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Benefits of Promoting Native Chickens for Sustainable Rural Poultry Development in Indonesia

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Abstract

There are many benefits of promoting of native chickens for rural poultry development in Indonesia. They are commonly raised in many areas of Indonesia and play a major role in food production, providing the main source of dietary animal protein for many people. They are often called “non-breed chickens"— (“or (“buras") to differentiate them from modern commercialized chicken breeds. There are at least 34 kinds of native chickens in Indonesia. Some of the more common native chickens, namely Ayunai, Balenggek, Banten, Bangkok, Burgo, Bekisar, Cemani, Ciparage, Gaok, Kampung, Kasintu, Kedu, Pelung, Lamba, Maleo, Merawang, Nagrak, Nunukan, Nusa Penida, Olagan, Sedayu, Sentul, Sumatera, Tolaki, Tukung, Wareng, Sabu, and Semau. Some of them are used for non-food purposes. Indonesia with its population is over 258.71 million people in 2016 has an annual level of protein consumption from poultry meat of 12.97 kg/capita/year and poultry eggs exceeded 190 eggs/capita/year. They accounted for about 10% of Indonesia‘s total meat consumption compared to broiler (55%), beef (19%), pork (8%), goat (7%), and others (1%) with its per capita meat consumption from livestock is still lower compared to many countries. There are three types of husbandry systems are used to raise native chickens in Indonesia. First, the extensive traditional system, farmers usually reared them ranged between 2 to 20 birds. Second, the semi-intensive with the bird numbers typically range from the least ownership of 25 birds to hundreds. Finally, there is professionally managed intensive system. The number of chickens reared is varies from hundreds to thousands.

Keywords: benefits; native chickens; sustainable rural poultry; Indonesia

1. Introduction

Chickens are found everywhere around the world; every culture knows them and how to husband them (Figure 1). Over the last decade, poultry population has grown spectacularly throughout the world: 23% in developed and 76% in developing countries, respectively. They are the world‘s major source of eggs and are a meat source that supports a food industry in virtually every country. They are extremely useful on a worldwide basis because they offer great potential for improving the nutritional levels of all the world‘s peoples. They have been utilized for so many centuries that in most societies their use is ingrained. 80% of poultry stocks in low-income-deficit countries of developing countries where owners raise poultry in small numbers ranging from single birds up to a few hundred. Poultry plays a key role in many households across the globe [7][8]. As reported by FAO (2014) worldwide, this poultry sector consists of chickens (90.55%), ducks (5.53%), geese and guinea fowl (1.67%), turkeys (2.09%), and other poultry (0.15%; Table 1).

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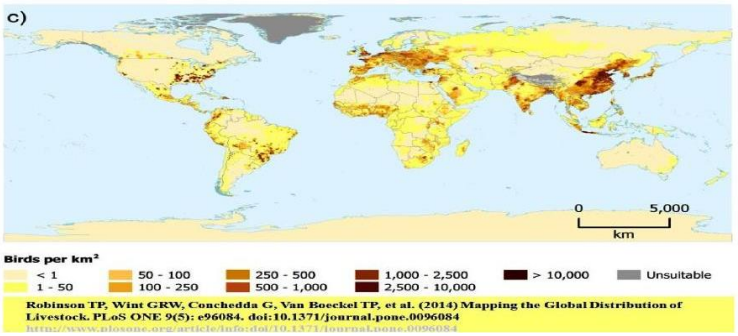

Figure 1. Global Distributions of Chickens (Robinson et al., 2014).

Table 1. Distribution of poultry species by region (%; FAO, 2014: 3).

Region	Chickens	Ducts	Geese and guinea fowl	Turkeys	Other poultry
Africa	96.03	1.10	0.85	1.21	0.81
Americas	93.95	0.45	0.01	5.58	0.00
Asia	88.07	8.99	2.70	0.10	0.14
Europe	91.30	2.65	0.89	5.03	0.13
Oceanea	96.45	1.60	0.07	1.88	0.00
World	90.55	5.53	1.67	2.09	0.15

Native chickens are commonly raised in many areas of Indonesia and play a major role in food production, often providing the main source of dietary protein in the diet of people. Indonesia has at least 34 breeds or distinct groups of native chickens. It has been estimated that Indonesia with its population is over 258.71 million people in 2016 has an annual level of protein consumption from poultry meat of 12.9 kg/capita/year and poultry eggs of exceeded 190 eggs/capita/year. Native chicken accounted for about 10% of Indonesia‘s total meat consumption compared to broiler (55%), beef (19%), pork (8%), goat (7%), and others (1%). Total consumption of broiler meat particularly in Indonesia is above 5.0kg/ capita/year and is still very low when compared to many ASEAN countries as well as developed countries, but only above the India [16][7][10](Figure 2).

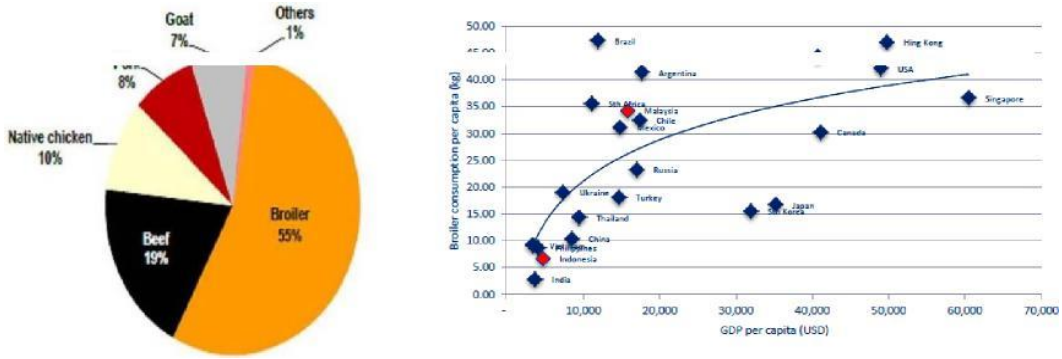

Figure 2. Native chickens meat consumption and broiler meat consumption in Indonesia compared with other countries [16][7].

2. Economic Benefits of Promoting Native Chickens

Many Asian countries are beset with a host of problems including unemployment and malnutrition. The majority of these countries strive to boost their meat and egg production to meet an increasing "protein gap" in the human food supply as their population growth rates continue to increase. The food and agriculture production of these countries can not always meet the increasing demand for these nutritious foods because of economic struggling and other aspect of crises. The import costs for food grains are increasing, leading to "heavy" loans and depleting foreign exchange reserves. Many such countries in Asia are carrying huge foreign debts of billions of US dollars to be settled by future generations. Fortunately, the poultry sector has been of great help in easing the food situation amongst many poor nations. As far of the history of indigenous or native chickens in Indonesia, the contributions to the fulfilment of nutritional needs and improved incomes of rural communities are significant. Therefore, livestock including poultry has played an important role in poverty alleviation programme particularly in rural areas of Indonesia. In macro-perspective, the contributions of native chickens are sufficiently high in the fulfilment of food needs of high nutritional value. Indigenous or native chickens thus provide the opportunity for rural communities to enjoy the benefits of poultry production development in Indonesia. Given that native chickens require limited inputs and are cared for primarily during idle hours of the day, there are would be no problems associated with low productivity of the birds. Their major function is as "a living savings account" in which some birds can be sold any time the owners need petty cash. Native chickens production will not significantly promote the incomes for most rural households. Technology improvements would be needed to enhance the performance of the native chickens raised in Indonesia [2][7]. None the less poultry production (e.g. indigenous or native chickens) has made a significant contribution to the people in the Indonesia‘s villages while also providing protein – as eggs and meat to small rural populations. Income from the sale of chickens and eggs can be used to meet farm and household expenses. Therefore, livestock including poultry, has played an important role in poverty alleviation programme particularly in rural areas of Indonesia (Figure 3)[7].

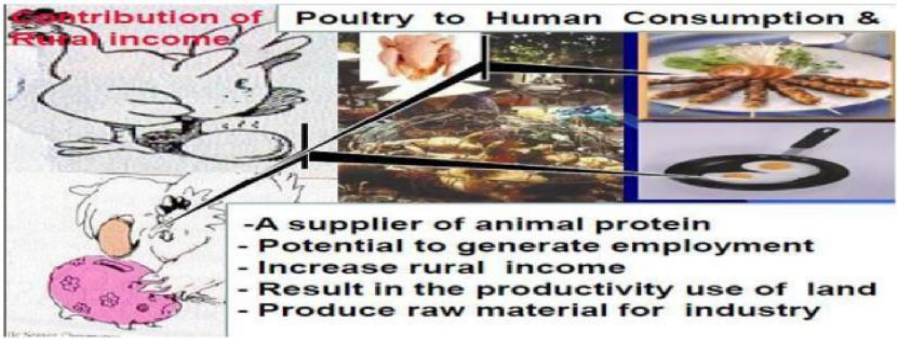

Figure 3. Contribution of poultry as human consumption and rural income (after)[7].

3. Native Breeds, Production And Husbandry Systems of Native Chickens in Indonesia

Indigenous or native chickens in Indonesia are often called “non-breed chickens"— (“or (“buras") to differentiate local chickens from commercialized chicken breeds such as widely known strains of Cobb, Hubbard, Hybro, Isa, Hyline and Hisex (Table 2). They are historically the result of years of domestication of four wild chicken species: red wild (*Gallus gallus*); Indian grey wild (*Gallus soneratti*); green wild (*Gallus varius*); red wild chicken (*Gallus gallus*); Indian grey wild (*Gallus soneratti*); and Ceylon orange wild (*Gallus lavayetti*). The red wild, which is believed to be the progenitor of the domesticated chicken, has its widest distribution in east Asia, from Pakistan through China, Eastern India, Burma, most of Indo-China, and on the islands of Sumatra, Java and Bali. Existing poultry varieties comprise of a wide range of breeds and strains that have evolved in the process of domestication and breeding. Breeding of poultry for commercial purposes using highly efficient selection programmes has resulted in a few highly specialized lines dominating today‘s world market [14][7][10][9].

Table 2. Grand parent stock of commercialized chickens breeds in Indonesia artasudjana and Supriyatna, 2010).

No.	Broiler	Layer	Origin
1.	-	Babcock B-300	France
2.	Arbor Acress	-	USA
3.	Bromo	Bromo	Indonesia
4.	-	Decalb Warren	USA
5.	Cobb	-	USA
6.	Hubbard	Harco	Hungaria/USA
7.	India River	Hyline	USA
8.	Hybro	Hisex Brown	The Netherlands
9.	Hypeco	Hypeco	The Netherlands
10.	-	Hubbard Golden Comet	USA
11.	Isa Vadette	Isa Brown	France
12.	Lohmann	Lohmann Brown	Germany
13.	-	H & N Brown Nick	USA
14.	Ross 208	-	England
15.	Shaver Starbo	-	Canada
16.	Tegel TM-70	-	Australia
17.	Avian	-	USA

There are at least 34 distinct types of native chicken in Indonesia: Ayunai, Balenggek, Banten, Bangkok, Burgo, Bekisar, Cangehgar, 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, Wareng, Sabu, and Semau. Genetically, they are estimated to come from the descents of the red jungle fowl (*Gallus gallus* and green jungle fowl (*Gallus varius*; Figures 4abc). Some of them are used for non-food purposes (Table 3; Figure 4d) and indeed indigenous of *kampung* chickens are the most popular and kept throughout the entire country [7][9].

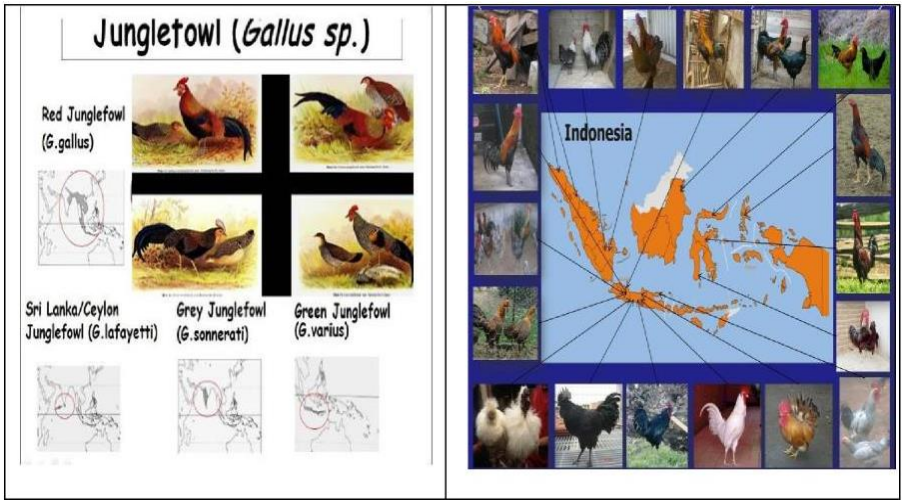

Figure 4a. Distribution of the four wild chicken species and some most popular breeds of indigenous or native chickens in Indonesia (after Han, 2014).

Characteristics of Four Species of Jungle fowls

(a) Red jungle fowl (Gallus gallus) (b) Grey jungle fowl (Gallus sonneratii) (c) Ceylonese jungle fowl (Gallus lafayettii) (d) Green jungle fowl (Gallus varius)

Figure 4b. General Characteristics of Four Species of Jungle Fowls (after Han, 2014).

Figure (a). The male have orange-red lanceolate feathers in the hackle, wing-bow, saddle regions and the lower plumage, including the breast is black. The legs are slate-colored. The eggs are buff in color. There are four subspecies of G. gallus: G.g. gallus, G.g. murghi, G.g. jabouillei, G.g. spadiceus, G.g. bankiva.

Figure (b). In this species, the general fowl appearance is grey, and evidently carries the dominant silver allele, S, which induces a white ground in place of a golden one. The eggs are sometimes spotted, sometimes not.

Figure (c). The plumage is somewhat like that of G. gallus, but the male is orange-red on the breast and under parts, and the secondaries of the female are barred. A distinct difference is found in the comb, which is all red in G. gallus, but has central part yellow surrounded by red in G. lafayettii.

Fig. (d). Plumage of the male is predominantly black, and in the females the under parts are buff and the rest of the plumage is greenish black and brown. The 16 tail feathers, median wattle and unserrated comb separate it from the other three species of Gallus.

Figure 4c. Distribution and good meat and eggs production capacity of 11 breed of native chickens in Indonesia (AgriFlo, 2013: 34 – 35).

In general, for a husbandry systems to be considered as less intensive or 'alternative system‘, it should be: (1) less confining – birds kept in cages should have more room to get up and lie down fully; (2) less crowded – birds in pens should be kept in smaller groups with more floor area per bird; and (3) better able to meet the bird‘s food and perching requirements. In other words, indigenous or native chicken production can also be considered as less intensive or 'alternative system‘ [2][7](Figure 4e). Among them, the extensive systems or the traditional systems are not only favoured by a small minority of farmers, but already have a place in many developing countries [7].

Table 3. Native chickens in Indonesia and their functioned.

Type of native chickens	Use	Community using them
Nunukan	Offering for religious rituals	Tarakan Island
Bekisar	Beauty – voice feathers	Indonesia
Ciparage	Cock-fighting	Karawang, West Java
Gaok	Beauty-voice	Madura Island
Banten	Cock-fighting	Banten
Kampung	Offering for religious rituals	Java and other regional/ethnic groups in Bali, East & West Nusa Tenggara
Sabu Semau	Cock-fighting	Savu Island & Semau Island, Province of East Nusa Tenggara

Figure 4d. Native chickens functioned as non-food purposes in Indonesia (after FAO, 2008).

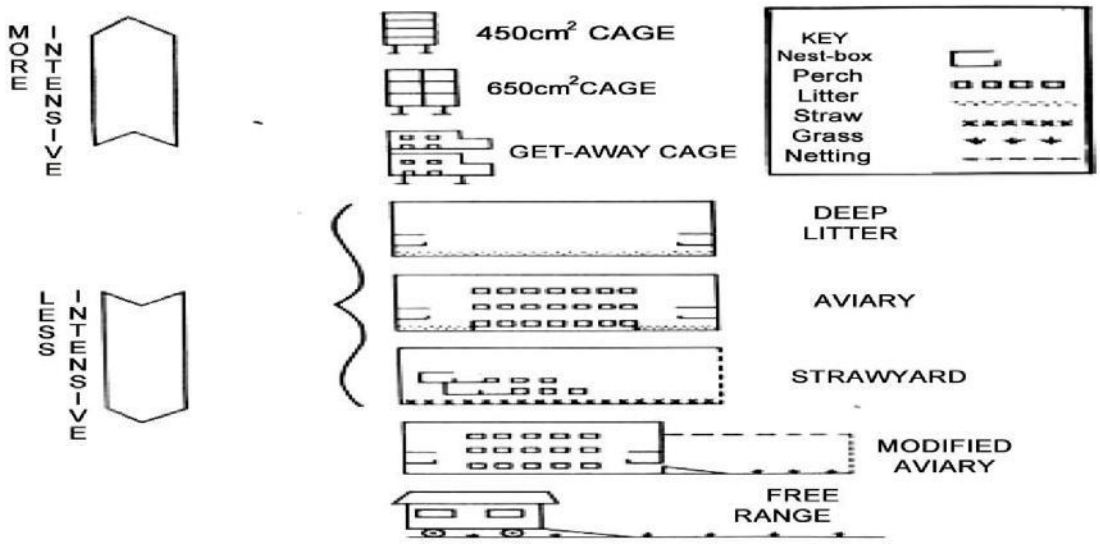

Figure 4e. Housing systems for '*alternative systems*' of poultry husbandry [2].

Three types of production systems are used to raise native chickens in Indonesia. First, in the extensive traditional system, chickens from day old until death are allowed to live freely with limited farmer' intervention. The birds are allowed to naturally roam around the house, seeking food, breeding, and engaging in other activities such interacting

with other birds in the flock and rearing their young chicks. These birds return home to the farmer‘s house at sunset, where they sleep in the trees around the house.

Farmers usually reared chickens ranged between 2 and 20 birds. Most of native chickens in Indonesia are raised under extensive traditional system where they are free to scavenge around farmer‘s home during the day. The second or semi-intensive system is more efficient and often used by wealthier people as a source of extra cash to help supplement their primary source of income. In this system the birds are usually housed in an open-fenced area, and the owner‘s provide feed and drinking water for them regularly, but not routine medical treatments. The bird numbers typically range from as few as 25 to several hundred. Finally, there is the professionally managed intensive system. In this system bird populations are separated on the basis of their life periods or phase of production. For example, the starter period (1 day–2 months); the grower period (2–4 months); and the finisher or laying period (> 4.5 months–culling). The number of chickens reared is varies from hundreds to thousands, depending on the financial resources of the farmer. Only a few farmers have large-scale farms [2][13][7][9].

The annual eggs productivity from poultry reared using the intensive system is very high compared to the extensive system (146–260 eggs vs. 37–47 eggs) and mortality is typically lower than the other two rearing systems as well. Almost of all the local breeds of native chickens in Indonesia are very low in production and reproduction. They grow very slowly and have a poor feed efficiency. Almost of all the local breeds of native chickens in Indonesia are very low in production and reproduction. They grow very slowly and have a poor feed efficiency. Production levels of native chickens from Indonesia are very low compared to imported breeds. It has been reported on the performance of native chickens in different production systems. Under the extensive system, productivity appears to be extremely low with poor feed efficiency compared to the intensive system (37–47 eggs vs. 146–260 eggs; 8–10 vs. 4.9–6.4, respectively; Table 4). The growth rate of the bird is also very low may takes 90 days to get to a kilogram of weight. Presumably, poor nutrition and the absence of disease prevention are primarily responsible for this poor performance. However, within the intensive system the average number of eggs laid is three times more than in the extensive system. The average egg weight ranges from 39 g to 48 g while the hatchability ranges from 74% to 84 % in all production systems. The average mortality of native chickens kept under the extensive systems is higher than the other two systems [3].

Table 4. Performance of native chickens kept under extensive, semi intensive and intensive production systems [3].

Traits	Native Chickens Production Systems		
	Extensive	Semi intensive	Intensive
Egg laid/hen/year	47	59	146
Egg productions (%)	13	29	40
Laid frequency (time/year)	3	6	7
Hatchability of eggs (%)	74	79	84
Egg weight (g)	39–48	39–48	39–43
Daily feed consumption (g)	<60	60–68	80–100
Feed conversion	>10	8–10	4.9–6.4
Mortality < 6 weeks (%)	50–56	34–42	<27
Total mortality (start to end production)	<15	15	<6

4. Conclusions

Native birds are often called “non-breed chickens" or “buras", to differentiate them from commercialized chicken breeds such as the widely known strains of Cobb, Hubbard, and Hisex. Indonesia has at least 34 breeds of native chickens and 18 breeds are most popular while 11 breeds are good meat and egg producers. Three types of production systems are used to raise native chickens in Indonesia. Almost of all the local breeds of native chickens in Indonesia are very low in production and reproduction. They grow very slowly and have a poor feed efficiency. It takes 90 days to get the weight of 900 to 1120 g. The annual eggs productivity of intensive system reared-poultry is very high compared to that of extensive system (146–260 eggs vs. 37–47 eggs) and mortality is typically lower than the other two rearing systems as well. There are many benefits of promoting of native chickens for rural poultry development in Indonesia.

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