Local chicken genetic resources and production systems in Indonesia

by

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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 literature information about smallholder poultry production systems in Indonesia. It is based on a bibliography that is covering published reports and grey literature in the fields of (i) Management and feeding systems, (ii) feed resources, (iii) poultry genetic resources, (iv) marketing systems, (v) poultry health and health control systems and (vi) cultural issues. The complete list of reference and abstracts of this bibliography is available on request from the author or from the Animal Production Service (AGAP)[1] of the Food and Agriculture Organization of the United Nations (FAO). We hope this report will provide accurate and useful information to its readers and any feedback is welcome by the author and AGAP.

Disclaimer

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1. INTRODUCTION

Indonesia, an archipelago country, comprises more than 13 000 islands and hundreds of ethnic groups, each with its different language and culture. Its population is over 220 million people, 70 percent of which live on Java Island. In Java and other islands, especially in rural areas, local chickens are common animals raised by communities. Since chicken business activities are dominant on Java Island, comprising six provinces (Banten, Jakarta, West Java, Central Java, Yogyakarta, and East Java), the following information on chicken production systems in the country mainly concerns these regions. This report describes the common practices in raising local chickens.

2. REARING MANAGEMENT AND FEEDING SYSTEMS

In general there are three types of rearing systems of local chicken in Indonesia: the extensive traditional system, the semi-intensive system and the intensive system (Saliem and Sudaryanto, 1994; Bamualim, Kedang and Ratnawaty, 1994; Rohaeni *et al.*, 2004). In the extensive traditional system, chickens from day 1 until death are allowed to live freely without farmers' intervention. There is no particular feed provided, no cage constructed, no health management applied and no technology implemented. All chicken activities are natural. Chickens can roam around the house or anywhere else to seek food, breed and engage in other activities such as playing with other poultry and taking care of young chickens, but return home to the farmer's house at sunset. At night, they sleep in the trees around the house or in the kitchen. Farmers usually have 2-20 heads. In this system, no cost is needed in rearing local chicken to produce eggs or meat. Farmers' profits when selling chickens will be the absolute chicken price minus the day-old chick (DOC) price. The extensive system is thus considered economically beneficial for the farmers since they do not need to spend much money and energy on rearing them. This is the most popular management system in the country because most farmers, who are usually uneducated, have no capital or access to financial institutions and no capital to buy feed, supplements, or medicine; they can only afford cheap commodities such as chicken. This system is considered less suitable for increasing productivity of local chicken, because it is difficult to control their feed consumption.

The semi-intensive system is more efficient than the traditional extensive system. Here, local Kampung chickens are usually kept and grown by rice farmers, teachers and government officers, among others; rearing local chickens is only a second job for them. DOC chickens are housed in an open-fenced area, which resembles a ranch and is usually built in the backyard of the farmer's house. Farmers provide feed and drink regularly, but not routine medical treatment. In some cases, colony cages are provided to allow chickens to sleep at night; in most cases, there are no cages available and the chicken sleep everywhere on the farm. The chicken, which number from 25 to several hundreds, are usually kept for non-commercial purposes and for urgent and basic needs such as school fees. Almost no technology is introduced by the farmers in this system.

Chickens are managed more professionally in the intensive system. The chicken population is separated on the basis of their life periods: the *starter* period (1 day–2 months); the *grower* period (2 months–4.5 months); and the *finisher* period (>4.5 months–culling). They are kept in cages in animal houses and provided with feed, water, feed supplements and regular medical applications. The production is usually for commercial purposes and is fully business-oriented. Farmers are very experienced and usually have a wide network. Efficiency and productivity in their chicken business is given top consideration. The number of chickens kept varies from hundreds to thousands, depending on financial sources. Only a few farmers have large-scale farms. The number of farmers sharply declined after the Indonesian financial crisis in mid-1997 and has not yet fully recovered (Yusdja *et al.*, 2005).

3. FEED SOURCES

In general, farmers prepare their own feed for their Kampung chicken by mixing concentrate, corn and paddy husk as the major components. The concentrate used in the mixture is actually broiler or layer feed produced by the feed miller, while ground corn and paddy husk are usually bought directly to the rice farmers or the rice millers. In the past, since the availability of corn and paddy husk was usually sufficient, finding feedstuff was of no

concern. However, after the financial crisis in 1997 and until recently, the poultry feed industry has been facing serious problems due to the high price of feedstuffs.

Table 1 Local feedstuffs used for chicken rations

Feedstuff	Maximum (%) in ration	Toxic substance
Banana skin flour	5–10	-
Bread factory waste	20–30	+/-
Cassava	20	+
Cassava waste	20	+
Chicken feather flour	5	+
Cocoa skin	5	+
Coffee skin	10	+
Corn bran	100	-
Fermented palm kernel sludge	15–20	+
Fish flour	100	+
Ground leaves	10	+/-
Noodle factory waste	20–30	-
Palm kernel cake	10	+
Pressed coconut cake	15	-
Pressed soybean cake	100	-
Pulverized limestone	5	-
Restaurant waste	50	-
Sago starch	20	-
Shrimp head flour	20	+
Snail flour	30	+
Sorghum	20	+
Soy sauce factory waste	10	-
Tofu residue	15–20	+
Wheat bran	30–40	-

A survey conducted three years ago (Yusdja *et al*., 2005) showed that most farmers (75 percent) buy paddy husk from the collector/trader, while the rest buy it directly from the rice miller. One of main feedstuff producers is located in Indramayu and Karawang Districts in West Java Province. From these districts, the paddy husk is distributed across Central Java and East Java Provinces. Another main feedstuff is corn, which is becoming extremely expensive and is in limited quantities. To obtain corn, chicken farmers have to buy it from retailers supplied by the collector traders. It is possible for chicken farmers to buy it directly from the corn farmers because they have previous contracts with traders prior to its harvesting. The trader pays the corn farmer in advance at a low price because the latter needs money immediately for living expenses and initial work in the corn plantation. Thus, the trader controls the price of corn and the corn farmers receive the least benefit. Another feedstuff is fish meal, which is commonly used as a protein source for its high amino acid content. It is relatively expensive and used only at less than 10 percent of the ration mix. Farmers sometimes use alternative feedstuffs. For concentrate feed, i.e. pellet-type of feed produced by the feed miller company, it is easily obtained from the poultry shop supplied by

the feed miller. This feed is usually given to modern chickens such as the Cobb strain of the broiler chicken or the Isa strain of the layer chicken.

To arrange for feed availability of feed, other feedstuffs need to be considered components of the ration. Much research on the use of local feedstuffs for chicken has been carried out, a list of which is presented in Table 1 (Zainuddin, 2006)

Almost all of the above-mentioned feedstuff are available and easily grown in Indonesia, but the potential of local feedstuffs is not yet well used.

4. LOCAL CHICKENS

In Indonesia, local chicken are often called "non-breed chicken" (*buras*). This term aims to differentiate local chickens from industrialized chicken breeds that result from a systematically programmed crossbreeding, such as widely known strains of Cobb, Hubbard, Hybro, Isa, Hyline and Hisex. Local chicken is historically the result of years of domestication of four wild chicken species: green wild chicken (*Gallus varius*), red wild chicken (*Gallus gallus*), Indian grey wild chicken (*Gallus Soneratti*) and Ceylon orange wild chicken (*Gallus lavayetti*). At present, there are at least 32 types of local chicken in Indonesia: Ayunai, Balenggek, Banten, Bangkok, Burgo, Bekisar, Cangehgar (or Cukir or Alas), Cemani, Ciparage, Gaok, Jepun, Kampung, Kasintu, Kedu (Black and White Kedu), Pelung, Lamba, Maleo, Melayu, Merawang, Nagrak, Nunukan, Nusa Penida, Olagan, Rintit or Walik, Sedayu, Sentul, Siem, Sumatera, Tolaki, Tukung and Wareng (Nataamijaya, 2000). Kampung chicken is the most popular and reared almost throughout the entire country.

In 2006, the population of the local chicken in Indonesia was around 291 085,191 heads (Statistics on Livestock, 2007). The data do not break down the population for each type of chicken, but it is believed that Kampung is the most popular local chicken since other local chickens are only occasionally found in certain areas and their population is low. Tables 2 and 3 provide parameters on productivity of several local chickens in the country.

Table 2 Growth characteristics of local chicken

Characteristics	Nunukan chicken	Black Kedu chicken	White Kedu chicken	Pelung chicken	Kampung chicken
Weight of DOC (g)	30.2	27.7	25.5	29.6	26.2
Weight at 4 weeks (g)	168	171	151	186	180
Weight at 8 weeks (g)	482	602	550	589	553
Weight at 12 weeks (g)	843	1 087	975	1 162	1 036
Weight at 16 weeks (g)	1 304	1 462	1 352	1 183	1 453
Weight at 20 weeks (g)	1 507	1 753	1 575	2 290	1 719

Source: Creswell dan Gunawan, 1982

Interesting findings on local chicken were reported by Sulandari *et al*. (2007b) who claimed that Indonesia is one of the main centres of chicken domestication in the world. Joint research carried out by the Indonesian Institute of Science and the International Livestock Research Institute used Hypervariable 1 (HV1) D-loop mitochondria of chicken as a DNA marker. DNA molecular chains with 397 base pairs from 15 Indonesian local chickens (total DNA sample obtained from 484 individual chickens) were sequenced and analysed. Sixty-nine haplotypes were identified. DNA data of the Indonesian local chicken HV1 D-Loop together with similar data from ILRI showed the three major geographic centres for the origin of today's domestic chicken, namely, the Indian subcontinent, the People's Republic of China and Indonesia. This indication is based on data showing that most Indonesian local chicken is in the clade II, most Chinese chicken is in the clade IIIc and IIId, and most Indian subcontinent chicken is in the clade IV. Other clades are represented by a small number of haplotypes of chicken originating from different countries.

Table 3 Egg production of local chicken

Characteristics	Nunukan chicken	Black Kedu chicken	White Kedu chicken	Pelung chicken	Kampung chicken
Age at first laying (days)	153	138	170	165	151
Age at 40% production (days)	186	166	202	193	184
Production at peak of laying (%)	62	75	72	44	55
Production, hen day (%)[2]	50	58.8	54	32.5	41.3
Total production, hen days (egg)	182	215	197	119	151
Production, hen house (%)	46.3	54.8	49.6	28.4	37.1
Average egg weight (g)	47.5	44.7	39.2	40.6	43.6
Feed consumption (g/head/day)	85	93	82	93	88
Feed conversion	3.6	3.6	3.8	7.1	4.9

Source: Creswell dan Gunawan, 1982

With respect to the *Avian influenza* (AI) in Indonesia, the Mx gene is used as a DNA marker to detect polymorphism of the Mx gene in local chicken populations and to determine the genotype of each individual chicken used. Mx gene is the gene candidate that codes for chicken immunity against the virus AI (Ko *et al.*, 2004). By testing the Mx gene based on whether there is a single base mutation at base position 1 892 in exon 13, each individual chicken is identified as having AA genotype (resistant to AI virus), AG (resistant/sensitive), or GG (sensitive). From 876 DNA samples tested, 386 have AA genotype, 339 have AG genotype and 151 have GG genotype (Sulandari *et al.*, 2007a). These results indicate that:

(i) Most Indonesian local chickens are resistant to AI virus;

(ii) Indonesian local chickens are potential carriers of AI virus that can be transmitted to other birds. This argument is still premature; to date, no other published reports support this argument;

(iii) Indonesian local chicken is a potential genetic resource in the formation of meat chicken strains or layers that could be resistant to the AI virus.

At present, the relationship between individual genotype and the presence of a virus in the chicken is being further studied.

5. THE LOCAL CHICKEN MARKETING SYSTEM

The main products for sales in local chicken business are DOC, live chicken and eggs. Local chickens are commonly sold live; they are rarely sold in carcass form. In 2005, a comprehensive marketing analysis was carried out on live Kampong chickens in South Jakarta (Isdiyanto, 2005). Jakarta is the biggest market for poultry products including the Kampong chicken.

[2] Hen day (%): number of eggs produced in a day divided by number of birds available in the flock on that day x 100

The snowball method was used to gather respondents, who were classified as follows: retail traders (21 persons), large traders (19 persons), mid-level distributors (three persons) inter-area collectors (IACs) (nine persons), village collectors (12 persons) and farmers (16 persons).

The research results identified business actors involved in the marketing of local chickens, i.e. farmers, village collectors/traders, IACs, main distributors, mid-level distributors, large traders, and retail traders. These business actors can be characterized as follows:

Large-scale and retail traders. The product is sold directly to the end consumer. The average turnover is around 30–100 chickens per day for large-scale traders and 7–15 chickens per day for retail traders.

Mid-level distributors. Generally, local chickens obtained from mid-level distributors came from IACs as the main supplier. The average turnover is 400–600 chickens per day. Mid-level distributors usually have 15 years' experience in this business.

The main distributor. Almost all main distributors have 25 years' experience in the business. They are suppliers of local chickens for DKI Jakarta Province and for large traders in South Jakarta. The average turnover is 1 000–2 500 chickens per day.

Inter-area collectors (IACs). With 20 years of business experience, IACs supply chickens to all categories of distributors, including the main, mid-level and large ones, providing around 750–1 500 chickens per day. IACs have the transportation means (i.e. trucks) to deliver local chickens to Jakarta. Generally, IACs operate in large markets in every region, such as the local chicken market in Solo (Central Java Province) for IAC Solo; Beringharjo Market (Yogyakarta Province) for IACs in Yogyakarta; Parung Market (West Java Province) for IAC Bogor; and a private warehouse for IAC Purwokerto.

Village collectors. Village collectors with ten years experience have a capacity to supply 20–60 chickens per day.

Farmers. Supplies collected from farmers with around five years' business experience can only reach around 3-15 chickens per day.

There are seven marketing routes formed from the seven business performers, as shown in Figure 1. The marketing route characteristics are as follows:

Route 1. This route has the largest capacity to deliver and receive chickens in DKI Jakarta, which is 12 000 chickens per day.

Route 2. The difference between marketing Track 1 and 2 lies in the type of end user. Here, the end user are restaurants located in the south Jakarta.

Route 3. This route has the second largest capacity to deliver and receive chickens in DKI Jakarta, which is 3 000 chickens per day.

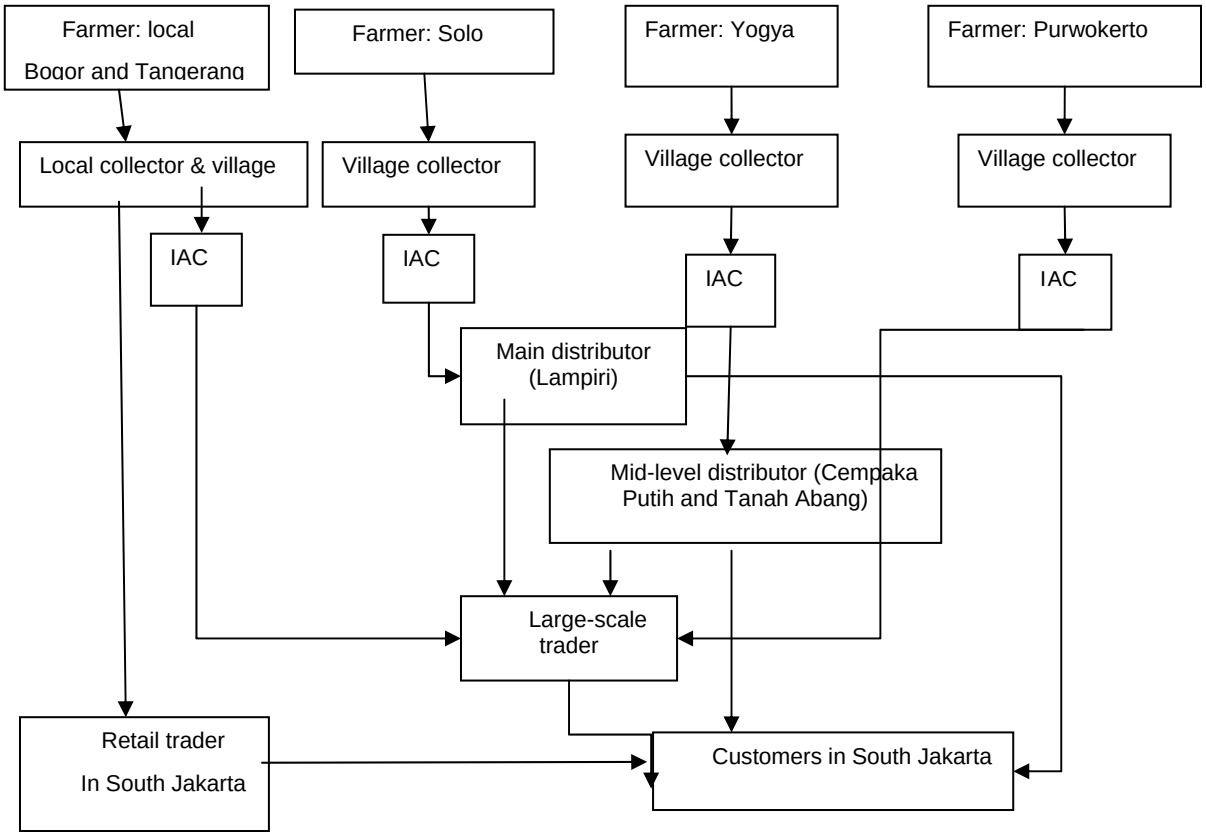
Route 4. Generally, up to the mid-level distributor, this route has similarities with Route 3; the difference lies in the type of end consumer, which are restaurants.

Route 5. This route does not use main and mid-level distributor services; their source of local chickens is from IAC Purwokerto and surrounding areas. The delivery capacity of IAC Purwokerto is smaller than IAC Yogya and Solo, which is only 2 000–3 000 chickens per day.

Route 6. This route has a relatively small delivery capacity in Jakarta Province. Local chickens are supplied from Bogor and surrounding areas. Large-scale traders tend to purchase chickens directly from Parung Market.

Route 7. The capacity of supply for marketing in this route is very small, at around 3-15 chickens per day, with sources of local chickens coming from small households in Jakarta (around traditional markets).

Figure 1 Marketing routes for local chickens in south Jakarta



Route 1: Farmer – village collector – inter-area collector (IAC) – main/major distributor – large trader – household consumer

Route 2: Farmer – village collector – IAC – major distributor – restaurant consumer

Route 3: Farmer – village collector – IAC – mid-level distributor – large trader – restaurant consumer

Route 4: Farmer – village collector – IAC – mid-level distributor – restaurant consumer

Route 5: Farmer – large-scale trader – household consumer and restaurant

6. LOCAL CHICKEN DISEASE MANAGEMENT AND CONTROL

One of important aspects in rearing local chicken is protection from diseases caused by viruses, bacteria or other pathogenic sources. The main diseases affecting local chicken are Newcastle disease, AI and infectious bursal disease (IBD). The Livestock Statistics data of 2002 show that Newcastle disease, also known as Tetelo disease, is the most common disease in the country. Sixteen provinces are identified where the disease reached a total of 229 038 cases in chickens, whereas infectious bursal disease appeared only in 1 818 cases in Lampung and South Sulawesi Provinces. No cases of AI were reported in the statistical data. From 2003 until the end of 2006, the highly pathogenic avian influenza (H5N1) spread to 27 provinces.

Weaver and Loth (2007) reported that almost all areas in Indonesia are contaminated with AI virus, resulting in a total of 12 500 000 chicken deaths. By the end of 2007, an increasing number of regions were infected, reaching a total of 268 regencies/cities in 31 provinces (Directorate of Animal Health, Directorate General of Livestock Service,

2008). This is a dire situation for the chicken population. It has also caused the death of 103 people.

To date, vaccinations are applied for the elimination and control of Newcastle disease. For local chickens kept under the traditional extensive system, oral vaccination is usually applied. The vaccine is mixed in a ration given to the local chickens. According to results from different trials carried out by Balitvet, the Unit of Veterinary Research, rice seeds and half-cooked rice are a more efficient means of transmission for the Newcastle disease vaccine than rice, corn or dried cassava. This method of vaccine application uses a mix of 1 ml of thick Newcastle disease vaccine in a half-glass of water (well or distilled water). Then, 1 kg of rice seeds are added gradually and mixed until homogeneous. The vaccine can be used for 100 heads of local chicken of any age (Ronohardjo and Halim, 1995).

Due to financial problems faced by small-scale farmers, frequently no vaccinations are carried out until the local government conducts the mass vaccination programme. Without such a programme, farmers will never vaccinate their chickens. In the case of Newcastle disease, which usually occurs in a seasonal transition (dry and rainy seasons), farmers simply sell their chicken before the seasonal transition.

AI has not yet come under control; the government has chosen a vaccination programme to control the virus. In the intensive system, the vaccine is easily applied to all chickens; however, in the traditional extensive system, the approach is difficult to implement. The government provides many vaccines to farmers, but it is difficult to control if they are all used properly. According to the Director of Animal Health, Directorate General of Livestock System, there are 15 types of vaccines to date used for the mitigation of AI, as listed in Table 4.

It is believed that, to date, the various types of vaccinates in Indonesia make it more difficult to control the virus. Another reason for this is the ineffectiveness of policies of both the central and the local government, and inadequate manpower on the farms.

Table 4 HPAI Vaccines in Indonesia and their producers

Type of vaccine	Producer
H5N1	Medion
H5N1	Vaksindo
H5N2 N-28	Medion
H5N2 N-28	Vaksindo
H5N2 N-28	Qilu, Jinan, Shandong, China
H5N2 N-28	Qian Yuan Hao Biological, Zhengzhou, China
H5N2 N-28	Harbin Weike Biotechnology Ltd., China
H5N2 N-28	Zhaoqin Dahuanong, Guandong, China
H5N2 Mex 232	Boehringer Ingelheim, Mexico
H5N2 Mex 232	Intervet International, Mexico
H5N2 Mex 232	Avimex Laboratories, Mexico
H5N2 Mex 232	Biomune Mexico, Mexico
H5N9	Merial Select, United States
H5N2- Newcastle disease	Intervet International, Mexico
H5N1 reverse genetics	Shigeta-IPB

Source: Directorate of Animal Health, Directorate General of Livestock Service, Ministry of Agriculture of the Republic of Indonesia, 2008.

Medical plants are another way in which local chicken farmers fight the spreading of disease or prevent diseases. Many farmers believe that medical plants can improve body resistance against diseases and the performance of local chicken. Data compiled on the use

of the Sambiloto (*Andrographis paniculata*) plant and the Mengkudu fruit plant (*Morinda citrifolia*) to improve the growth of local chicken are shown in Table 5.

Table 5 The effect of 7 weeks' administration of medicinal plants to local chickens on their growth from the age of 40 to 75 days

Treatment	Final bodyweight at 75 days (g/head)	Bodyweight increment (g/head)	Feed consumption (g/head)	Feed conversion
Control	999.17	675.69	2 158.64	3.20
Sambiloto	1 189.14	851.97	2 362.00	2.77
Mengkudu Fruit	1 182.85	875.77	2 417.60	2.76

Source: Zainuddin, 2003.

The above findings clearly show the improvement in performance of local chicken from feeding with medicinal plants, which would also improve body resistance towards diseases. Zainuddin and Wibawan (2007) compiled articles relating to the use of medicinal plants for preventing and treating diseases in local chicken, as shown in Table 6.

Table 6 List of plants potentially for supplements and medicine

Name of plant	Latin name	Part of plant used	Usage
Jahe	*Zingeber officinale* Roxb	Sprout	Reduces hazardous effects of coccidiosis, prevents chronic respiratory disease, and improves immunity
Garlic	*Allium sativum* Linn	Tuber	Neutralizes aflatoxisity
Kunyit	*Curcuma domestica*	Sprout	Increases appetite, digestion, and functions as antibacterial
Lengkuas	*Langua galanga* (L) Stuntz	Sprout	Increases appetite, stamina; functions as a tonic to make chicken more powerful
Lidah buaya	*Aloe vera*	Leaf meat	Lowers mortality, improves feed efficiency
Temulawak	*Curcuma xanthorrhiza*	Sprout	Increases appetite
Lempuyang	*Zingeber aromaticum*	Sprout	Reduces cough and diarrhoea, improves damage cells, increases appetite
Sambiloto	*Andrographis paniculata*	Herb (leaf, stem, flower)	Lowers aflatoxin in feed, prevents the flu, improves stamina, functions as an antiviral, and reduces hazardous effects of coccidiosis
Mengkudu	*Morinda citrifolia*	Leaf, fruit	Improves body stamina, feed efficiency, gives egg yolk a more yellow colour –
Papaya	*Carica papaya* Linn	Leaf	Improves body stamina and lowers fat
Temu ireng	*Curcuma aeruginosa* R	Sprout	Prevents worm infestation

All of these above-mentioned plants are available in Indonesia and easy to cultivate. The use of plants for feed supplement and medicine is a traditional practice.

7. CULTURAL ISSUES

Social behaviour in rearing local chickens is influenced by the value of each type of local chicken found in Indonesia, such as *balenggek, cemani, gaok, gemba, kedu, nunukan* and *pelung*. The qualities of chicken value can be categorized into: (i) chicken for art's sake, i.e. voice and singing; (ii) chicken as medicine; and (iii) chicken for its mystical powers.

Some chicken are kept for art's sake, i.e. their good voice and sound quality. One example is the Pelung chicken (Rusdin, 2007). The male Pelung chicken with a good voice/sound is reared carefully to maintain the beauty of its voice, while the chicken without a good voice is reared as regular broiler. For the former, a special ration of rice bran mixed with partially steamed rice and warm water is provided. This chicken is fed twice, in the morning and in the evening. Feedstuff is force-fed until its crop is fully filled. It is believed that this kind of feeding assists in the good quality of the bird's voice because its energy requirements are met. To maintain voice quality, the rooster is given fruits (tomatoes, siam banana and papaya) as well as fish oil, small young nila fish, eels, raw eggs, honey, mungbeans, red rice and black sticky rice. It is believed that the fruits produce soft and high-pitched voices, while eggs and honey produce unbroken voices of a low and unsophisticated quality.

The system of marketing the Pelung chicken is different from that of local chicken, because the former have their own marketing and consumer sector. Based on interviews, consumers generally approach the farmer for the guarantee of the purity of its progeny. The guarantee from the farmer is an important requirement because most Pelungs sold in the market are the offspring of hybridization. In addition, Pelung chickens are marketed during exhibitions, contests and rehearsals. People believe that the quality of good crowing is inherited from the dam rather than from the sire. For that reason the hens which are the dams of the contestants are also brought to the contest arena. The price of a champion rooster and its progeny are shown in Table 7.

Table 7 The price of a champion Pelung rooster and progeny in Cianjur District, one of the biggest centres in Indonesia

Description	Champion rooster and progeny (Rp.)	Non-champion rooster and progeny (Rp.)
Mature rooster	500 000–15 000 000	100 000 – 1 000 000
Mature hen	150 000–2 000 000	50 000 – 400 000
DOC/offspring (one pair)	30 000–150 000	10 000 – 60 000
Egg (unit)	5 000 – 20 000	2 000 – 10 000

In an effort to train a Pelung champion, roosters are given "mental exercises" to overcome fear of crows during the contest. They learn to crow at the age of 4–8 months. Mentally inferior roosters are those who lack the courage to crow in a flock of many roosters. The mental exercise consists of the following. Initially, the Pelung bird is placed next to younger or smaller birds, then next to his birds of the same age group and finally next to older birds. The Pelung bird is then brought to a new flock with many mature Pelung roosters. Farmers and hobbyists in Sukabumi and Cianjur determine the exercises to be conducted every Sundays in particular locations, in rotation. Roosters that have difficulty in adapting to the situation tend to crow in silent, familiar surroundings.

Rural people believe that the beauty of the crow is inherited by the daughter progeny only; hence there is no guarantee that the direct offspring of roosters with good crows will inherit good crowing qualities. They expect that good qualities will be generated by roosters in the third generation. In other words, these roosters are the grandchildren of good crowing roosters.

Cemani chicken also have interesting usage (Surono, 1997), generally for mystical rituals, such as the "pelarungan" (floating valuable things on the sea for mystical purposes), "ruwatan" (exorcism rituals to provide permanent wellbeing and health to an individual or community), and various ceremonies during the construction of factories, bridges and multi-story buildings. Cemani chickens are also used to cure the sick, especially those cursed by spells. Based on these beliefs, the price of Cemani chicken is determined by the requirements agreed on by the buyers. For example, if the buyer wants a chicken with a large cockscomb, a pial form or with a crippled leg, then its price could reach Rp. 3 million per chicken. On the other hand, if the above criteria are not met, the price of the chicken would only be around Rp. 400 000 per chicken. Generally, the demand for Cemani chicken increases during the Islamic calendar months of Rajab, Ruwah and Muharam. Even though they are considered to have mystical properties, the farmers tend not to give them special treatment. They only build special cages for the chicken's safety and health. High prices are based on performance. Cemani chicken eggs are also believed to be able to arouse sexual desire. In the supermarket, Cemani chicken meat does not have selling value because the people tend not to eat it.

Several local chickens used for non-food purposes are shown in Table 8.

Table 8 Use of Indonesian local chickens for non-food purposes

Type of chicken	Use	Community using the chicken	Source
Nunukan	Offerings for religious rituals	Tarakan Islands	Sartika *et al.* 2007
Kampung	Offerings for religious rituals	Jawa and other regional/ethnic groups	Sidadolog, 2007
Bekisar	Beauty – voice and feathers	Indonesia	Nataamijaya, 2000
Ciparege	Cock-fighting	Kerawang, Jawa Barat	Iskandar, 2005
Gaok	Beauty – voice	Madura Island	Nataamijaya, 2000
Banten	Cock fighting	Banten	Nataamijaya, 2000

It is clear that chickens for non-food purposes are economically important for farmers, and culturally important for particular communities, and are indirectly a means to conserve local genetic resources in the country.

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