	10.4	1.6	6.2
Mixing of species	30.7	38.6	13.7	7.2	1.3	8.5
Other	18.3	4.0	15.1	18.2	25.4	19.0

* Priority scale: 1 Lowest, 5 Highest Priority

There are several institutions and veterinary workers that could help farmers for preventing and handling sick chickens. However, most farmers (43.5 percent) do not use these services. The most important external assistance are local veterinary workers that are used by 8 percent of the surveyed poultry owners. Other persons or institutions such as District Veterinarians, staff from commercial companies or neighbours are not used by many for assistance (Table 17).

Table 17 Assistance for preventing disease and curing sick chickens

Means of assistance	Respondents	Percentage
Do it yourselves	87	43.5
No assistance	44	22.0
Local veterinary worker	16	8.0
District veterinarian	9	4.5
Sub DAH	4	2.0
Commercial company	3	1.5
Neighbour	2	1.0
Other	35	17.5

Similar to the approach that was used to understand views about HPAI control the respondents were also asked to rank their priorities for improving *Kampung* chicken production in general. The results (Table 18) do not clearly indicate a specific need and priority of the surveyed poultry producers. However, more technical advice, better supply of chicks and feed, better access to credit, and better health service are approaches that were considered more important by the respondents.

Table 18 Respondents' priorities for improving chicken production

Approach	Percentage of Priority*				
	1	2	3	4	5
More technical advice	20.0	5.5	13.0	35.0	25.5
Better access to credit	17.8	12.0	13.6	29.3	20.3
Better supply of chicks and feed	20.5	11.3	12.3	30.8	18.5
Better health services	16.6	6.0	21.1	35.7	17.1
Access to land for construction	24.2	15.7	28.3	17.7	6.1
Better marketing of products	36.2	11.7	15.3	15.3	5.6

* Priority scale: 1 Lowest, 5 Highest Priority

Qualitative and quantitative characters of local chickens

In order to characterize the local chickens one bird was randomly chosen from each respondent. Each bird was then visually inspected, information recorded into a data sheet (Annex 3) and photographs were taken. The shank length was measured and body weight recorded. The qualitative parameters are summarized in Table 19 and the quantitative parameters in Table 20. In addition to chickens few ducks were also characterized but results are not further described in this report due to small sample size.

The qualitative characters show that the majority of *Kampung* chickens characterized in this survey have shanks of yellow colour (56 percent), white skin (88 percent), single comb (46 percent), red ear-lobes (89 percent), and orange eyes (72 percent) (Table 15). Black and white shanks were also found with a frequency of 13 percent and 12 percent, respectively. In addition to the single comb type the surveyed *Kampung* also had pea combs (31 percent), rose combs (15 percent) and cushion combs (8 percent). Other special characteristics like crest, naked neck, beard and muff, polydactyl and silky or frizzled feathers were not found among the selected *Kampung* chickens.

Table 19 Distribution of qualitative characters of 185 adult Kampung chicken

Qualitative trait	Phenotype	Number	Frequency
Shank colour			
	Yellow	104	56%
	Black	24	13%
	White	22	12%
	Grey-Blue	21	11%
	Green	8	4%
	Yellow-Black	6	3%
Skin colour			
	White	163	88%
	Yellow	21	11%
	Black	1	1%
Comb type			
	Single	86	46%
	Pea	57	31%
	Rose	27	15%
	Cushion	14	8%
	Double	1	1%
Ear-lobe colour			
	Red	165	89%
	Red-White	10	5%
	White	6	3%
	Black	3	2%
	Blue	1	1%
Eyes colour			
	Orange	133	72%
	Red	27	15%
	Brown	17	9%
	Opaque	8	4%

Plumage types and plumage gene frequencies

The plumage types and plumage gene frequencies were determined from photographs of 162 Kampung chickens and the results are presented in Table 20

and Table 21. Black is the most common plumage type in the surveyed locations of Indonesia but with significant differences ($P < 0.001$) between the two regions (Table 20). The Black plumage is more frequent in Central Java (34 percent) than in West Java (11 percent) and the same is true ($P < 0.05$) for the **E** gene with 48 percent in Central Java compared to 25 percent in Central Java. There are also significant differences ($P < 0.05$) between the two regions for the Wild-type plumage. The Wild-type plumage is more frequent in West Java (14 percent) than in Central Java (4 percent).

Table 20 Plumage and other characteristics of Kampung chickens

Phenotype	Genes	Both Regions	West Java	Central Java	χ^2
Plumage					
Black	E	24%	11%	34%	***
Recessive Wheaten	e^y	19%	20%	18%	
Columbian	Co	12%	13%	11%	
Wild	e^+	9%	14%	4%	*
Silver	S (sex-linked)	8%	11%	5%	
Blue	Bl	7%	3%	10%	
Birchen	E^R	6%	10%	3%	
Melanotic	Ml	5%	7%	3%	
Brown	e^b	4%	4%	0%	
White	I (dominant)	4%	1%	7%	
White	c (recessive)	4%	6%	3%	
Mottling	mo	4%	4%	3%	
Lacing	Lg	3%	1%	4%	
Barring	B (sex-linked)	2%	3%	2%	
Pencilling	Pg	2%	1%	1%	
Double lacing		1%	0%	1%	
Spangling	Sp	1%	0%	1%	
Other Genes					
Fibromelanosis	Fm	2%	1%	2%	
Naked neck	Na	1%	0%	1%	
N		162	71	91	

Table 21 Plumage gene frequencies at the E, Co, Bl, I and S loci

Loci	Both Regions	West Java	Central Java	χ^2
E	38%	25%	48%	*
Co	13%	14%	13%	
Bl	7%	3%	10%	
I	6%	2%	8%	
S	5%	8%	3%	

The data about productive and reproductive traits of *Kampung* chicken in Table 20 show large variation for all the quantitative traits considered. The high variability of the body weight of the *Kampung* chicken may be a result of variations in age, type of *Kampung* chicken raised, the rearing system, and availability of feed sources. Except for body weight and shank length, the data presented were obtained from interviews with farmer's leaders from each of the visited villages. This way of data recording may also have had an influence on the precision of the data. The data obtained about hatching and survival of chicks is in the same range but slightly different from those received from the individual owners (see Table 10). The results indicate that chicken performance in West Java and Central Java are similar.

Table 22 Production and reproduction traits of Kampung chickens

Traits	West Java		Central Java	
	Mean	Stdv	Mean	Stdv
Age at start of laying (month)	6.9	1.07	5.9	1.45
Number of clutches per year	4.97	1.94	3.97	1.92
Egg numbers per clutch	11.2	2.44	11.2	2.87
Average egg weight (g)	42.0	6.1	43.6	15.09
Egg set per clutch per hen	10.6	2.23	10.6	2.86
Chicks hatched per clutch per hen	8.9	2.39	9.2	2.95
Chicks surviving 4 weeks per clutch per hen	7.9	2.38	7.1	2.99
Body weight male (g)* n= 97	2367.0	812.87	2189.0	1005.21
Body weight female (g)* n= 88	1875.7	930.10	1706.9	670.82
Shank length male (cm)* n= 97	11.5	1.86	11.3	2.01
Shank length female (cm)* n= 88	9.8	1.72	9.8	1.12

*) measured data; others: statement from respondents: Number of chicken measured = 56 males and 37 females (West Java); 41 males and 51 females (Central Java)

4. CONCLUSIONS

1. Chickens are the most popular poultry kept in the Indonesian villages. Most chicken farmers are not highly educated and have limited land for their agricultural activities. Paddy is the most common crop produced by the farmers and it is usually used for commercial purpose and family consumption. Poultry owners have, on average, less than 50 birds.

2. Most chicken operations are managed extensively (in backyard without chicken housing) or semi-intensively (with better management and chicken housing).

3. Most farmers have only limit knowledge of all subjects related to good farming practices for poultry.

4. Avian Influenza has caused losses to some of the poultry owners but has not largely changed management practises.

5. Local *Kampung* chickens in both West Java and Central Java are basically similar with respect to phenotype, reproductive and productive traits.

ANNEX 1: POULTRY PRODUCTION SYSTEM EVALUATION

Enumerator:	**Farm Code**

Part 1: Identification and Characteristics of Sample Household

<table>
<tr><td colspan="2">Date:</td><td rowspan="2">Regular Radio Listener:

1= yes 2= no</td></tr>
<tr><td colspan="2">District:</td></tr>
<tr><td colspan="2">Village:</td><td rowspan="2">Mobile or other phone access:

1= yes
2= no</td></tr>
<tr><td colspan="2">GPS Coordinates:</td></tr>
<tr><td colspan="2">Name of Respondent:</td><td rowspan="3">Land Owned:

1= Nil
2= Marginal: ≤ 0.3 ha
3= Marginal Small: ≤ 1 ha
4= Semi-medium: ≤ 5 ha
5= Medium: ≤ 10 ha
6= Large: > 10 ha</td></tr>
<tr><td colspan="2">Male: ☐ Female: ☐</td></tr>
<tr><td colspan="2">Age:</td></tr>
<tr><td>Education of Household Head:
Education of Respondent:

0= No School
1= Grade School
2= High School</td><td>HH:

RES:</td><td>Household Size (sharing common kitchen):
1= 1–5 members
2= 6 or 7 members,
3= 8 or 9 members,
4= > 9 members</td></tr>
</table>

2. Farm Characteristics

Main Crops	Proportion of Land	Main Use (1: Market, 2: HH Consumption)

	Main Use (1: Market, 2: HH Consumption)	**Priority for the family (1-5) 1=lowest, 5=highest**
Large Ruminants		
Small Ruminants		
Pigs		
Poultry		
Chicken		
Ducks		
Other		

Part 2: Animal Numbers and Flock Management

2.1 List Animals Owned

Category	Calves / lambs / kids	Female		Male		Total
		< *2* years	≥ *2* years	< *2* years	≥ *2* years	
Cows / bulls						
Buffaloes						
Sheep						
Goats						
Pigs						

Local Chicken Owned						
	Chicks	*Female*		*Male*		Total
	< 1 month	*< 6 months*	*> 6 months*	*< 6 months*	*> 6 months*	
Chicken						
Ducks						
Other (Name)						

Improved (Crossbred) Chicken Owned						
	Chicks	*Female*		*Male*		Total
	< 1 month	*< 6 months*	*> 6 months*	*< 6 months*	*> 6 months*	
Chicken						
Ducks						
Other (Name)						

	Chicken	**Ducks**
2.21 Did the number of animals in your poultry flock change during the last 5 years? 1= no, remained same 2= yes, increased 3**=** yes, decreased		
2.22 Does the number of animals in your poultry flock change with the season? **1=** yes **2=** no		
2.23 Which months are poultry numbers highest?		
2.24 Which months are poultry numbers lowest?		

Separate Form for chicken and ducks from here

2.3.a. Do you buy birds for your flock?	☐ **Yes**	☐ **No (go to Q 2.4.a)**
2.3.b. If YES, where do you buy birds?	☐ **Market** ☐ **Neighbour** ☐ **Commercial poultry farm** ☐ **Other: .....**	
2.3.c. If YES, what kind of birds do you buy?	☐ **Local Breed** ☐ **Improved Breed**	☐ **Young birds** ☐ **Adult birds**

2.3.d. Check all criteria you use for selection of birds you buy:

			Remarks
No special criteria:	□ **Yes**		_____
Size/Weight:	□ **Yes**	□ **No**	_____
Longevity:	□ **Yes**	□ **No**	_____
Ability to live on its own (needs no housing, good scavenger):	□ **Yes**	□ **No**	_____
Number of eggs laid:	□ **Yes**	□ **No**	_____
Colour of eggs laid:	□ **Yes**	□ **No**	_____
Taste of meat:	□ **Yes**	□ **No**	_____
Disease Resistance:	□ **Yes**	□ **No**	_____
Good mothering qualities	□ **Yes**	□ **No**	_____
Colour or pattern of plumage	□ **Yes**	□ **No**	_____

Other reasons (describe)

2.4.a.

Do you hatch your own eggs

☐ **Yes**

☐ **No**

2.4.b.

Do you try to get better birds for your flock?

☐ **Yes**

☐ **No (go to Q 3.1 a)**

2.4.c.

If YES, where do you get better animals?

☐ **From my own flock** _____

☐ **From the neighbour**

☐ **From the market** _____

☐ **From a commercial poultry farm** _____

☐

Other:..... _____

Why?

2.4.d. Check all criteria you use for selection of birds you use to improve your flock:

Size/Weight:	□ **Yes**	□ **No**	Remarks
Longevity:	□ **Yes**	□ **No**	_____
Ability to live on its own (needs no housing, good scavenger):	□ **Yes**	□ **No**	_____
Number of eggs laid:	□ **Yes**	□ **No**	_____
Colour of eggs laid:	□ **Yes**	□ **No**	_____
Taste of meat:	□ **Yes**	□ **No**	_____
Disease Resistance:	□ **Yes**	□ **No**	_____
Good mothering qualities	□ **Yes**	□ **No**	_____
Colour or pattern of plumage	□ **Yes**	□ **No**	_____
Other reasons (describe)			

Part 3: Production Technology

3.1.a. **Are your birds housed all day & night?**	☐ **Yes** ☐ **No**
3.1.b. **If NO, are your birds housed at night?**	☐ **Yes** ☐ **No (go to Q 3.1.e)**
3.1.c. **If your birds are housed (either only at night, or all day/night long), please described the housing type:**	☐ **Simple construction with on-farm materials** ☐ **Simple construction with purchased materials** ☐ **Improved construction (e.g., disease vector control, climate control)**
3.1.d. **If your birds are housed, how do you dispose of manure?**	☐ **No special disposal or storage** ☐ **Feed to other animals** ☐ **Use as fertilizer** ☐ **Sell** **Other:……**
3.1.e. **If your birds are NOT housed, give a reason**	☐ **Not enough money to build** ☐ **Not necessary, birds do well without** **Other:……**
3.2.a. Do you provide feed to your birds?	☐ **Yes** ☐ **No (go to Q 3.3.a)**
3.2.b. If YES, do you purchase feed for your birds?	☐ **Yes** ☐ **No**
3.2.c. If YES, approximately how much of the feed that you provide to your birds is purchased?	☐ **100 %** ☐ **75%** ☐ **50%** ☐ **25%** ☐ **0%**

3.2.d. If YES, describe the type of feed for your birds:	☐ **Purchased concentrate feeds** ☐ **Concentrate feeds (grains) produced on own farm** ☐ **Other (please name):**
3.2.e. If YES, describe source of purchased feed for your birds	☐ **Market** ☐ **Neighbour** **Other: .....**

We define three periods for estimating mortality.	*Age Period 1: Up to 1 month of age* *Age Period 2: From 1 to 6 months of age* *Age Period 3: From laying age onward*	
3.3.a. Do you take note of the mortality of your birds?	☐ **Yes** ☐ **No**	
3.3.b. If you incubate eggs by a broody hen try to give the following numbers:	**Number chicks hatched per mother:** **Number chicks survive period 1 per mother:** **Number Chicks that survive period 2 per mother:**	_____ _____ _____
3.3.c. If you purchase day old chicks try to give the following numbers:	**Proportion of chicks that survive period 1:** **Proportion of chicks that survive period 2:**	_____ _____
3.3.d. Name the most important reason for losses in Period 1:	☐ **Disease** ☐ **Predator (incl. theft)** ☐ **Accident** ☐ **Unknown reason**	
3.3.e. Name the most important reason for losses in Period 2:	☐ **Disease** ☐ **Predator (incl. theft)** ☐ **Accident** ☐ **Unknown reason**	
3.3.f. Name the most important reason for losses in Period 3:	☐ **Disease** ☐ **Predator (incl. theft)** ☐ **Accident** ☐ **Unknown reason**	

3.3.g. What is the season of the year with the highest losses?	
3.3.h. Do you use veterinary services for your birds?	□ **Yes** □ **No**
3.3.i. Do you vaccinate your birds?	□ **Yes** □ **No**
3.3. j **If yes, for which diseases do you vaccinate your birds?**	

Part 4: Market and Labour

4.1.a. Do you sell birds?	☐ **Yes** ☐ **No**
4.1.b. If yes, where?	☐ **To neighbours** ☐ **Local Market (< 10 km distance)** ☐ **Regional Market (> 10 km distance)** ☐ **To traders that come to the village** **Other:……**
4.1.c. Do you sell eggs?	□ **Yes** □ **No**
4.1.d. If yes, where?	□ **To neighbours** □ **Local Market (< 10 km distance)** □ **Regional Market (> 10 km distance)** □ **To traders that come to the village** **Other:……**
4.2.a. Who in your family is responsible for the birds?	□ **Yourself** □ **Your partner** □ **Your children** □ **Other family members** □ **Hired labour**

4.2.b. Who in your family is responsible for feeding the birds?	☐ **Yourself** ☐ **Your partner** ☐ **Your children** ☐ **Other family members** ☐ **Hired labour**
4.2.c. Who in your family is responsible for housing the birds (cleaning, maintenance)?	☐ **Yourself** ☐ **Your partner** ☐ **Your children** ☐ **Other family members** ☐ **Hired labour**
4.3.d. Who in your family sells eggs?	☐ **Yourself** ☐ **Your partner** ☐ **Your children** ☐ **Other family members** ☐ **Hired labour**
4.3.e. Who in your family sells birds?	☐ **Yourself** ☐ **Your partner** ☐ **Your children** ☐ **Other family members** ☐ **Hired labour**

ANNEX 2: HEALTH INFORMATION COLLECTED FROM POULTRY PRODUCERS

Farm Code: .....

Date.....

5. Poultry health and general impressions

5.1 What do you do when you get new birds? (Multiple answer possible)

1) Clean and disinfect before arrival ☐
2) Quarantine new birds ☐
3) Mix with existing to get them adjusted ☐
4) No special programme ☐

5.2 Do you clean the shed?

1) After birds removed ☐
2) During presence of birds ☐
3) When needed ☐

5.3 When you clean the shed what do you do? (Multiple answer possible)

1) Clean with broom ☐
2) Clean with water ☐
3) Use disinfectant ☐
4) Wait time before putting new birds ☐

5.4 What do you do with litter?

1) Move from farm to own land ☐
2) Store and sell ☐
3) Use as feed for fish ☐

5.5 How do you control pest?

1) Poison ☐
2) Traps ☐
3) Have no problems ☐

5.6 What do you do if you have sick birds?

1) Get help from veterinarian ☐
2) Get help from local veterinary worker ☐
3) Quarantine sick birds ☐
4) Treat birds with medicine ☐
5) Sell sick birds ☐
6) Slaughter sick birds ☐

5.7 What do you do with dead birds?

1) Bury or burns them ☐
2) Allows to be eaten by pets ☐
3) Mix with manure ☐
4) Use them ☐

5.8 Did you have animal losses through HPAI?

1) Poultry died ☐
2) Poultry culled ☐
3) No losses ☐

5.9 Where do you get information about HPAI? (Multiple answer possible)

1) Sub DAH ☐
2) District veterinarian ☐
3) Local Veterinary. Worker ☐
4) Commercial company ☐
5) Neighbour ☐
6) Get no information ☐

5.10 Precautionary measures realised on farm? 1Yes ☐ 2 No ☐

5.11 Vaccination (HPAI) on the farm? 1Yes ☐ 2 No ☐

5.12 How many times vaccinated against HPAI .....

5.13 Who helps with disease prevention and treatment of sick birds? (Multiple answer possible)

1) Sub DAH ☐
2) District veterinarian ☐
3) Local Veterinary. Worker ☐
4) Commercial company ☐
5) Neighbour ☐
6) Do it yourselves ☐
7) Nobody ☐

What is needed to improve your poultry production?

(Rank importance 1-5, 5 most important)

5.14	More technical advice	1☐	2☐	3☐	4☐	5☐
5.15	Better supply of chicks and feed	1☐	2☐	3☐	4☐	5☐
5.16	Better access to credit	1☐	2☐	3☐	4☐	5☐
5.17	Better marketing of products	1☐	2☐	3☐	4☐	5☐
5.18	Better health services	1☐	2☐	3☐	4☐	5☐
5.19	Access to land for construction	1☐	2☐	3☐	4☐	5☐
5.20	Other					

_____

What are good ways to prevent the spread of HPAI? (Rank importance 1-5, 5 most important)

5.21	Vaccination	1☐	2☐	3☐	4☐	5☐	
5.22	Restrict entry of visitors on farm	1	2	3	4	5	Applied
5.23	Avoid contact with wild birds	1	2	3	4	5	Applied
5.24	Mixing of species	1	2	3	4	5	Applied
5.25	Wash hands	1	2	3	4	5	Applied
5.26	Disinfection	1	2	3	4	5	Applied
5.27	Good supply of chicks	1	2	3	4	5	Applied
5.28	Disinfection	1	2	3	4	5	Applied

What have you done to better protect your poultry from HPAI?

1) Vaccinated the birds	1 Yes ☐	2 No ☐
2 Disinfected premises	1 Yes ☐	2 No ☐
2 Better cleaned the area where the poultry stay	1 Yes ☐	2 No ☐
3 Bought birds from secure sources	1 Yes ☐	2 No ☐
4 Constructed or improved poultry housing	1 Yes ☐	2 No ☐
5 Separated chickens from ducks	1 Yes ☐	2 No ☐
6 Only allowed family members near the birds	1 Yes ☐	2 No ☐
7 Kept fewer birds	1 Yes ☐	2 No ☐
8 Asked for technical advice	1 Yes ☐	2 No ☐
9) Anything else?	_____	
Have these interventions cost you money?	1 Yes ☐	2 No ☐

If yes, how much in total? (in Indonesian Rupiah)_____

If yes, how much in 2007? (in Indonesian Rupiah)_____

ANNEX 3: INDIVIDUAL OBSERVATIONS OF CHICKENS

Farm Code:					
Animal / N°	1	2	3	4	5
Number of photo from Camera					
Sex Female=1, Male=2					
Body weight (g)					
Shank Characteristics					
Colour White (W) Grey – Blue (GB) Black (B) Yellow (Y) Green (G)					
Shank length (cm)					
Skin Colour					
White (W) Yellow (Y) Black (B)					
Comb Type					
Single (S) Pea (P) Rose (R) Cushion (C) Double (D)					
Ear-lobe Colour					
Red (R) White (W) Blue (B) Red-White (RW)					
Eyes Colour					
Orange (O) Brown (B) Red (R) Pearl (P)					
Other characteristics					
Crest Yes= (Y), No= (N)					
Naked neck Yes= (Y), No= (N)					
Beard and muffs Yes= (Y), No= (N)					
Polydactyl Yes= (Y), No= (N)					
Frizzled Yes= (Y), No= (N)					
Silky Yes= (Y), No= (N)					
Other observations					