MANAGEMENT OF POULTRY FLOCKS IN QUảNG NAM AND ĐA NẵNG PROVINCES OF CENTRAL VIET NAM

by

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&

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GCP/RAS/228/GER Working Paper No. 9

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ABBREVIATIONS

AI	Avian Influenza
DARD	Department of Agriculture and Rural Development (Provincial)
FAO	Food and Agriculture Organization
HH	Household
HPAI	High Pathogenic Avian Influenza
VC	Coefficient of Variation
VNĐ	Vietnamese Dong, 1 US Dollar (USD) ≈ 17 000 Vietnamese Dong

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. The recognition of the needs to fully consider poultry genetic resources and their genetic diversity has only recently got momentum due to the outbreaks of Avian Influenza and the related control measures. A characterization of the existing poultry genetic resources and the knowledge where and with which numbers they exist is absolutely essential to consider them in disease control programmes. 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 the Đà Nẵng and Quảng Nam provinces. It is based on field investigations with selected producers in these provinces. We hope this report 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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Poultry Management, Poultry nutrition, Poultry breeds, Marketing, Poultry and Culture

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EXECUTIVE SUMMARY

This report is part of a survey about poultry production and consumption patterns in selected locations of Vietnam. The poultry production systems in the Đà Nẵng and Quảng Nam provinces, well known areas for producing native chicken, are described. A total of 151 chicken producers of large, medium and small size were interviewed by using structured questionnaires. Additional in-depth interviews with key informants like government officers, experienced farmers and traders and observation methods were used to complement the findings from the survey.

This study aimed to describe in detail the production techniques in Quảng Nam - Đà Nẵng with the differentiation of three production types, namely "scavenging chicken" (gà thả lan), "semi-confined chicken" (gà thả vườn) and "industrial chicken" (gà công nghiệp).

Information about characteristics of 140 individual birds was collected from 80 of the producers. The traits investigated included body weight, shank length and colour traits that are reported for five different types of chickens used in the two provinces.

The research finding showed industrial chicken was distinguishable by their production techniques, their taste and market prices. There was a mistake by most consumers between scavenging, native chicken with semi-confined, native or crossbred chicken. In local markets, semi-confined, native chicken were usually sold at the same price with scavenging, native chicken. On farm level, some producers deliberately changed the feeding practices and/or used crossbred chicken to get the premium price of native chicken (ex: A 2.5- 3 month old Tam hoang breed chicken in semi-confined production type got farm-gate price of VNĐ 50 000/kg while a crossbred between Tam hoang and native chicken of the same age and same production type costed VNĐ 80 000/kg). This practice may harm the reputation of native chicken and degrade the source of native birds. Therefore, the local authority in Quang Nam nowadays wants to establish a tradename of biosecure native chicken for some areas such as Que Son district

1. OVERVIEW OF CHICKEN PRODUCTION IN QUảNG NAM-ĐA NẵNG

QUảNG NAM PROVINCE

The Quảng Nam province lying adjacent to Đà Nẵng city has been well-known for its native chicken varieties and tasty chicken dishes. The famous chickens are found in the mountainous areas of Dèo Le, Quế Sơn district and Tiên Phước district. One of the famous chicken restaurants in Vietnam is Madame Luận's restaurant located at 77 Phan Chu Trinh St. Tam Ky town, Quảng Nam. The restaurant owner, Mrs Luan, claims that chicken sold at her restaurant are raised in the mountainous area of Tiên Phước district (Interview with Mrs Luan, 2008). Agricultural government officers at both provincial and commune level are interested in establishing a tradename for safe native chicken production from an area at Deo Le, Quế Sơn district but there has been no official training for farmers on biosecurity. On the other hand, there is a group of 20 farmers raising safe native chicken at Duy Xuyên district. This group is headed by Mr. Nguyễn Văn Điển who has self-studied how to raise chicken safely since 1994. Mr. Điển and another farmer produce 2 000 day-old-chicks each every month. Half of these chicks are sold to 18 members who then sell broilers to traders or consumers in the local area. The other half is sold to poultry farmers in the Điện Bàn and Thăng Bình districts. The supply of safe chicks has not met the market demand (Interview Mr Điển, 2008).

During the AI crisis from 2003-2005, outbreaks occurred in confined chicken flocks and duck flocks that were transported from Dong Thap province of the Mekong River Delta, but there was no report of outbreaks in native chicken (Dr. Pham Ngoc Anh, Head of Animal Health Department in Quảng Nam province). The total poultry population in Quảng Nam province was 3 361 000 in August 2007 of which 2 990 701 (about 90 percent) were chickens. The main chicken production areas are concentrated in 7 districts (among 18 districts of the whole province) and two towns (See Table 1).

Table 1 Poultry population in the main production areas of Quảng Nam province (August, 2007)

District/Town	Poultry numbers	Chicken numbers
ĐIỆN BÀN	400 000	364 000
DAI LOC	368 700	350 700
DUY XUYÊN	436 000	389 000
THĂNG BÌNH	486 000	431 000
NUI THANH	328 000	262 000
QUế SƠN	325 000	305 000
TIÊN PHƯớC	185 000	175 000
TAM KY Town	91 000	75 000
HOI AN Town	62 000	34 000
TOTAL	2 681 700	2 385 700

Source: DARD of Quảng Nam

Native chicken raising is popular in households in the peri-urban and rural areas while industrial chickens are mainly produced in Dien Ban district (near Đà Nẵng city) which has a large scale slaughtering house.

Chicken breeding is in the hand of the private sector. So far the local authority has paid attention for investment in breeding of pig and beef only (Mr. Nguyễn Huy Lập, Director of Animal Breeding Center in Quảng Nam).

ĐA NẵNG CITY

Đà Nẵng is a fast growing city in the middle part of Vietnam. Despite of having a large local market for chickens, poultry production is restricted in the city due to AI threats. There are a few large scale industrial chicken farms at Ngu Hanh Son district and a 10 hectares area at Hoa Vang district is projected for large scale farms where presently wild pigs and native chicken are raised Besides, native chicken are commonly found in households in the peri-urban area of Cam Le district and many in the mountainous area of Hoa Vang district.

The external supply of chicken to Đà Nẵng comes mainly from Quảng Nam province in the South and from Hue Thua Thien province in the North. Chickens raised on small scale farms or by households are gathered by traders and then transported on motorbikes to Đà Nẵng city. Chickens may be slaughtered in slaughter houses or sold alive to restaurants or at market places.

TYPES OF POULTRY PRODUCTION

Scavenging chicken

Scavenging chickens range freely to find feed in the garden without walls or mesh fences. Additional feed of food leftover is supplied twice a day, early in the morning and in the evening. Chickens stay overnight in pig or cattle pen. Only native chickens are found in this type of production.

Photo 1 Chickens fed with paddy

Photo 2 Chickens stay in cattle pen

Photo 3 Freely ranging chickens

Semi-confined chickens

The movement of chickens in the semi-confined system is limited to a small garden which is surrounded with a wall or fence and feed is fully supplied. Feed may vary depending on the growth stage. An example is: concentrate feed from 1- 20 days; unpolished rice from 21-45 days and paddy after 45 days of age. (This is the formula of the safe chicken group at Duy Xuyên district). Coops of various forms are used which are made from wood, bamboo or nets. Both native and exotic breeds like Luong Phượng, Tam Hoàng or crossbred are found in this type.

Photo 4 Chick rearing

Photo 5 Simple chicken coops

Photo 6 Grazing

Photo 7 Chicken coop

Confined Industrial Chickens

In the industrial system exotic breeds (white chicken) are confined in coops and totally fed with concentrate feed. Coops can be made from metal, bamboo or wood.

Photo 8 Layer farm

Photo 9 Layers in cages

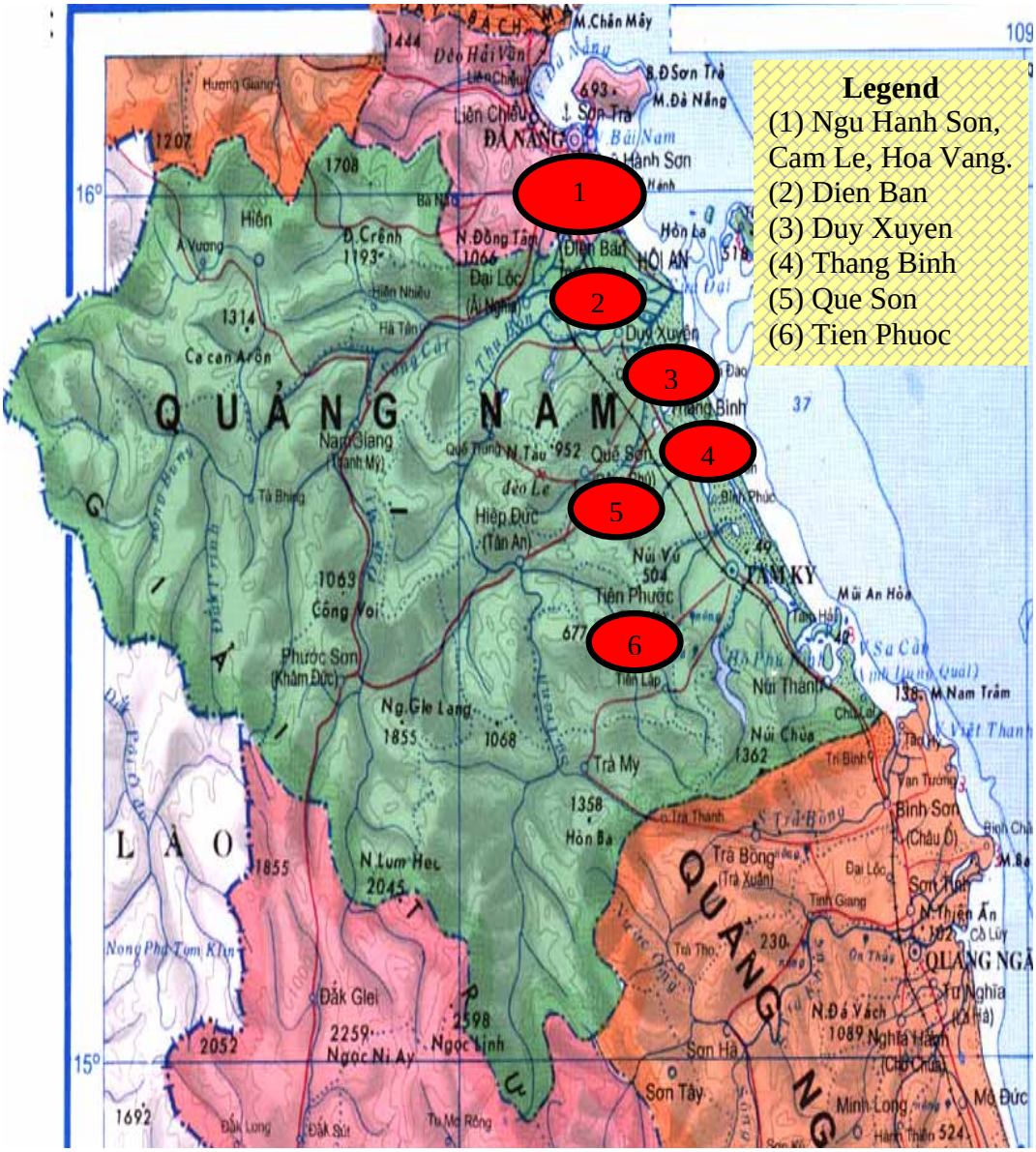
2. SURVEY AND THE CHARACTERISTICS OF THE SAMPLE

In Quảng Nam and Đà Nẵng provinces 151 poultry owners were interviewed with standard questionnaires (Annex 1). In Đà Nẵng, two industrial chicken farms and 26 small poultry producers were selected in the Cam Le and Hoa Vang districts. In Quảng Nam, 123 small poultry producers were randomly selected from 13 communes of five districts (Table 1).

Table 2 Locations of the poultry producers in Quảng Nam and Đà Nẵng provinces

Province	District	Ward/village	Producer	Total
Đà Nẵng	Cẩm Lệ	Hòa Xuân	3	3
	Ngũ Hành Sơn	Hòa Quí	2	2
	Hòa Vang	Hòa Phước	5	23
		Hòa Khương	1	
		Hòa Phú	17	
Quảng Nam	Điện Bàn	Điện Hòa	6	24
		Điện Thắng Trung	11	
		Điện Thọ	7	
	Duy Xuyên	Duy Trung	11	37
		Duy Sơn	9	
		Duy Châu	10	
		Duy Hòa	7	
	Quế Sơn	Quế Long	7	7
	Thăng Bình	Hà Lam	6	50
		Bình Định Bắc	13	
		Bình Định Nam	16	
		Bình Trị	15	
	Tiên Phước	Tiên Kỳ	5	5
Total				151

Figure 1 Map of the studied sites in Quảng Nam and Đà Nẵng provinces



The percentage of male and female respondents in the sample was 54 percent and 46 percent, respectively (Figure 2). Most of them were at an age between 40 and 60 years which is a typical pattern in the rural areas as only elder people stay in agricultural sector (Figure 3). There were 21 percent of respondents that had completed high school (Grade 12). Another 49 percent had completed lower secondary school (Grade 9) and the higher education level accounted for 6 percent (See Figure 4). This education distribution pattern is also typical for Vietnam.

Besides chickens, more than 60 percent poultry of the producers raised cows, pigs and only 12 percent were raising duck. In fact, a few ducks were raised together with chicken in the lowland area.

Figure 2 Sex of the respondents

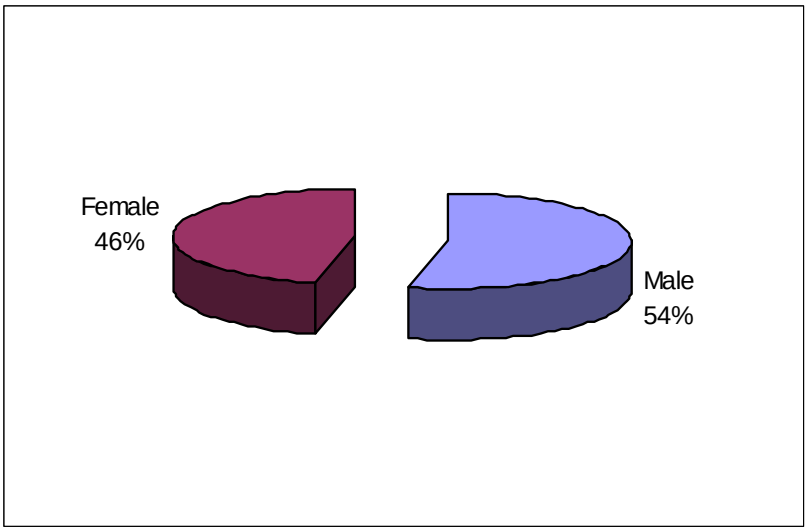


Figure 3 Age distribution of the respondents

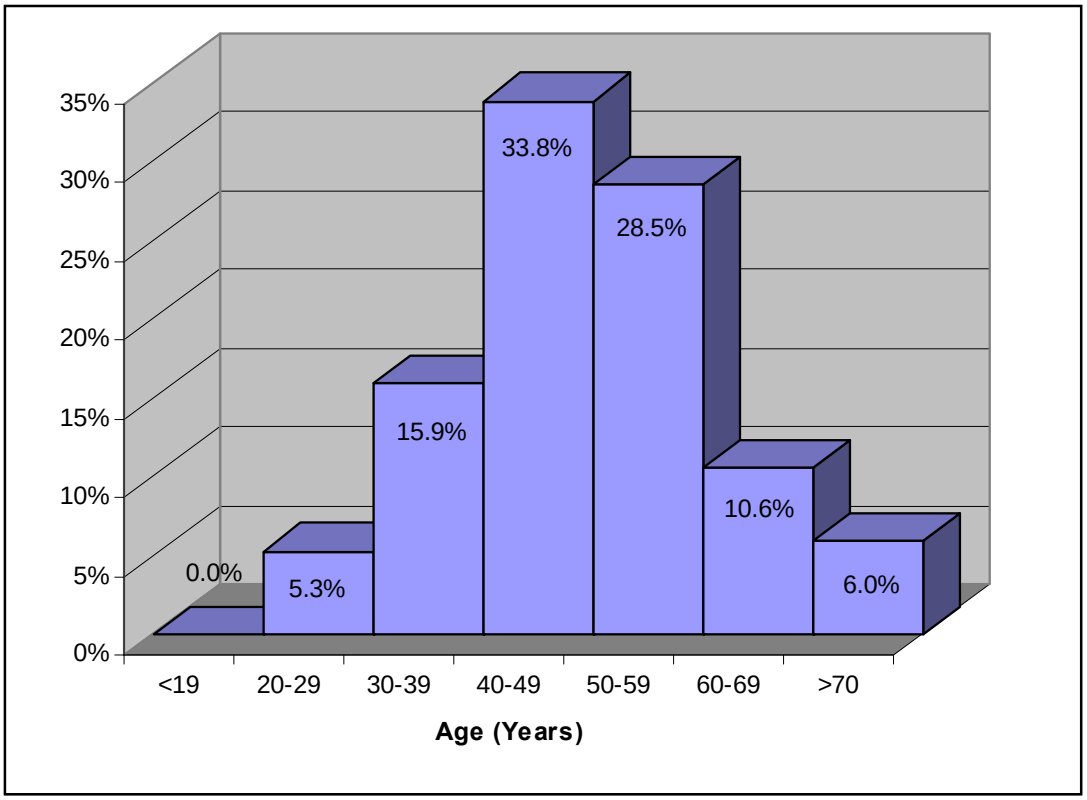


Figure 4 Education distribution of the respondents

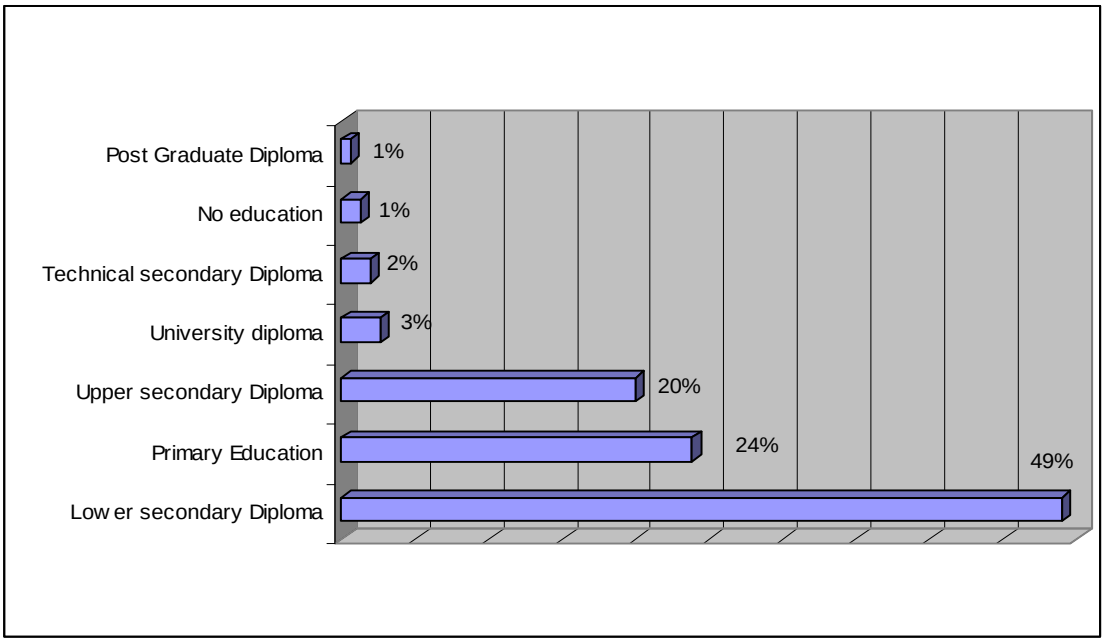


Table 3 Other livestock owned by chicken producers

Type	No of producers	Proportion
Cattle	63	66%
Pigs	93	62%
Ducks	18	12%

3. THE CHARACTERISTICS OF CHICKEN FARMS

For comparison three types of chicken production systems were selected for the survey. In the sample, 64 percent of households were of the free ranging (scavenging) type, 32 percent of the semi-confined type and 4 percent of the confined chicken-industrial type (Table 4)

Most chicken farms were small farms (with less than 1 hectare), however, the free ranging chicken type farms tended to own larger land sizes and have larger family size than the semi-confined and confined types (Table 5 and 6). As the confined type farms owned less land, they usually combined chicken raising only with pigs. Dead chickens were usually used as feed for pigs. The free ranging type and semi-confined type farms usually combined chicken raising with keeping pigs and cattle. A few also raised duck (Table 7)

In terms of flock size, the free ranging type farms had less than 100 birds per household with an average of 37 birds. The semi-confined type farms owned less than 400 birds per farm with an average of 90 birds while the industrial type farms had from 200 to 8 000 birds per farm with an average of 2 267 birds (Table 8). It is no wonder that the importance of chicken to the producers gets more and more important from the free ranging type to the semi-confined type and is very important for the industrial one (Table 9)

Table 4 Distribution of poultry producers by type of production

Types of production	Producer	Proportion
Scavenging chicken	96	64%
Semi-confined chicken	49	32%
Confined chicken	6	4%
Total	151	100%

Table 5 Land ownership of different types of surveyed poultry producers

Land Owned	Scavenging chicken		Semi-confined chicken		Confined chicken		Total
	HH	%	HH	%	HH	%	
Nil	1	1%	0	-	1	17%	2
Marginal: ≤ 0.3 ha	32	34%	30	61%	4	66%	66
Small: 0.3 ≤ 1 ha	58	60%	16	33%	1	17%	75
Semi-medium: 1 ≤ 5 ha	4	4%	3	6%	0	0%	7
Medium: 5 ≤ 10 ha	0	-	0	-	0	-	0
Large: > 10 ha	1	1%	0	-	0	-	1
Total	96		49		6		151

Table 6 Family size of different types of surveyed poultry producers

Size of Household	Scavenging chicken		Semi-confined chicken		Confined chicken		Total
	HH	%	HH	%	HH	%	
1-5	72	75%	39	80%	5	83%	116
6-7	21	22%	10	20%	1	17%	32
8-9	3	3%	0	-	0	-	3
Total	96		49		6		151

Table 7 Farming systems of surveyed chicken producers

	Land/household (ha)	Main crops	Main animals
Scavenging chicken	0.3 - 1	Rice, Cassava, Sugar cane, Corn	Chicken, Pig, Cattle, Duck
Semi - confined chicken	≤0.3	Rice, Cassava, Corn	Chicken, Pig, Cattle, Duck
Confined chicken	≤0.3		Chicken, Pig

Table 8 Size of different production types (Birds/household)

Type of production	Minimum	Maximum	Average
Scavenging chicken	3	100	37
Semi-confined chicken	14	400	90
Confined chicken	200	8 000	2 267

Table 9 The importance of chickens and other livestock by type of poultry production system (percentages within the system)

Type of production	Level of Importance	Chicken	Cattle	Pigs
Scavenging chicken	Low	3%	0%	0%
	Medium	**56%**	15%	28%
	High	31%	42%	**51%**
	Very high	10%	**44%**	22%
Semi – confined chicken	Low	0%	0%	0%
	Medium	**37%**	21%	27%
	High	41%	**43%**	**43%**
	Very high	22%	36%	30%
Confined chicken	Low	0%		0%
	Medium	0%		20%
	High	0%		**80%**
	Very high	**100%**		0%

4. BREEDING AND HATCHING PRACTICES

For local peoples, there are five types of chickens: native chicken (Gà ta); fighting cocks (gà đá); wild chickens (gà rừng); crossbred chickens (gà lai) and industrial chickens (gà công nghiệp). Wild chickens exist only at some mountainous areas and they are a specialty to consumers. Fighting cocks need special care because of their high value and their role in cock fighting gambling. In some places in the Quảng Nam province such as the Tien Phuoc commune, fighting cock raising is a hobby and the producers keep their production technique as a secret.

Native chickens include the Kiến (also called Mía, Tàu) and Chọi breeds. The Kiến breed is small sized, has low market weight (about 1.2kg), yellow feathers, thin and yellow shanks and is very tasty. The Chọi breed is bigger, has larger market weight, dark feathers, yellow, white or black shanks and is highly tolerant to disease.

Fighting cocks are selected from the pure Chọi breed. In order to create chickens that have a good meat quality, bigger market weight and are tolerant to disease, the Chọi is crossbred with Kiến. A common breeding formula exists based upon the belief that (in breeding) "a dog inherits genetic characteristics from the father and a chicken takes it from the mother" (Chó giống cha gà giống mẹ):

- Chọi with yellow shank (father) X Kiến (mother) = Chạ (good taste, yellow shank and increased weight 1.5-2 kg/bird, usually mistaken with pure Kiến breed).
- Kiến (father) X Chọi (mother) = Chọi (large weight > 2kg/bird but less tasty).
- Chọi (father) X Chọi (mother) = fighting cock

Exotic breeds that are similar to the Kiến breed are Lương phượng and Tam hoàng. These exotic breeds together with the natives are grouped into "colour feathered chicken". The Table 10 shows that this group is commonly raised in scavenging and semi-confined types of production and the native breed is still the most common (Table 11).

Table 10 Chicken breeds used in the different production systems

Type of production	Breeds
Scavenging chicken	Native (Kiến, Chọi; crossbred between Kiến and Choi). Exotic & colour feathered: Lương phượng
Semi – confined chicken	Native Exotic & colour feathered: Lương phượng and Tam hoàng. Crossbred: native & Tam hoàng.
Confined chicken	Exotic: Hy-line, Babcock B380, Tam hoàng

The producers of industrial chicken have to rely on agents or breeding company of Lương Mỹ for day-old-chicks. Less than half of the semi-confined type owners especially those whose flock size is large bought birds from agents for their flock. For the scavenging chicken type, most farmers produce their own birds (Table 12). They bought mainly breeding cocks. The own cocks are usually sold at 4-6 months of age for meat or for offering. For offering, a preferred cock must be immature, have yellow feathers, yellow shanks and a straight upstanding comb. This preferred

type of cock has a premium price of more than VNĐ 100 000/kg compared to VNĐ 60-65 000/kg for a regular one (i.e. with black shank or pea comb). Breeding cocks must be new, selected from neighbours that are good producers and that live at a far distance. The old cock will be replaced after 4-5 years. In contrast, hens are selected from within the flock mainly based upon considering weight, colour, mothering quality and number of eggs (Table 13). Hens will be replaced when the quantity or quality of eggs decrease or after 5-6 years.

Table 11 Numbers and proportion of native and exotic breeds by production system

Type of production	Native breed		Exotic breed		Total
	Nos.	%	Nos.	%	Nos.
Scavenging chicken	3476	97%	105	3%	3 581
Semi – confined chicken	4187	95%	200	5%	4 387
Confined chicken	0	-	13 600	100%	13 600
Total	7629	35%	13 905	65%	21 534

Table 12 Flock owners that purchase birds

Type of production	Flock owners	% of producer
Scavenging chicken	13	14%
Semi - confined chicken	21	43%
Confined chicken	6	100%
Total	40	26%

Table 13 Selection criteria for chickens by type of production system (percentage of producers)

Criteria	Scavenging chicken	Semi – confined chicken	Confined chicken	Total
Size/Weight	27%	27%	20%	27%
Number of eggs	15%	15%	60%	16%
Colour or pattern of plumage	17%	13%	0%	16%
Disease resistance	10%	18%	20%	13%
Good mothering qualities	15%	10%	0%	13%
Ability to live on its own	3%	3%	0%	3%
Longevity	1%	1%	0%	1%
Colour of eggs	2%	1%	0%	1%
Taste of meat	1%	1%	0%	1%
Other	9%	10%	0%	9%

All scavenging chicken farms practised hatching by their own while 84 percent of semi-confined chick farms did so. In the scavenging type, hens hatch 9-20 eggs per batch, with 12 eggs on average. However, producers may adjust the number of eggs for hatching depending on the seasons: fewer eggs during dry season (about 10 eggs/batch). In the semi-confined type system, artificial hatching is done in wooden chests heated by oil lamps (see Photo 10).

Photo 10 Hatching method in the semi-confined type of production, Duy Xuyên district, Quảng Nam

5. CHICKEN CHARACTERISTICS

The average body weight recorded for female and male chickens from selected farms was 1 434 g and 1 396, respectively (Table 14). The lower than expected weight of the cocks probably reflects different age groups, a factor which could not be considered in choosing the sample. The high Coefficient of Variation also probably indicates differences of age and management. With the exception of few, probably still growing Lương phượng chickens the local RI chickens had the lowest body weight and also the shortest shank length (Table 15). Orange eyes and red ear-lobes were the most common.

Table 14 Body weights of chicken types in Quảng Nam province

Type of Chicken	Female			Male		
	Nos	Weight (g)	VC %	Nos	Weight (g)	VC %
Kiến (Ri)	30	1191.7	50.6%	38	1089.5	43.2%
Chọi	9	1544.4	44.5%	14	2278.6	46.9%
Crossbred	13	1723.1	49.4%	13	1561.5	46.6%
Lương phượng	2	675.0	15.7%	6	916.7	23.6%
Tam hoàng	4	1700.0	31.1%	1	1400.0	-
Layer	10	1730.0	8.2%	-	-	-
All	68	1433.8	46.1%	72	1395.8	57.5%

Table 15 Shank lengths of chicken types in Quảng Nam province

Type of Chicken	Female			Male		
	Nos	Length (cm)	VC %	Nos	Length (cm)	VC %
Kiến (Ri)	30	8.1	13.4%	39	8.9	16.6%
Chọi	9	8.9	17.1%	14	12.1	17.8%
Crossbred	13	8.3	16.9%	13	10.2	15.6%
Lương phượng	2	7.5	9.4%	6	8.5	7.4%
Tam hoàng	4	9.6	20.5%	1	9.5	
Layer	10	8.3	10.4%			
All	68	8.3	15.3%	73	9.7	20.9%

A large majority of the sampled chicken types in Quảng Nam province had yellow skin (94 percent) and yellow shanks (87 percent) with only the Chọi showing some variation. The proportions of different eye and ear-lobe colour are shown by the Table 17. Most chickens have orange eyes and red ear-lobes. With regard to comb type and the occurrence of Naked Neck the Chọi chickens appear to be different compared to the other types kept in the villages of Quảng Nam Province (Table 18). The Chọi have a higher occurrence of combs and Naked Neck which also lead to a higher proportion of these characteristics in the crossbred type birds.

Table 16 Skin and shank colours of chicken types in Quảng Nam province

Type of Chicken	Skin Colour		Shank Colour			
	Yellow	White	Yellow	Grey-Blue	Black	White
Kiến (Ri)	99%	1%	99%	0%	0%	1%
Chọi	78%	22%	52%	17%	26%	4%
Crossbred	88%	12%	77%	23%	0%	0%
Lương phượng	100%	0%	100%	0%	0%	0%
Tam hoàng	100%	0%	100%	0%	0%	0%
Layer	100%	0%	100%	0%	0%	0%
All	94%	6%	87%	7%	4%	1%

Table 17 Eye and ear-lobe colours of chicken types in Quảng Nam province

Type of Chicken	Eye Colour		Ear-lobe Colour		
	Brown	Orange	Red	White	Red-White
Kiến (Ri)	-	100%	72%	9%	19%
Chọi	13%	87%	87%	9%	4%
Crossbred	4%	96%	73%	12%	15%
Lương phượng	-	100%	38%	50%	13%
Tam hoàng	-	100%	20%	40%	40%
Layer	-	100%	-	-	100%
All	3%	97%	66%	12%	22%

Table 18 Comb-type and occurrence of naked neck in chicken types from Quảng Nam province

Type of Chicken	Comb Type				Naked neck
	Single	Pea	Cushion	Rose	
Kiến (Ri)	84%	13%	1%	1%	7%
Chọi	13%	70%	17%	0%	48%
Crossbred	50%	46%	0%	4%	23%
Lương phượng	100%	-	-	-	-
Tam hoàng	100%	-	-	-	-
Layer	100%	-	-	-	-
All	69%	26%	4%	1%	16%

6. CHICKEN COOPS AND WASTE DISPOSAL

Only industrial chicken are kept day and night in simple coops made with purchased materials. For other types of production, day-old-chicks were housed from 7-30 days after birth. All semi–confined chickens are housed at night in simple houses made with either on-farm materials or purchased ones. There were 60 percent of the households raising scavenging chicken that housed chickens at night in simple houses made mainly with on-farm materials (see Tables 19 and 20). The reason that 40 percent of these households did not house scavenging chicken at night was mainly that they made use of pig and cow houses and the rest believed that birds could do well without house or even get sick if keeping them this way.

For the semi-confined and industrial chicken, rice husk was put on the ground to warm chicken then mixed with manure. The mixture was used mainly as fertilizers; some farmers used it for biogas production or burnt it out. The manure was rarely sold.

Table 19 Chicken housing practices by type of production system

Types of production	Housed permanently		Housed during the night	
	Nos	%	Nos	%
Scavenging chicken	0	0%	58	60%
Semi - confined chicken	0	0%	49	100%
Confined chicken	6	100%	n.a	n.a

Table 20 Chicken housing types by production system

Types of production	Simple construction with on-farm materials		Simple construction with purchased materials	
	Nos	%	Nos	%
Scavenging chicken	48	83%	10	17%
Semi - confined chicken	24	49%	25	51%
Confined chicken	0	-	6	100%
Total	72		41	

7. FEEDING PRACTICES

Feed is a very important factor affecting meat quality and growing period. Feeding practices may affect the meat quality and the growing period of the same breed for the producer's desired profitability.

Commercial and home made concentrate feed are used commonly for all types of production. Home made concentrate is a mixture of commercial one with grains such as maize, broken paddy or paddy bran at various formulas. In general, concentrate feed is needed for day-old-chicks from 7 to 20 days after birth in the scavenging type system. This duration is longer for the semi-confined chicks (30-42 days after birth). Industrial chickens were fed with concentrate feed all their life with more home-made concentrate at the end. There is experience that if chicken are fed with "natural" feed (grains, vegetables…) their meat will taste better but they will need longer production time. Native breed of Kiến, if raised with natural

feed in the scavenging type, always had higher farm-gate price than the same breed raised with concentrate feed (see Box 1).

Box 1 Feeding practices of three households raising semi-confined chicken

1) Ms. N. T. H., Hòa Phú commune, Hòa Vang district, Đà Nẵng.

Flock size: 200 birds

Breed: Gà Kiến selected from the owned flock.

Stage 1: less than 30 days old, commercial concentrate and corn (1:1).
Stage 2: after 30 days, mix corn, paddy and paddy bran.

Duration: 6 months, weight: 1.5 kg/bird.

Sell to neighbour and traders, farm gate price: 90 000 VNĐ/kg (interview 22/09/08)

2) Mr. N.Đ.B., Điện Thọ, Điện Bàn district, Quảng Nam.

Flock size: 170 birds

Breed: Gà Kiến bought from Phú Mỹ Sơn commune, Duy xuyên district, Quảng Nam.

Stage 1: less than 42 days old: commercial concentrate
Stage 2: 42-60 days: mix corn with milled rice and concentrate feed (2-1-1).
Stage 3: beyond 60 days: mix corn with milled rice and concentrate as in stage 2 but adding paddy.

Duration: 2.5-3 months, weight: 1.5 kg/bird.

Farm gate price: VNĐ 65 000/kg.
If market demand is high, will shorten the duration by increasing the commercial concentrate ingredient in stage 2. Adding paddy in stage 3 is to make meat firmer and tastier.

3) Mr. Đ.V.T., Duy Châu commune, Duy Xuyên district. Quảng Nam province

Flock size: 360 birds

Breed: Gà Kiến, old day chicks bought from the safe chicken production group at Duy Châu commune.

4) Mr Đ.H., Hòa Phú, Hòa Vang, Đà Nẵng

Flock size :113 birds

Breed: Crossbred between Tam hoàng (father) and Kiến (mother).

Stage 1: 1- 35 days, commercial concentrate.

Stage 2: beyond 35 days. Mix commercial concentrate with corn and paddy bran. Weight: 1.2 kg (60 days) or 1.5 kg if feeding at night (after 10PM to morning). Farm gate price: VNĐ 75-80,000/kg.

If 100% Kiến breed raised without commercial feed at stage 2 can reach 1.2kg/bird after 4-5 months. Farm gate price: VNĐ 100-120 000/kg.

Confined Tam hoàng (45-60 days) got farm gate price of VNĐ 50 000/kg

Table 21 Feed use and purchases by type of production system

Type of production	Purchase feed	Purchase concentrates	Use concentrates from farm
Scavenging chicken	36%	36%	64%
Semi - confined chicken	76%	42%	58%
Confined chicken	100%	56%	44%
Total	52%	39%	61%

8. TRADING

Chickens are highly commercialized. In general, 87 percent of all chickens was for sale. The marketable portion increased from 85 percent in scavenging type to 90 percent in the semi-confined type and 100 percent in the industrial type. The rate of marketing for eggs for the scavenging type and the semi-confined type were relatively low: 11 percent and 20 percent, respectively. For these two types of production, eggs are mainly kept for reproduction. Low quality eggs and eggs laid in harsh weather were usually for sale.

Production tasks such as feeding and housing were handled by females (48- 52 percent of producers) or by both male and female (26-32 percent of producers). However, the females were totally responsible for selling chickens and eggs.

Scavenging chickens were mainly sold to neighbours or to local markets. As native and scavenging chicken are highly preferable for offering, family events such as wedding, parties and the like, orders from neighbours are made in advance during peak season (i.e. near Lunar New Year). Semi-confined chickens were mainly sold to traders who came to farms or sold to neighbours and local markets. Industrial chickens were either sold to traders who came to farms or transported to slaughter houses or to traders.

Table 22 Selling of chicken products by type of production system

Type of production	Selling birds		Selling eggs	
	Nos.	%	Nos.	%
Scavenging chicken	82	85%	11	11%
Semi – confined chicken	44	90%	10	20%
Confined chicken	6	100%	6	100%
Total	132	87%	27	18%

Table 23 Selling places of chicken by type of production system

Type of production	To neighbours	Local markets <10 km distance)	Regional market >10km distance	Traders in the village	Others
Scavenging chicken	42%	42%	-	16%	-
Semi – confined chicken	28%	24%	2%	41%	4%
Confined chicken	14%	-	-	43%	43%
Total	36%	34%	1%	26%	4%

9. FLOCK MANAGEMENT

During the HPAI crisis from 2003-2007, the number of chickens in general was not heavily affected as most producers maintained their flock size (Table 24) and only 15 percent of total households had chicken losses (Table 25). The Industrial chickens got hurt most as they were culled by instruction (Table 25).

Table 24 Change in size of chicken flock during the last five years (2003-2007)

Type of production	No change		Increase		Decrease	
	Nos.	%	Nos.	%	Nos.	%
Scavenging chicken	60	63%	24	25%	12	12%
Semi – confined chicken	30	61%	17	35%	2	4%
Industrial	2	33%	0		4	67%
Total	92	61%	41	27%	18	12%

Table 25 Producers reporting chicken losses through HPAI

Type of production	Death of poultry		Culling of poultry		Total	
	Nos.	%	Nos.	%	Nos.	%
Scavenging chicken	11	11%	6	6%	17	18%
Semi – confined chicken	3	6%	0	-	3	6%
Industrial	0	-	2	33%	2	33%
Total	92	61%	41	27%	18	12%

Flocks are also heavily affected by weather changes during the year of which scavenging chickens are most affected (Table 26). The flocks in general are lowest during the winter season (10-12th lunar month) when weather is cold with heavy rain. The flock size is biggest, particularly for scavenging chicken, by the end of the spring (3-4th lunar month) when the season is favourable and farmers re-established a new flock for the New Year. Most semi-confined chicken owners had the highest flock size during the 8th lunar month in preparation for the high demand by the end of the year.

The flocks were also affected by the survival rates of the day-old-chicks and affected by diseases and predators (i.e. wild animals). The survival rates of chicks incubated by hens were 75 percent until the first month of age and 67 percent until 6 months of age. The survival rates for purchased chicks were higher, 87 percent and 86 percent for the two periods, respectively. Diseases were the main reason for the losses particularly during the first month. Predator particularly wild animals in the upland and mountainous areas were the second most important reason of losses, the threat increased with the age of the chicks (Table 27).

Table 26 Seasonal changes of flock size

Type of production	Seasonal change of flock size		No seasonal change of flock size	
	Nos.	%	Nos.	%
Scavenging chicken	56	58%	40	42%
Semi – confined chicken	20	41%	29	59%
Industrial	2	33%	4	66%
Total	78	52%	73	48%

Table 27 Reason for chicken losses in different age group

Most important Reason	Until 1 month of age		1 to 6 months of age		From laying age onwards	
	Nos.	%	Nos.	%	Nos.	%
Disease	77	59%	66	47%	68	49%
Predator	28	21%	55	40%	67	48%
Accident	16	12%	16	12%	2	1%
Unknown	10	8%	2	1%	3	2%
Total	131	100%	139	100%	140	100%

10. POULTRY HEALTH

Veterinary services, HPAI information and farm vaccination

The veterinary services network consists of the sub-Department of Animal Health (sub-DAH) at the provincial level (e.g.: 23 employees serving at the sub-DAH in Quảng Nam province), about 6-7 governmental veterinarians at the district level and one governmental veterinary worker at each commune or ward. There were a few private veterinarians at commune level.

Most producers of all types (97-100 percent) were aware of HPAI (Table 28). About half of the scavenging and semi-confined chicken farm owners got HPAI information through mass media (i.e. Television and radio); 35-44 percent got them from local and district veterinarians and 2 percent from sub-DAH. Only 17 percent of industrial chicken farms got information from the sub-DAH. It is not surprising that the thin network of public service could not provide HPAI information

to more than 43 percent of all the farms (Table 29). Commercial companies were not mentioned at all for providing such information.

More than 80 percent of the farms with scavenging and semi-confined poultry and 100 percent of industrial chicken farms had their chickens vaccinated for HPAI, mostly two times per year (Table 30 and 31). The HPAI vaccination was free of charge for all farms except for large farms of more than 2 000 birds. The large scale farms had their own veterinarians and only bought vaccine from authorized agents. A much smaller portion of farms practiced vaccination for cholera, variola and pasteurellosis (Table 32).

Table 28 Proportion of farmers having received HPAI information and taking precautionary measures

Type of production	Received information about HPAI		Precautionary measures taken	
	Nos.	%	Nos.	%
Scavenging chicken	93	97%	66	69%
Semi – confined chicken	49	100%	44	90%
Industrial	6	100%	6	100%
Total	148	98%	116	77%

Table 29 Sources of information about HPAI (multiple answers)

Source	Scavenging chicken	Semi – confined chicken	Confined chicken	All
Sub DAH	0%	2%	17%	2%
District veterinarian	6%	10%	25%	9%
Local Veterinary Worker	29%	34%	25%	31%
Neighbour	8%	9%	0%	8%
Other	56%	44%	33%	51%
Responses	131	90	12	233

Table 30 Use of veterinary services, vaccination and preventive measures for new birds related to HPAI

Type of production	Use veterinary services		Use vaccination		Use preventive measures	
	Nos.	%	Nos.	%	Nos.	%
Scavenging chicken	70	73%	80	83%	61	64%
Semi – confined chicken	37	76%	39	80%	35	71%
Industrial	4	67%	6	100%	6	100%
Total	136	90%	136	90%	102	68%

Table 31 Number of on-farm HPAI vaccination per year

Times per year	Scavenging chicken	Semi – confined chicken	Confined chicken	All
Once	5%	13%	0%	7%
Twice	90%	82%	75%	87%
Three times	5%	5%	0%	5%
Five times	0%	0%	25%	1%
Number of Responses	82	39	4	125

Table 32 Proportion of producers using different vaccinations

	Scavenging chicken	Semi – confined chicken	Confined chicken
HPAI	75%	55%	33%
Cholera	6%	33%	50%
Variola/ polio	11%	22%	17%
Pasteurellosis	6%	18%	17%
Tetanus	1%	0%	0%
Coldness	1%	0%	0%
Number of producer	97	49	6

Farm hygienic practices

When receiving new birds the majority of the scavenging chicken farms and semi-confined chicken farms took no preventive actions while most industrial chicken owners took some action such as cleaning and disinfecting or quarantine. The scavenging chicken farms and semi-confined chicken farms used the practise of quarantine for new birds more than the disinfection of premises (Table 32).

Table 33 Preventive measures when getting new birds

Type of production	Clean and disinfect before arrival		Quarantine new birds		Mix with existing to get them adjusted*	
	Nos.	%	Nos.	%	Nos.	%
Scavenging chicken	20	21%	42	44%	4	4%
Semi – confined chicken	20	41%	22	45%	0	-
Industrial	5	83%	2	33%	1	17%
Total	45	30%	66	44%	5	3%

*Question used to test knowledge of producer

Just like with HPAI information, 90-100 percent of the poultry producers received help for disease prevention (i.e. vaccination) and treatments from government services (Table 34), mainly from local veterinary workers for scavenging and semi-confined chicken farms and also from district veterinarians and sub–DAH for industrial chicken farms. When their birds get sick, half of farmers treated them at first with medicine by themselves, and 18 percent farmers quarantine sick birds. When things get more serious, farmers seek help mostly from veterinarian and local veterinary workers (Table 35). When birds die, most scavenging and semi-chicken owners burn them, very few reported that they used them (i.e. eating, mixing with manure, feeding to pets). For industrial chicken farms, the dead chicken numbers was usually high, half of the owners said they buried them and the other half said they feed dead birds to their pigs (Table 36).

Table 34 Sources of help for disease prevention and treatment

Source of help	Scavenging chicken	Semi – confined chicken	Confined chicken	All
Sub DAH	0%	2%	27%	3%
District veterinarian	5%	7%	27%	7%
Local Veterinary Worker	89%	80%	45%	82%
Neighbour	2%	7%	0%	4%
Other	4%	5%	0%	4%
Number of Responses	82	44	11	137

Table 35 Action taking when having sick birds

Action	Scavenging chicken	Semi–confined chicken	Confined chicken	All
Seek help from veterinarian	2%	2%	43%	3%
Seek help from vet. worker	28%	27%	0%	27%
Quarantine sick birds	19%	17%	14%	18%
Treat birds with medicine	50%	55%	43%	51%
Sell sick birds	1%	0%	0%	1%
Number of Responses	116	60	7	183

Table 36 Treatment methods for dead birds

Treatment method	Scavenging chicken	Semi – confined chicken	Confined chicken	All
Bury or burn	94%	96%	43%	92%
Allows to be eaten by pets	1%	2%	43%	3%
Mix with manure	2%	0%	0%	1%
Use them	2%	0%	0%	1%
Other	1%	2%	14%	2%
Number of Responses	98	49	7	154

In all those farms with scavenging chickens that use sheds for their birds the shed is cleaned, mostly during the presence of birds and with a broom (Tables 37 and 38). In all semi-confined chicken farms the shed is also cleaned and in 79 percent of cases during birds' presence. Cleaning is also mostly simply by broom and less than half of the farms use disinfectant (Tables 37 and 38). All industrial chicken producers clean the sheds during birds' presence mainly with disinfectant and most of them even cleaned after bird removal.

Table 37 Shed cleaning practises

Type of production	After birds removed		During presence of birds		When needed	
	Nos.	%	Nos.	%	Nos.	%
Scavenging chicken	1	1%	63	77%	18	22%
Semi – confined chicken	6	13%	38	79%	4	8%
Industrial	4	40%	6	60%	0	0%
Total	11	8%	107	76%	22	16%

Table 38 Shed cleaning methods

Cleaning method	Scavenging chicken	Semi – confined chicken	Confined chicken	All
Clean with broom	58%	51%	18%	53%
Clean with water	16%	20%	27%	18%
Use disinfectant	17%	24%	45%	21%
Wait before putting new birds	2%	2%	0%	2%
Other	8%	2%	9%	6%
Number of Responses	126	82	11	219

Although next to diseases pests was the second most common reason for loss of birds, only about 60 percent of farms took preventive measures. The most common method for scavenging and semi-confined chicken was using traps; others included such measures as making good houses, using nets, and keeping dogs.

Table 39 Pest control methods

Control method	Scavenging chicken	Semi – confined chicken	Confined chicken	All
Poison	8%	6%	0%	8%
Traps	42%	42%	0%	41%
Other	49%	52%	100%	51%
Number of Responses	59	31	2	92

HPAI preventive measures and its associated costs

Nearly all poultry farmers in all production systems mentioned that they had received assistance for dealing with HPAI by the veterinary authorities, in particular through vaccination (Table 40). The Table 41 shows the view of these producers how best to prevent HPAI and the Table 42 which measures were actually implemented by them. In line with actual preventive measures, most farmers believe good ways to prevent the spread of HPAI were vaccination (66 percent of total farms); disinfection (55 percent) and restricting on-farm visitors. The three most common preventive measures applied by farmers were vaccination, disinfection and cleaning the area where the poultry stays (Table 42). These methods were not costly, particularly vaccination as it was free to most farmers. The average expenditure spent per farm for implementing measures was VNĐ 432 294 (higher for industrial farms which invested VNĐ 1 176 667 per farm). The actual expenditure per farm in 2007 was only VNĐ 240 940 (Table 43).

Table 40 Proportion of farmers receiving help for HPAI diseases prevention and practising vaccination

Type of production	Help with HPAI prevention		Use HPAI vaccination	
	Nos.	%	Nos.	%
Scavenging chicken	87	91%	82	85%
Semi – confined chicken	44	90%	42	86%
Industrial	6	100%	6	100%
Total	137	91%	130	86%

Table 41 Good ways to prevent the spread of HPAI (percent of all multiple answers, n=257)

Intervention	Priority Ranking (1=lowest, 5=highest)						
	1	2	3	4	5	Total	Responses
Vaccination	-	-	3%	2%	34%	39%	100
Disinfection	-	-	1%	9%	22%	32%	83
Restrict entry of visitors on farm	-	1%	-	2%	9%	12%	32
Wash hands	-	-	-	5%	5%	11%	27
Supply of good chicks	-	-	-	-	4%	4%	11
Avoid contact with wild birds	-	-	-	-	1%	1%	3
Avoid mixing of species	-	-	0.4%	-	-	0.4%	1

Table 42 Proportion of producers that have implemented specific intervention as protection from HPAI

Intervention	Scavenging chicken	Semi – confined chicken	Confined chicken	All
Vaccinated the birds	76%	73%	83%	75%
Disinfected premises	64%	78%	83%	69%
Better cleaned the area where the poultry stay	41%	55%	50%	46%
Only allowed family members near the birds	11%	14%	0%	12%
Bought birds from secure sources	9%	10%	33%	11%
Kept fewer birds away	9%	14%	0%	11%
Sought technical advice	10%	10%	17%	11%
Separated chickens from ducks	4%	4%	0%	4%
Constructed or improved poultry housing	3%	2%	0%	3%

Table 43 Investments in improvements to prevent HPAI

Type of production	Invested in improvements		Total average expenditure (VNĐ)	Average expenditure 2007 (VNĐ)
	Nos.	%		
Scavenging chicken	31	32%	210 226	217 323
Semi – confined chicken	23	47%	705 882	294 706
Industrial	4	67%	1 176 667	150 000
Total	58	38%	432 294	240 940

Technical assistance needed by producers

In order to improve chicken production, most farmers suggested more technical advice (44 percent of total farms), better access to credit and better supply of chicks and feed (Table 44).

Table 44 Priorities for improving poultry production (percent of all multiple answers, n=204)

Intervention	Priority Ranking (1=lowest, 5=highest)						
	1	2	3	4	5	Total	Responses
More technical advice	-	-	5%	8%	20%	33%	67
Better access to credit	-	1%	3%	9%	18%	31%	63
Better supply of chicks and feed	-	-	1%	6%	12%	19%	39
Better marketing of products	-	-	1%	1%	1%	4%	8
Better health services	-	-	-	4%	2%	7%	14
Access to land for construction	-	-	1%	2%	3%	6%	13

11. CONCLUSIONS

- Chicken production in Quảng Nam- Đà Nẵng is generally practised with small and medium scales. Scavenging chicken production (freely roaming chicken) is still dominant in the peri-urban and rural areas while industrial chicken farms are in clusters of some rural and remote areas. Semi-confined chicken farms tend to cluster near urban areas.
- The production technology practised on scavenging chicken farms was very basic.
- All industrial and about half of the semi-confined chicken farms were dependent on breeding companies for the supply of exotic day-old-chicks while on-farm breeding with native breeds is common for the scavenging chicken type farms. In general, scavenging chicken producers were less dependent on breeding companies, feed agents and modern retailers (i.e. poultry shops, supermarket, etc). They had less access to provincial government services for poultry health and information but their production was less vulnerable during the HPAI crisis than that of the industrial poultry producers.
- Although native breeds are highly preferred by local people, there has been no government support for breeding native chicken. Native breeds were kept in relatively good conditions at some places where cock fight gambling is preferred.
- The research findings show that industrial chickens differ from the native chickens by their production techniques, their taste and market prices. However, most consumers have difficulties to clearly distinguish between scavenging, native chickens and those produced as semi-confined, native or crossbred chickens. In local markets, native chickens originating from semi-confined production were usually sold at the same price as scavenging, native chicken. Some producers deliberately changed the feeding practices and/or used crossbred chickens to get the premium price of native chicken (as an example: a 2.5-3 month old Tam hoàng breed chicken in semi-confined production type got farm-gate price of VNĐ 50 000/kg while a crossbred between Tam hoàng and native chicken of the same age and same production type costed VNĐ 80 000/kg). This practice may harm the reputation of native chicken and degrade the source of native birds. The local authorities in Quảng Nam therefore want to establish a trade name for biosecure native chicken originating for some areas such as the Quế Sơn district.

ANNEX 1: POULTRY PRODUCTION SYSTEM EVALUATION

Enumerator:	**Farm Code**

Part 1: Identification and Characteristics of Sample Household

Date:	**Regular Radio Listener:** **1=** yes **2=** no
District:	
Village:	**Mobile or other phone access:** **1=** yes **2=** no
GPS Coordinates:	
Name of Respondent:	**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
Male: ☐ **Female:** ☐	
Age:	

Education of Household Head: **Education of Respondent:** **0=** No School **1=** Grade School **2=** High School	**HH:** **RES:**	**Household Size** *(sharing common kitchen)*: **1**= 1–5 members **2**= 6 or 7 members, **3**= 8 or 9 members, **4**= > 9 members

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 PRODUCER

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 VN Dong) _____

If yes, how much in 2007? (in VN Dong) _____

ANNEX 3: INDIVIDUAL OBSERVATION OF THE CHICKEN

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)					
Crest Yes= (Y), No= (N)					
Other characteristics					
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					

ANNEX 4: PHOTOS OF CHICKEN BREEDS/TYPES

Photo 11 Ri chickens

Photo 12 Choi chickens

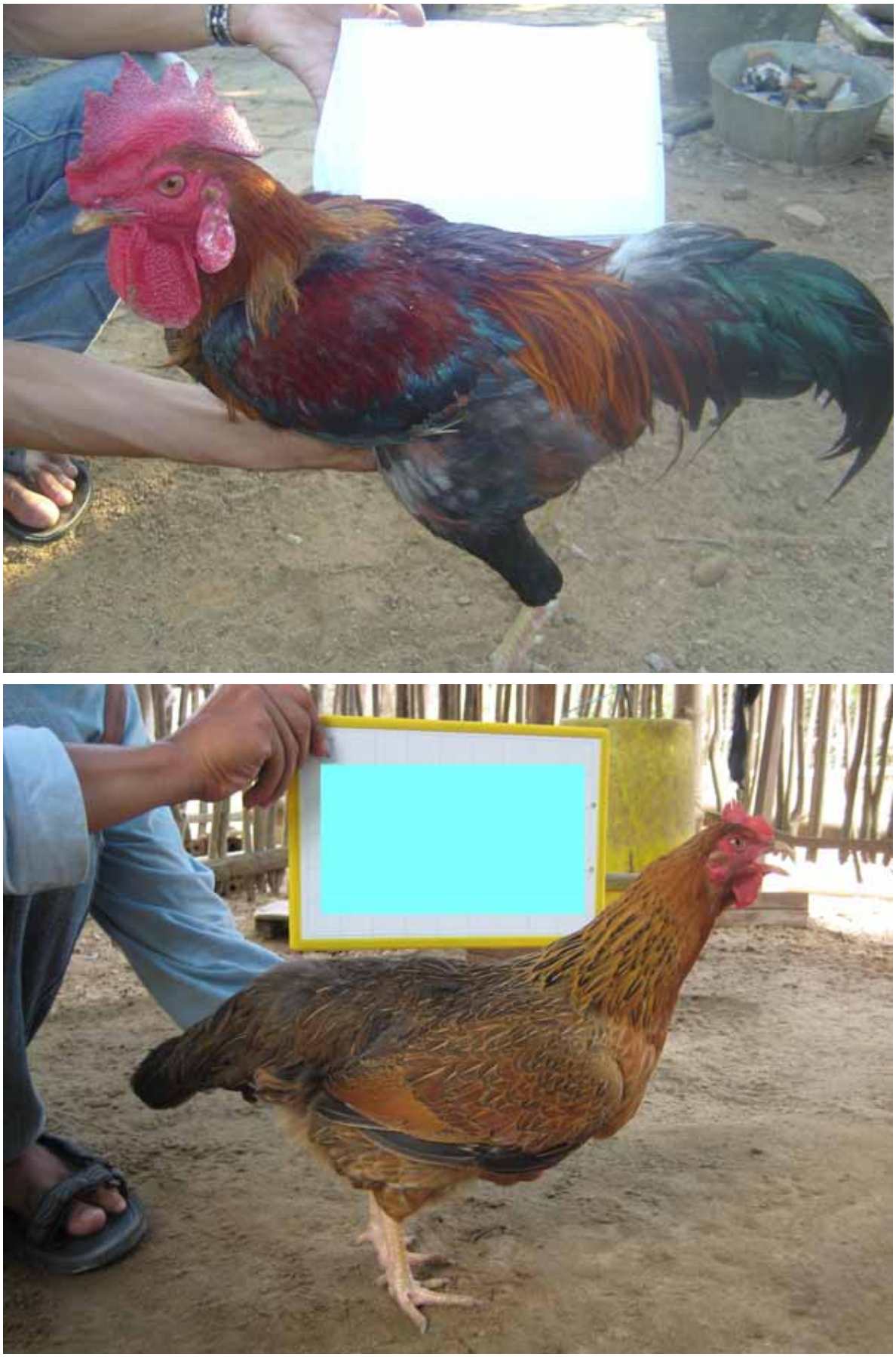


Photo 13 Crossbred chickens

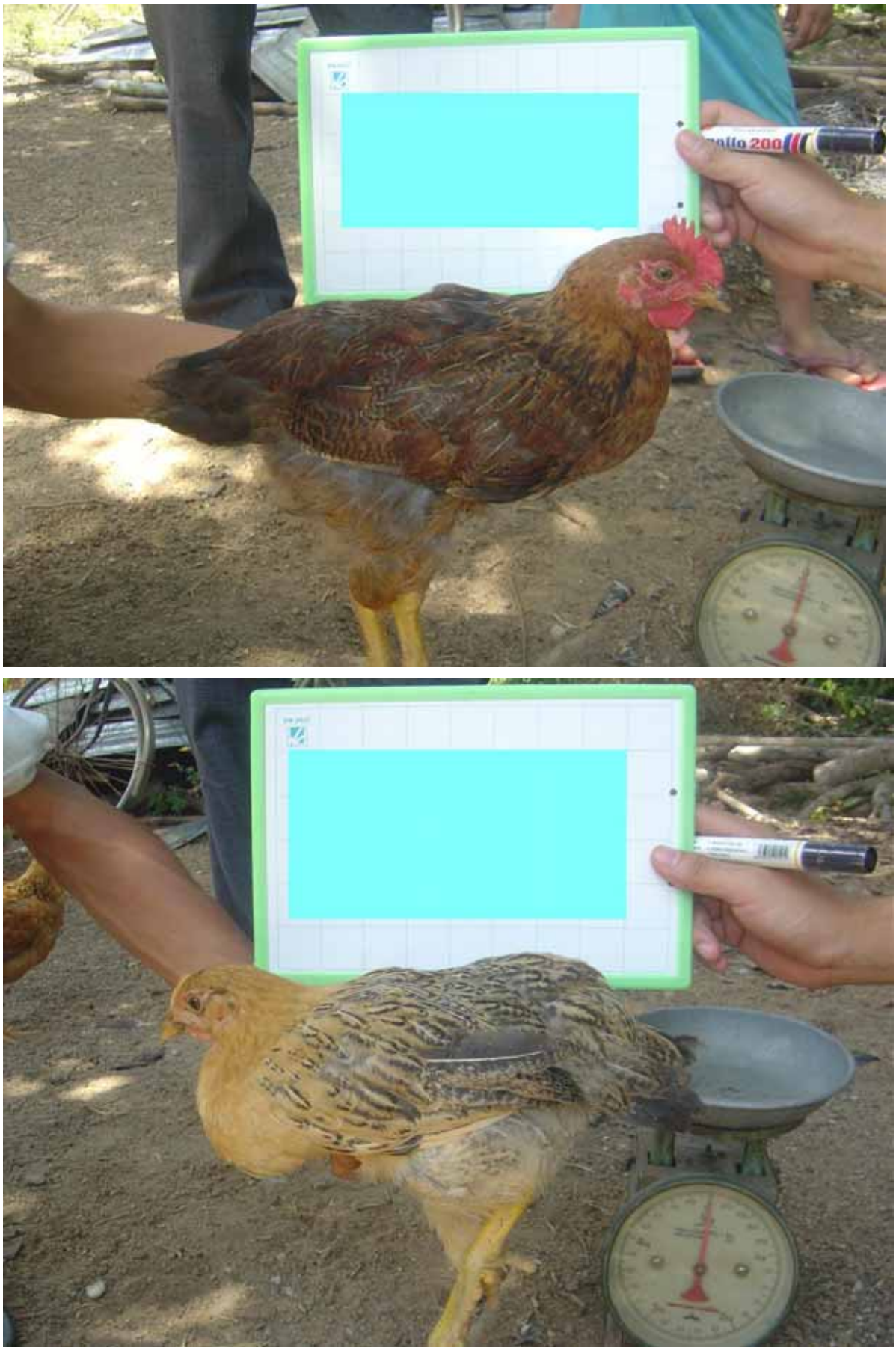


Photo 14 Lương phượng chickens

Photo 15 Tam hoàng chicken

Photo 16 Commercial layer chicken