

SMALL-SCALE NATIVE CHICKEN PRODUCTION SYSTEMS IN MOUNTAIN BARANGAYS OF AYUNGON, NEGROS ORIENTAL, PHILIPPINES

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ABSTRACT

This study surveyed eighty (80) farmers in mountain barangays of Ayungon, Negros Oriental to determine the characteristics of small-scale native chicken production systems. The survey found that the age of small-scale native chicken farmers was 47.5 ± 15.1 years, with a household size of 3.7 ± 1.8 , average land-holdings of 0.38ha, and average monthly income of ₱10,285.80. They are considered subsistence farmers who grew crops to support their native chickens and other livestock, with the excess produce sold to augment their income. On average, a farmer raises 27 ± 16 heads of native chicken mostly under the free-range system with feed supplementation. Very few were practicing vaccination against Newcastle disease. The average egg production per hen per year was 38 eggs, with hatchability and survival rates of 67% and 71%, respectively. Their lack of technologically advanced farming techniques and equipment did not seem to hamper their production. Studies should be done to improve the performance of small-scale native chickens, beginning with the number of eggs laid per year. Any innovation introduced to farmers should consider their capabilities and the resources available to them in these production systems.

Key words: mixed crop-livestock production systems, small-scale native chicken

INTRODUCTION

Native chickens (*Gallus gallus domesticus* Linnaeus, 1758) contribute significantly to Philippine agriculture as they provide supplemental meat and eggs while providing extra income to many farmers (Lambio, 2000). According to the Philippine Statistics Authority (PSA, 2020), there are 80.86 million native/improved chickens in the country, 10.7% (8,613,369 heads) of which can be found in the Central Visayas region.

Although small-scale native chicken (SSNC) breeds are generally low and slow producers of eggs and meat compared to their commercial breed counterparts, most small-holder farmers prefer to raise native chickens over commercial breeds because of low inputs and their inherent ability to survive under harsh environmental conditions (FAO, 2010). They also reproduce even under minimal care and marginal management. (Lambio, 2000). The persistence of SSNC production systems in regions where large-scale commercially-

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produced poultry products are available is an example where communities have chosen a sustainable production system that produces healthy and culturally appropriate food (Wong *et al.*, 2017).

Negros Oriental province is located in the region of Central Visayas, Philippines with a total land area of 5,385.53 km² (PSA, 2019). It occupies the southeastern half of the island of Negros, and borders Negros Occidental, which comprises the northwestern half. Ayungon is a 2nd class municipality in the province of Negros Oriental with a population of 46,303 (PSA, 2016). Situated 82-km north of the provincial capital, Dumaguete City, Ayungon town has barangays located in low and grooved mountain ranges about 30 to 50 km from the shoreline. A few of these “mountain barangays” have settlements occupied by communist rebels, which even today, have been identified by the Philippine military as areas of their operation.

Although broiler integrators have been operating in the province of Negros Oriental for many decades now, SSNC production has persisted due to the very strong demand for native chicken meat, which many still prefer because of its unique flavor and texture. However, no one has ever studied small-scale native chickens in Negros Oriental, nor the breeding, feeding, and other management practices followed by small-holder farmers raising these native chickens. This study aims to describe and characterize mixed crop-livestock SSNC production systems found in some mountain barangays of Ayungon, Negros Oriental. Moreover, it analyzes the correlation of socio-demographic characteristics and practices in raising native chicken.

MATERIALS AND METHODS

Out of the twenty-four (24) barangays in Ayungon, six (6) that are located in what are considered as mountain barangays were chosen in this study namely: Carol-an, Kilaban, Mabato, Nabhang, Tambo, and Tibyawan. The survey location was chosen based on the recommendation by the Office of the Municipal Agriculturist of Ayungon considering the number of farmers raising native chicken, accessibility, and security of the enumerators. This study surveyed a total of eighty (80) SSNC farmers who have attested to the purity of the breed of native chickens they are raising. A structured survey questionnaire modified from Magpantay *et al.* (2006) was developed and used for this study to reflect the current scientific knowledge about native chickens.

The survey covered the socio-demographic and economic information, farming system and characteristics, family consumption and trade, production system and management, and production performance which were based on historical accounts. Reasons for mortality and current challenges were also noted. Data collected were analyzed for descriptive statistics, frequencies, and correlation using IBM® SPSS® Statistics software version 25.0 (IBM Corp., 2017).

RESULTS AND DISCUSSION

SSNC farmers surveyed in Ayungon, Negros Oriental had an average age of 47.5 ± 15.1 years (Table 1). This observed average age, as well as in other areas of the country is much lower than the observed average age of rice farmers in 2012, which is 59 years, as cited by Moya *et al.* (2015). But according to NEDA (2017), the average age of farmers

Table 1. Socio-Demographic Data from SSNC Farmers in Ayungon, Negros Oriental.

Variables	N	Mean	SD	Minimum	Maximum
Age, Years	80	47.5	15.1	21.0	86.0
Household Size	80	3.7	1.8	1.0	9.0
Monthly Income, ₱	80	10,285.80	7,982.50	1,000	50,000
Food per Income, %	80	25.01	13.91	4.11	75.00

of palay (rice prior to husking), corn and fishers of bangus and tilapia range from 48 to 55 years old. This is an indication that the average age of SSNC farmers in Ayungon, Negros Oriental is within the range of the national average, and comparable to the previous reports in other parts of the Philippines (Magpantay *et al.*, 2006; Dusan and Pabulayan, 2012; Bejar *et al.*, 2012; Lopez *et al.*, 2014).

The mean number of family members (household size) is 3.7 ± 1.8 . In terms of frequency, 48.8% have household sizes of three and four. Bejar *et al.* (2012) reported that only 30% of SSNC farmers in Samar Province belong to this same group. This means that SSNC farmers in Ayungon, Negros Oriental belong to smaller household sizes than in Samar Province. Only 23.8% of them finished elementary level. The low percentage of SSNC farmers in Ayungon, Negros Oriental who finished elementary could be a reflection of the location of the barangays where they reside.

The average monthly income is $\text{₱}10,285.80 \pm \text{₱}7,982.50$. Magpantay *et al.* (2006) reported a lower monthly income for SSNC farmers in Dolores, Quezon at $\text{₱}3,353$. The monthly income of SSNC farmers in Palawan is also much lower at $\text{₱}2,597.45$, as reported by Lopez *et al.* in 2014. This is also true for SSNC farmers across all 6 provinces in Region VI, whose average income is $\text{₱}4,155.80$ per month (Dusan and Pabulayan, 2012). SSNC farmers in Ayungon, Negros Oriental spend on average, 25.01 ± 13.91 percent of their income on food. Although families of SSNC farmers in Ayungon, Negros Oriental belong to the bottom 20% of families in Central Visayas in terms of income (PSA, 2018), they spend much less on food compared to other families. Monthly income reported by farmers was not primarily from growing native chicken but from selling vegetables and other crops, raising other livestock (pigs and cattle), and remittances from members of the household who are currently working in the cities or abroad.

Table 2 shows the correlation of Food Expense as Percent of Income and other socio-demographic variables with each other. It is interesting to note that older farmers spend less on Food as a percent of Income even if their income is not affected by their age. This could probably mean a lower food consumption for older farmers, or that older farmers buy less food and instead acquire more food from their backyard. Food expense as a percent of income decreases as monthly income increases.

The average number of crops grown is 5.73 ± 1.59 (Table 3). Results showed that 81.3% are planting chili peppers or “siling labuyo”, followed closely by gabi, and corn both at 62.5%. Although not all of these crops are fed to their native chickens, the majority of them were also planting coconut, banana, and cassava. Tomato, rice, and eggplant are also planted by more than 30% of them. In Leyte province, chili pepper (*Capsicum frutescens*) is reportedly used by marginal upland farmers as traditional herbal medicine for their native chickens against New Castle Disease and fowl pox (Come and Zamora, 2014). Datuin *et al.*

(2019) explain that many native chicken raisers in the Philippines plant chili peppers because they believe that scavenging chickens eat the fruit of chili peppers to obtain essential nutrients that have medicinal benefits.

The average number of native chickens raised is 27.57 ± 16.50 (Table 3). Dusaran and Pabulayan (2012) reported that native chicken farmers in Western Visayas had an average of 16.2 heads of hens and 4.4 heads of roosters but did not report any figure on the rest of the flock. If the average land area occupied by SSNC farmers in Ayungon, Negros Oriental is divided by the average number of native chickens they have, the average land area per chicken results to $171.15 \pm 175.87 \text{ m}^2$ (Table 3). BAFS (2018) in their Philippine National Standard (PNS) recommends not more than one (1) native chicken per m^2 as outdoor stocking density for free-range native chickens in the Philippines. The stocking density observed among SSNC production systems in Ayungon, Negros Oriental is certainly acceptable based on the PNS.

However, the correlation analysis shows that the positive correlation of the number of crops grown by farmers with their monthly income is significant (Table 4). This could mean that farmers get to sell more products because they are growing more crops, thus increasing their income. The positive correlation of land area with the number of crops grown by farmers is also significant. This can be explained by the increased need for land whenever

Table 2. Correlation Among Socio-Demographic Data from SSNC Farmers in Ayungon, Negros Oriental.

	Age, years	Level of Education	Household Size	Monthly Income, Php	Food Income, %
Age, years	1	-0.414**	-0.260*	0.058	-0.260*
Level of Education		1	0.071	0.187	0.036
Household Size			1	0.085	0.020
Monthly Income, ₱				1	-0.410**
Food Income, %					1

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Table 3. Characteristics of SSNC Production Systems in Ayungon, Negros Oriental.

Variables	N	Mean	SD	Minimum	Maximum
Number of Crops	80	5.73	1.59	1	10
Chicken Population	74	27.57	16.50	5	150
Land Area, m^2	71	3,800.70	2,877.21	100	15,000
Area per Chicken, m^2	66	171.15	175.87	3	1,000
Years raising native chickens	56	23.80	14.24	1	57

Table 4. Correlation of Monthly Income of SSNC Farmers in Ayungon, Negros Oriental with the Characteristics of their SSNC Production Systems.

	Monthly Income, ₱	Number of Crops	Chicken Pop'n	Land Area, m ²	Area per Chicken, m ²	Years Raising Chickens
Monthly Income, ₱	1	0.278*	-0.002	0.118	0.047	0.055
Number of Crops		1	-0.174	0.280*	0.214	-0.111
Chicken Population			1	-0.13	-0.305*	-0.132
Land Area, m ²				1	0.765**	0.235
Area per Chicken, m ²					1	0.255
Years Raising Chickens						1

*Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

a farmer adds a crop to be planted. It is obvious, however, that the negative correlation of area per chicken with chicken population is significant. This is also true for the positive correlation of area per chicken with land area. This correlation analysis result was presented to show that the difference in the land area occupied by these farmers was determined not by the number of native chickens they raise but by the number and identity of crops they grow.

This study found that all native chickens are free-ranged in the day, as well as in the night. The only provision provided by almost all farmers is nests. Almost the same proportion of farmers (99%) provide nests to their native chickens in Samar Province (Bejar *et al.*, 2012).

The backyard of all of the farmers in Ayungon, Negros Oriental has high-growing trees which are accessible to their native chickens. This is probably the reason why farmers do not provide their native chickens with perches to sleep on at night. Also, very few farmers provide a feeder and waterer because their chickens scavenge for food and water everywhere. The supplemental feed given by farmers is just broadcasted on the ground from where native chickens feed on them.

Among the farmers surveyed, 86.3% buy supplemental feed in the market. On average, farmers spend ₱199.18 ± ₱147.09 a month on supplemental feed, and among those farmers buying supplemental feed, 88.4% of them buy commercial-mixed feed. Other farmers buy corn grits (18.8%) while a few of them buy rice grain (2.9%).

While 86.3% buy supplemental feed, more of them (97.5%) said that they also feed their native chickens with what they produce on their farm. The mean number of times farmers give supplemental feed to their chickens for different kinds of supplemental feed per day ranges from 1.33 to 2.08. Among these farmers, 61.5% of them provide corn, 43.6% of them provide coconut meat, while 32.1% of them provide cassava root. Kitchen leftover

was included as one of the many supplemental feeds that farmers need not buy, but only a very small number of them give it to their native chickens (1.3%).

Only 10% of SSNC farmers surveyed collect the eggs of their native chickens. Not one farmer surveyed practice artificial incubation of native chicken eggs. This study found that 22.5% give a vaccine to their native chickens against Newcastle Disease. The office of the municipal agriculturist (MAO) of Ayungon provided the vaccines and was inoculated with the help of a volunteer group called Barangay Livestock Aides (BLAIDE). These volunteers received minimal allowance from the Department of Agriculture (DA) to help the MAO implement projects of the DA for the benefit of livestock and poultry raisers in the municipality.

This study also found that 79.5% of farmers select their breeders from their own flock. Another 12.8% get their breeding stock from friends for free, while a total of 14.1% of farmers buy breeding stock from either the marketplace (11.5%) or from other friends (2.6%). Only live chickens are being selected, unlike those in Western Visayas who were also selecting eggs (Cabarles, 2013). More than half of all respondents select their breeding stock from clutches with the highest survival rate of chicks, and numbers of eggs laid. The next criteria used by fewer farmers in selecting their breeding stock are body form (23%) and plumage color (12.2%).

SSNC farmers surveyed in this study did not maintain written records of their flock's performance. Native chicken performance data presented in this section came from farmer's historical accounts. The mean number of eggs per clutch was found to be 15.24 ± 1.46 (Table 5). The mean number of clutches per year is 2.49 ± 0.50 (Table 5). FAO (2010) cited studies showing different average clutches per year among SSNCs in several developing countries where the lowest mean number of clutches per year was 2.1 reported in Ethiopia, and the highest was 4.1 reported in Pakistan. Fotsa *et al.* (2014) identifies the number of clutches per year as a major cause of the five to eightfold difference in egg production between indigenous (native) and commercial layer breeds. The broody native hen does not lay eggs while hatching a clutch of eggs and rearing the chicks to about seven weeks of age. The same authors even suggest that genetic improvement of native hens in terms of egg and/or chick production can be achieved by selecting breeding stock among chicks from hens that lay big clutches of eggs and/or have high hatchability and survival rates. The mean hatchability rate of eggs is $67.37\% \pm 12.11\%$ while the mean survival rate is $71.57\% \pm 13.30\%$ (Table 5).

Causes of mortality were due to disease (88%), predation (3.8%), and parasite infestation (2.5%). Still, 10% of farmers did not know what caused the mortality among their native chickens. Dusan and Pabulayan (2012) reported that farmers in Western Visayas

Table 5. Production Performance of SSNCs in Ayungon, Negros Oriental.*

Variables	N	Minimum	Maximum	Mean	SD
Eggs per Clutch	80	10	18	15.24	1.46
Clutches per Year	80	2	3	2.49	0.50
Eggs per Year	80	20	54	38.13	9.33
Hatchability Rate, %	80	38.89	100	67.37	12.11
Survival Rate, %	80	33.33	100	71.57	13.30

*Based on historical account of farmer, no written records.

blame the changing climate as the reason why the disease has become prevalent among native chickens. It is only in Negros Occidental where predators and thieves were believed to have caused most of the losses among native chickens (Cabarles, 2013).

The majority (71%) of farmers said both husband and wife take care of them. Only 10.1% said the whole family takes care of their native chickens. Family consumption was the main reason why farmers in Ayungon are raising native chickens. Around 53.2% said that they raise native chickens so they can sell them.

Of those farmers who sell native chicken products, 60.9% of them sell live chicken for meat. Only 4.7% of them sell native chicken eggs but could not say how many eggs per clutch are sold. Almost all (95.3%) SSNC farmers who sell their live native chickens do so at the nearest marketplace. This could either be at the town's "market-day" place called "tabo", which happens only every Friday, or at the official public market at the town proper all days of the week. Only 32.8% of farmers are visited by traders or "middlemen" to buy their live native chickens. Very few farmers (9.4%) sell their live native chickens to friends and neighbors, probably because almost all of their neighbors and friends also raise native chickens.

The mean selling price of live native chickens sold at the marketplace by farmers is ₱161.97 ± ₱64.31 per kilogram (Table 6). To neighbors and friends, farmers sell them less (₱156.67 ± ₱36.70), while they sell at the lowest price to visiting buyers (₱153.81 ± ₱34.60). Visiting buyers or traders should also be buying live native chickens lower than the price they are sold at the marketplace because they have to spend a lot of time and some fuel to get to the homes of SSNC farmers.

The disease is the biggest challenge seen by 72.5% of SSNC farmers. Only 1.3% of farmers perceive predators as a challenge to raising chickens, while 27.5% of them do not see any challenges at all. This shows that many SSNC farmers in Ayungon, Negros Oriental fear the onslaught of disease which could easily wipe out their native chicken population in just one outbreak. Despite these challenges, 92.5% of SSNC farmers in Ayungon say that they will continue to raise native chickens.

SSNC production systems in Ayungon, Negros Oriental are mixed crop-livestock systems owned and managed by subsistence farmers located in mountain barangays that are far from the town center. These production systems in Ayungon, Negros Oriental should be sustained, for the farmer's survival, and for the benefit of the community who has been enjoying the unique taste and texture of specialty dishes from the meat of these native chickens. Studies should be done to help improve the performance of these native chickens, beginning with the number of eggs laid per year. The application of technologies to increase the clutch size and reduce clutch intervals among these native chickens should be prioritized in these studies. Any innovation introduced, however, should consider the resources and capabilities of subsistence farmers who are managing these systems.

Table 6. Selling Price of Live Native Chickens to Different Buyers.

Buyers	N	Minimum	Maximum	Mean	SD
Marketplace, ₱/kg	61	100	350	161.97	64.31
Neighbors and Friends, ₱/kg	6	120	200	156.67	36.70
Visiting Buyers, ₱/kg	21	120	220	153.81	34.60

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