

## THE ANALYSIS OF SEMI INTENSIVE NATIVE CHICKEN FARMING IN RURAL COMMUNITIES

(Case Study on Farmers Group “Poyuyanan” in Poyowa Besar Village,  
South Kotamobagu District, North Sulawesi Province)

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### ABSTRAK

Penelitian ini bertujuan untuk mengetahui pendapatan pada usaha peternakan ayam buras yang dipelihara secara semi intensif dan untuk mengetahui faktor-faktor yang mempengaruhinya. Penelitian dilakukan dengan metode survey dan wawancara dengan berpedoman pada daftar pertanyaan terhadap tiga puluh lima orang anggota kelompok “Poyuyanan” di Desa Poyowa Besar Kecamatan Kotamobagu Selatan Provinsi Sulawesi Utara. Analisis data penelitian dilakukan secara deskriptif dan analisis kuantitatif menggunakan teknik regresi berganda model Cobb-Douglass. Hasil penelitian menunjukkan bahwa peternak mempunyai rata-rata pemilikan 8 ekor ayam betina dan memperoleh pendapatan yang ekuivalen dengan 37,9 kg beras per bulan. Hasil analisa regresi menunjukkan bahwa secara bersama-sama variabel bebas mempengaruhi pendapatan peternak sebesar 81,2%. Secara parsial variabel bebas yang dapat meningkatkan pendapatan peternak adalah jumlah ternak ayam produktif yang dimiliki, biaya produksi, jumlah telur menetas dan daya tetas telur sedangkan variabel mortalitas DOC hingga umur 75 hari akan mengurangi tingkat pendapatan peternak ayam buras. Biaya produksi usaha peternakan ayam buras yang dipelihara secara semi intensif yang sebagian besar digunakan untuk membeli pakan dapat meningkatkan produksi dan pendapatan peternak yang pada akhirnya mampu untuk memenuhi ketersediaan pangan untuk masyarakat di pedesaan

*Kata Kunci : Ketersediaan pangan, semi intensif, peternakan ayam buras, pendapatan*

### ABSTRACT

The study was aimed to determine the income for semi intensive native chicken farming and to determine the factors influence it. The study was conducted by survey method and direct interview using questionnaire to 35 members of farmers group “Poyuyanan” in Poyowa Besar Village, South Kotamobagu Dstrict North Sulawesi Province. Data were analyzed by using descriptive and quantitative analysis using multiple regression analysis of Cobb-Douglass model. The result showed that farmer with an average ownership of 8 hens could obtain income equivalent to 37.9 kg of rice per month. The regression analysis showed that altogether the dependent variables had effect to income as much 81.2% ( $R^2 = 0.821$ ). Partially variables that could increase farmers' income were hatching rate, number of productive hen, cost of production and number of eggs hatched. Mortality was the only variable that decreased farmers' income. Cost of production in semi intensive native chicken farming which mainly for buying feed could increase the production and income for farmers that in turn would support food availability of rural communities in Poyowa Besar Villages

*Keywords: Food availability, income, semi intensive, native chicken farming*

## INTRODUCTION

In Southeast Asia local –or native– chicken meat is preferred by most consumers (Chang, 2007). Native chicken are an important part of traditional rural living. Typically, a farm household keeps around 10-20 birds (Suryana and Hasbianto, 2008). More than 70% of the national meat consumption are from poultry. In that portion about 85% are from broiler chicken (Direktorat Jenderal Peternakan, 2012). However, broiler chicken farming is less significant for improvement of the rural welfare because the production system is largely depending on imports (Yuwono and Prasetyo, 2013). On the other hand, the native chicken which is usually raised in the rural area has many potentials to support the national meat consumption because of the taste and quality of the meat (Kperegbeyi *et al.* 2009). These factors have made native chicken meat has a premium price. The price is considered to be stable and even going up, thus it makes the native chicken farming a good business opportunity for people in rural area to increase their income.

Semi intensive farming is believed to be the better system than the traditional ones. According to Mangesha (2012) semi intensive farming is a way to raise chicken in a small fence space with routine feeding, thus the growth of the poultry can be observed. On the contrary in the traditional one the chicken is raised freely without any cage and any routine feeding, therefore semi intensive native chicken farming is able to produce meat and eggs more than traditional ones and ensure food availability from animal protein for rural communities.

Heryadi and Rusfrida (2010) proposed a program namely *Family Poultry* based on semi intensive native chicken farming activity with 10 hens and 1 cock per household to establish food availability from animal protein. In the first year of the program the amount of the chicken parents increased by 5.8 times and the family could consume 150 eggs and 24 chicken meat. Direktorat Jenderal Peternakan (2012) stated that Indonesian meat consumption is lower than neighborhood country such as Malaysia and Thailand. Therefore semi intensive native chicken farming is an alternative to meet the food availability especially meat consumption for rural communities.

The farmers in Poyowa Besar village, have started to rear native chicken in semi intensive

farming since 2010. However farmers have not been able to run their business optimally due to lack of knowledge about semi intensive native chicken farming. Farmers need information continuously about how to increase the production and their income that in turn would support the food availability for rural communities in Poyowa Besar Villages. Therefore it is necessary to investigate the factors affecting farmers' income from semi intensive native chicken business.

## MATERIALS AND METHODS

### Sampling Methods and Data Collection

The study was conducted in Poyowa Besar Village, South Kotamobagu District, North Sulawesi Province. Poyowa Besar Village was purposively chosen based on the existence of farmer group who rear semi intensive native chicken farming, namely "Poyuyan group". All of native chicken farming in Poyowa Besar village are member of "Poyuyan" group that in 2010 the group have got extension service from Faculty of Animal Husbandry Sam Ratulangi University (FAHSRU). Thirty five members of native chicken farmer group were selected as respondents. Data were collected by using survey method with interview directly to farmers assisted by questionnaires taken in June – August 2013. Data collection consisted of primary data of technical parameters and economic parameters such as egg production per hen, number of egg hatched per year, rearing, production cycle of hen, mortality of DOC until 75 days old of chicken, hatchability, body weight of chicken sold, inputs and outputs price and characteristic of respondent.

### Data Analysis

Data were analysed by using descriptive and quantitative methods. Descriptive analysis was used to determine the characteristic of the respondents, whereas quantitative analysis was used to determine the economic incentive or income and to determine factors influencing the native chicken farmers' income. Income was computed by subtracting revenue obtained to cost of production spent by farmers. The formula is given as follow (Amir and Knipscheer, 1989) :

$$\Pi = TR - TC$$

Where:

$\Pi$  = Income/ economic incentive  
(IDR/year/farmer)

TR = Total revenue (IDR/year/farmer)

TC = Total cost (IDR/year/farmer).

In this research cost of production was considered because the shift from traditional to semi intensive farming needed an extra cost to purchase feed and vaccines and to build cages to protect the chicken.

Cobb-Douglass model of production function was used to analyse factors influencing farmers' income (Gujarati, 2003) :

$$\text{Ln } Y = \alpha_0 + \alpha_1 \text{Ln } X_1 + \alpha_2 \text{Ln } X_2 + \alpha_3 \text{Ln } X_3 + \alpha_4 \text{Ln } X_4 + \alpha_5 \text{Ln } X_5 + \alpha_6 \text{Ln } X_6 + e$$

Where:

Y = Income (IDR/year/farmer)

X<sub>1</sub> = Number of productive hen (bird)

X<sub>2</sub> = Cost of production (IDR/year/farmer)

X<sub>3</sub> = Mortality of DOC until 75 days old of chicken (%)

X<sub>4</sub> = Number of egg hatched (egg/year)

X<sub>5</sub> = Hatching rate (%)

X<sub>6</sub> = Average of body weight of chicken sold, 75 days old (kg/year/farmers)

$\alpha_0$  = Constant

$\alpha_1, \alpha_2, \dots, \alpha_6$  = Regression coefficient of each variable X<sub>1</sub>,...X<sub>6</sub> (Independent variables)

e = error term

To estimate the coefficient of regression, ordinary least square method was used. Furthermore, accuracy of the model was evaluated using hypothesis test namely coefficient of determination test (R<sup>2</sup>) overall test ( F test) and partial test (t test). Completion of analysis was conducted using computer with SAS. Version 9.1.3

## RESULTS AND DISCUSSION

### Characteristics of Respondents and Production Parameters

The research showed that most of the farmers were 19-54 years old and on the average was 41 years old. It showed that almost all native chicken farmers are still in the productive age. Forty two percent of farmers' education background was senior high school. However they had farming experience more than 5 years. Besides the formal education, the native chicken farmers, also obtained informal education, such as counseling by Agriculture and Animal Officer from District of South Kotamobagu and extension service from FAHSRU. Nevertheless extension Officer from District of South Kotamobagu rarely provide technical information about semi intensive native chicken farming in the study area due to limited amount of the Officer whereas

extension service from FAHSRU was only implemented in 2010.

Farmers usually used their courtyard to manage their chicken. The average number of hen raised by farmer was eight hens and 1 cock. Farmers kept the hens and cock in the limited space of cage. Productive hens were managed for breeding, brooding, rearing, and chicken parenting for about 5-6 days, then farmer separated the day old chick from its parent. This treatment will make hen lay again and so on. Chicks were raised until the age of about 75 days with intensive feeding, then they were sold as resulting product for breeder (Table 1).

Production parameters consist of technical and economic parameters. Technical parameters consisted of egg production, production cycle, mortality, hatching rate and body weight of chicks. In the animal production, feed was a very important factor which along with good raising management factors would affect the technical parameters (Justus *et al.*, 2013) The feed which were given by farmers in "Poyuyan" group are presented in Table 1. Economic parameters consisted of input and output price. Based on the technical and economic parameters cost of production and income could be measured appropriately.

The raw materials of feed in the form of rice bran, dried rice and and corn were local raw materials which were easily obtained from the local market. Nevertheless, broiler feed was still supplied from the factory. Therefore farmers still needed guidance from the relevant institution to make feed mix ratio that meet the needs by utilizing local raw materials. Based on the price research data of broiler feed, rice bran, dried rice and corn were IDR 6425/kg, IDR 2500/kg, IDR3200/kg and IDR 4250/kg respectively. In regard to local raw material, corn was the most expensive ones so it was rarely used by farmers.

Some researchers showed that semi intensive farming was one of the intensification approach to increase the production, productivity and income of smallholder farming. In the backyard system of chicken farming, production cycle of native chicken had taken about five months or 158 days and produced 30-40 eggs/hen/year (Haunshi *et al.*, 2009) whereas based on the result of this study that is presented in Table 2 it only took about 59 days in semi intensive farming or six times per year. This meant that semi intensive native chicken farming performed by farmers in the study area could reduce production cycle and

Table 1. Amount of Feed at Each Phase of Chicken Reared in Semi Intensive Farming By Farmers of “Poyuyanan” Group

Phase of Chicken	Type of Feed			Average/bird/day (gram)
	Broiler Feed	Rice Bran	Dried Rice/Corn	
	.....%.....			
0-30 (days)	100	0	0	30
31-60 (days)	25	50	25	75
61-75 (days)	20	40	40	90
Hen*	5-10	40-45	40-45	100
Cock*	0	50	50	110

\* The feed was added with kitchen waste

Table 2. Native Chicken Production With Semi Intensive Farming by Farmers of “Poyuyanan” Group

Production Items	Average/ hen/ period
Laying period (days)	12.80
Eggs Production (eggs)	10.21
Number of egg hatched (eggs)	9
Brooding period (days)	21
Rearing (days)	5.63
Production cycle (days)	59
Production cycle/year (time)	6

increase egg production. The production and productivity of native chicken farming are presented at Table 3. Table 3 shows that the number of productive hen per farmer per year was 8 birds, therefore they produced 594 eggs or 66 eggs/hen/year. The productivity of semi intensive native chicken farming in the study area was good compared with the result of previous research (Dutta *et al.*, 2013; Park *et al.*, 2010) that hatching rate and production cycle of Bangladesh indigenous chicken and Korean cross breed native chicken were 79.30%, 82.8% and 4 - 6 times per year respectively while the hatching rate and production cycle of native chicken farming running by “Poyuyanan” group farmers in

Poyowa Besar Village were 88.7% and 6 times/year respectively. This is because a female Bangladesh indigenous chicken lays 3-4 clutches of eggs yearly. It takes 2 weeks for laying, 3 weeks for hatching, and 6–10 weeks for taking care of her broods. Thus, a hen spends 10–15 weeks for each production cycle. The time period of a hen’s production cycle depends on two main factors namely feed and body weight (Suryana dan Hasbianto, 2008). A hen needs good quantity and quality feed and should reach at least the previous body weight before entering the next production cycle. However, mortality rate of native chicken farming in the study site still needed to be controlled with better management. Each household can consume two eggs and two birds every months or 25.77 birds and 27.18 eggs per year. The number of chicken per farmer were eight birds per year and it varies greatly depending on hatching rate, mortality until 75 day old, the availability of natural feeds and crop – by products and endemic diseases. All parameters in Table 3 would determine the success of “Poyuyanan” group farmers in getting the economic incentives to meet their food.

#### Cost of Production, Revenue and Economic Incentive (Income)

The component of production cost, revenue and income or economic incentive of semi intensive native chicken farming are presented in Table 4. The result of the research showed that feed consumption had most contribution on semi intensive chicken farming cost production. The average feed cost per year was IDR 9,175,564. It

Table 3. Productivity of Native Chicken Farming Per Farmer in Poyowa Besar Village

Production Items	Average/year
Number of productive hen (birds)	8
Egg production (eggs)	594
Egg sold (eggs)	63.87
Self consumption of eggs (eggs)	27.18
Hatching eggs (eggs)	502.95
Hatched eggs (eggs)	446.12
Hatching rate (%)	88.7
Mortality until 75 days (birds/%)	40.68/9.12
Number of chicken, 75 days old (birds)	405.44
Self consumption of chicken, 75 days old (birds)	25.77
Number of chicken sold (birds)	379.67
Average body weight at 75 days old (g/bird)	973.35

The price of eggs and chicken 75 days were IDR 1,180/egg and IDR 38,000/kg body weight (August 2013)

Table 4. Cost of Production, Revenue and Income of Farmers

Components	Average
<b>Cost of Prooduction</b>	
Cage and equipment (IDR/year)	267,455
Buy hen and cock (IDR/year)	306,691
Feed (IDR/year)	9,175,564
Vaccine (IDR/year)	105,217
Drugs (IDR/year)	173,818
Electricity (IDR/year)	69,677
Total of cost production (IDR/year)	10,098,422
<b>Revenue</b>	
Chicken sold (IDR/year)	14,427,460
Income (2-1) (IDR/year)	4,329,038

Income/month was IDR 360,753 equal to 37.974 kg of rice  
 Price of rice IDR was 9,500/kg (August, 2013)

was because farmer has given 100% broiler feed on 0-30 days old chicks and decreased until 20% step by step on 61-75 days old while rice bran and dried rice/corn was up to 40% of each. The result was consistent with Dewanti and Sihombing (2012) that feed cost was the highest expense

compare to other expense because livestock need to feed everyday for their living and production. Farmers need cage and equipment to raise the chicken in semi intensive farming. The average cage and equipment cost production was IDR 267,455 per year. Other production costs were

vaccine, IDR 105,217/year drugs, IDR 173,818/year, electricity, IDR 69,677/year and buy hen and cock, IDR 306,691/year The average total cost of native chicken farming was IDR 10,098,422/year

Marketing systems for native chicken farming in Poyowa Besar Village can be divided into two levels; there were person-to-person transaction in the villages, and market in Kotamobagu Town. Person-to-person transaction in the villages involve a direct contact between wholesaler and native chicken farmers. These transaction occurred when some consumer received guest at home or running the party This marketing system was occasional or seasonal. Chicken were sold live and the bird size varies from young, 1 kg body weight birds up to old parent stocks. In the case of markets in Town, the farmers carried their chickens to the markets very early in the morning. The number of chicken brought by a farmer ranges from three to six birds. The desired weight was around 1.0 kg/bird; if heavier, the price tends to go down due to the inferior, tougher and meat texture. The price of chicken 75 days was IDR 38,000/kg body weight in August 2013. Farmers sold 379.67 birds/year, thus each farmer has opportunity to get the monthly income of IDR 360,753 equivalent to 37.9 kg of rice per month (Table 4), the price of rice was IDR 9,500/kg. The result indicated that semi intensive native chicken farming conducted by “Poyuyanan “ group farmers has contributed

on food availability to rural community in this region. Dutta *et al.* (2013) stated that indigenous chicken has contributed about 25.06% of total meat and eggs production thus it can establish food sovereignty for sub urban and rural households in Rajshahi Regency, Bangladesh.

### Factors Influencing The Income

The result of regression analysis from 35 farmers are presented in Table 5. The result showed altogether the dependent variables have effect to farmers’ income or economic incentive as much as 81.2% ( $R^2 = 0.812$ ). The magnitude of the regression coefficient indicated the extent to which specific independent variable can increase or decrease income or economic incentive. The variables that can significantly increase ( $P < 0.05$ ) income or economic incentive were hatching rate (0.891), number of productive hen (0.671), cost of production (0.562) and number of egg hatched (0.524), respectively and  $P < 0.10$ . The only variable that significantly decrease income was mortality (-0.106) with  $P < 0.10$ , while body weight of chicken sold, 75 days was completely not significant. The result was in line with previous study reported by Dewanti and Sihombing (2012) that hatching rate and cost of production had a significant influence to the income of semi intensive and intensive native chicken farmer therefore semi intensive native chicken rearing could be more economical for the small holder poultry keepers (Sanka and Mbagu,

Table 5. Factors Influencing Farmer’s Income

Independent Variables	Coefficient	t-value	Probability
Constant	27.633	0.184	0.426
Number of productive hen ( $X_1$ )	0.671	1.914*	0.083
Cost of production ( $X_2$ )	0.562	14.239**	0.027
Mortality ( $X_3$ )	-0.106	2.164*	0.065
Number of egg hatched ( $X_4$ )	0.524	7.206**	0.041
Hatchig rate ( $X_5$ )	0.891	2.227**	0.032
Body weight of chicken sold, 75 days old ( $X_6$ )	0.421	1.117	0.352
Adjusted $R^2$			0.812
F-value			0.000

\*\* = level significantly of 0.05 ( $P < 0.05$ )

\* = level significantly of 0.1 ( $P < 0.1$ )

2014). Hatching rate determined the farmer's income because the higher of hatching rate, farmer can sold the more eggs and obtain more income. In semi intensive native chicken farming conducted by Poyuyanan farmers group provided the chicken with routine feeding and vaccine thus it increased chicken's production and productivity thus would also increase revenue for farmer. Similarly Pham *et al.* (2013) reported that Taiwan native chicken is well managed by feed and breeds and therefore there is a good potential for adaptation to new environmental conditions or markets. The level of education, farming experience, mortality, number of eggs hatched, the existing of capital, extension agents, and training of farmers could affecting native chicken's production which in turn made farmers income increase.

### CONCLUSION

Farmers conducted semi intensive native chicken farming in Poyowa Besar Villages, South Kotamobagu District North Sulawesi Province could obtain an income that equivalent to 37.9 kg of rice per month. Factors that significantly influenced farmer's income on semi intensive native chicken farming were hatching rate, number of productive hens, cost production and number of eggs hatched

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