

The Potential of Broiler Chicken Development: A Case Study of Broiler Breeders in Kambu District, Kendari City

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ABSTRACT

This study aims to determine the carrying capacity of broiler chicken development in Kambu District, Kendari City. Purposive sampling technique with four farmers who maintain broiler chickens in Kambu District. This study uses descriptive analysis to formulate and interpret existing data to provide a clear picture of broiler productivity in the field. The results of this study indicate that in Kambu District, Kendari City has a carrying capacity for the development of broiler chickens. It can be seen from the availability of human resources such as the level of high school education has reached 75%, the experience of raising 5-10 years and above has reached 50%, the utilization of labor is very efficient. Feeding is efficient two times a day; the average harvest age is 35 days with a dominant harvest weight of 2 – 2.2 kg/bird or has reached 75%. At the same time, the mortality rate in chickens is only between 4 to 4.8% of the scale ownership 2,000-2,500 birds every breeder.

Keywords: Carrying capacity, broiler chicken

1. INTRODUCTION

Livestock is a sub-sector that plays an essential role in meeting animal protein needs. Community needs in consuming livestock products (meat, milk, and eggs) are increasing [1] [2] [3]. The increase in consumption of livestock products is supported by the increasing population, education level, public awareness of nutrition, and the role of food substances, especially protein for life, and improve the community's ability to utilize livestock products; so that the development of the livestock sector has a positive impact on the community to improve nutrition which can have other impacts in the form of increasing welfare.

The government's effort to increase farmers' income to fulfil the animal protein needs of the community is to utilize and develop the potential of regional livestock [4]. Potential high-value livestock, one of them is chicken broiler, which is a producer of meat cattle with rapid growth with a short life cycle compared with other poultry [5]. It is one of the reasons for farmers to cultivate broiler chickens.

Kendari City has high broiler chicken production, especially in Kambu District, each breeder with population ownership ranging from 2,000-3,000 birds/month per cage.

This data was obtained based on field observations (Thursday, 6 February 2020). Therefore, the author wants to research the title carrying capacity of broiler chicken development in Kambu District, Kendari City. This study is expected to determine the carrying capacity of broiler chicken development in Kambu District, Kendari City.

2. MATERIALS AND METHODS

This research was conducted in February-March 2021 in Kambu District, Kendari City. Based on field observation data with farmers in Kambu District, Kendari City. The selection of sub-districts as a sample is based on livestock ownership by farmers, which is 2,000-3,000 birds/month per cage. In contrast, the sampling technique is purposive with four farmers who maintain broiler chickens in Kambu District.

The data in this study include primary and secondary data. Primary data is obtained from informant sources, namely individuals/breeders, obtained by researchers through direct field observations/observations and interviews. In comparison, secondary data is obtained or collected by people researching existing sources. The data used to support the preliminary information that has been obtained are library materials, literature, previous research, books.

The research data collection technique was carried out with several data collection techniques, namely:

1. Observation is the collection of data carried out through direct observation to the research location to get a candid picture of the condition of the research object.
2. Interviews are direct dialogue and in-depth discussions with the farmers who were the study sample using the help of a questionnaire containing a list of required questions.
3. Documentation, namely data collection by collecting data in written notes, pictures, tables in the form of books or reports contained in an agency.

The variables were observed in this study include supporting capacity development of broiler chickens, including:

1. Characteristics of breeders include breeder age, education level, type of work, livestock experience, labour, and ownership scale of broiler chickens.
2. Production factors include broiler cage, cage sanitation, disease type, and amount of feed widely.
3. Production: production includes feeding frequency, harvest age, bodyweight/period, and mortality rate.

The analytical method used is the descriptive analysis method. The descriptive analysis method is a way of formulating and interpreting existing data to provide a clear picture of broiler productivity in the field. For field research and data analysis, several operational definitions are used, including:

1. Conduct interviews with farmers directly related to the description of education level, age, experience, number of livestock, area of cages, number of workers applying technology, and other facilities. It was done to obtain information related to broiler farming in Kambu District, Kendari City.
2. The management of livestock rearing broilers includes systems and feeding patterns, types of feed, the amount of feed used, weight, the

number of deaths, the handling of cage sanitation, diseases, and treatment of animal diseases.

3. After obtaining data from farmers, researchers then tabulated and analysed based on the factors supporting the broiler business.

3. RESULTS AND DISCUSSION

3.1. Breeder's Age

The age of the breeder is one of the indicators that affect the ability to work and a person's mindset in determining the broiler farming business. The classification of respondents based on the age of farmers in Kambu District, Kendari City, can be seen in Table 1.

Table 1. Age classification Broiler Breeders

Breeders Age (Years)	Number of Respondents (persons)	Total percentage (%)
20-30	2	50
31-50	1	25
>50	1	25
Total	4	100

The results obtained (Table 1) show that the age of broiler breeders in Kambu District, Kendari City, aged 20-30 years is two people with a percentage of 50%. In comparison, broiler breeders aged 31-50 years to 50 years of age respectively of one person with the same percentage of 25%. Based on the age of broiler breeders in Kambu District, Kendari City, the dominant breeders are motivated and productive at the age of 20-30 years compared to 31-50 to 50 years and over. Chamdi [6] reported that the productive age of 20-45 years still has high enthusiasm and is easy to adopt new things.

Based on the age level of broiler breeders, which are dominated by the age of 20-30 years, it is very supportive of the productivity of broiler chickens in Kambu District, Kendari City. With the age of productive breeders, it is effortless to participate in the broiler business development program that the government has launched to meet market needs.

3.2. Level of Education

The level of education is essential in managing a business, including broiler chicken farming, because it is the principal capital in receiving information about animal husbandry to increase broiler chicken productivity. The classification of respondents based on

the level of education of farmers in Kambu District, Kendari City can be viewed in Table 2.

Table 2. Classification of the Education Level of Broiler Breeders

Education Level	Number of Respondents (persons)	Total percentage (%)
Elementary School	1	25
Junior High School	0	0
Senior High School	3	75
Bachelor/Diploma	0	0
Total	4	100

Table 2 presents broiler breeders in the Kambu District with an elementary school education level of 1 person with a percentage of 25%- While the education level of Senior High School is three people with a percentage of 75%.

Based on the level of education of broiler breeders in the Kambu District, it is dominated by senior high school graduates. The human resource potential as the carrying capacity of broiler chicken farm in the District Kambu Kendari; the show with the level of education is an indicator quality support in the development of farm processing business that acted. In line with this concept, Siregar *et al.* [7] reveal that education greatly influences a person's mindset, especially decision-making and management arrangements in managing a business. Their education may be easier to accept or consider innovation and decision-making in developing businesses concurrently run under the planning.

3.3. Job Type

The type of work is essential to determine the amount of time a person spends running a business. The classification of respondents based on the type of work of breeders in Kambu District, Kendari City, can be detected in Table 3.

Based on Table 3 shows that there are three broiler

Table 3. Classification of Types of Work for Broiler Breeders

Job Type	Number of Respondents (persons)	Total percentage (%)
Breeders/Farmers	3	75
Government employees	1	25
Total	4	100

breeders in the Kambu District with the type of work as broiler breeders with a percentage of 75%. In comparison, the primary type of work as a Civil Servant with a side job as a broiler breeder is one person with a percentage of 25%. Broiler breeders dominate this type of work in District Kambu Kendari. Then the rest of the broiler breeders are just a job or a side business to increase their income. When viewed from the prospect of broiler chicken farming, it is very promising from an economic point of view because the market demand for the city of Kendari for broiler chicken meat needs is quite significant due to the increasing demand for meat consumption.

3.4. Farming Experience

Experience is practical learning in life because, with experience, a person will certainly have a broader insight, even more so that he has had many experiences. In this case, of course, the experience of raising livestock is an influential factor in running a broiler farming business because later, it will be essential for the success of raising livestock and the resulting production. The classification of respondents based on the experience of raising livestock in Kambu District, Kendari City can be seen in Table 4.

Table 4. Classification of Types of Work for Broiler Breeders

Farming Experience (years)	Number of Respondents (persons)	Total percentage (%)
<5	2	50
5-10	2	50
Total	4	100

Based on Table 4, it can be seen that the experience of raising livestock, on the scale of broiler chicken farming in Kambu District, Kendari City, has various experiences, namely from experience raising under five years as many as two people with a percentage of 50%. While broiler breeders who have experience raising from 5-10 years as many as two people or 50%. The experience of broiler breeders in Kambu District, Kendari City, can be said to have been quite long, namely, 5-10 years, which is the lowest experience under five years of raising only a short time in carrying out broiler farming business activities, especially considering the harvest process in one broiler harvest period only for about 35 days. The experience of raising broilers will undoubtedly help the broiler business in Kambu District, Kendari City, to increase the population of broiler chickens and can also increase the development of the business itself. According to Sugeng [8] & Indrayani *et al.* [9], the longer the

experience of raising livestock, the easier it is for farmers to make decisions related to the technical implementation of their livestock business.

3.5. Family Labour

The broiler farming business, especially with many business scales, needs some business managers. From the study results, it can be seen that some breeders have a workforce (Table 5).

Table 5. Classification of Family Labor for Broiler Breeders

Family Labor (Person)	Number of Respondents (persons)	Total percentage (%)
1-2	4	100
3	0	0
Total	4	100

Table 5 confirms the involvement of broiler breeders in Kambu District, Kendari City, from 4 respondents, each 1-2 workers. It suggests that family labor in broiler chicken farming is efficient with the condition of livestock ownership broilers; each farmer ranged 2,000 – 2,500 birds is maintained.

3.6. Scale Livestock Owners

The number of livestock ownership based on the population of broiler chickens kept by farmers in Kambu District, Kendari City can be seen in Table 6.

The study results (Table 6) show that the scale of ownership of broiler breeders in Kambu District, Kendari City, used 2,500 birds of the initial population with a final production achievement of 2400 birds, namely one person or about 96.0%. Then to scale ownership early 2,000 with production performance of 1,920 as many as one person or about 96.0%. While the scale of livestock ownership early 2,500 birds obtained from the two respondents are the same production in 2,380 birds end with the achievements of 95.2%. The number of broilers that farmers keep depends on the capabilities they have.

Table 6. Classification of Scale Livestock Owner for Broiler Breeders

Number of Respondents (persons)	Scale Livestock Owner		Percentage (%)
	Early (bird)	Final (bird)	
1	2500	2400	96,0
1	2000	1920	96,0
2	2500	2380	95,2

3.7. Factors of Production

3.7.1. Cage Size

The cage is a delicious part of the building used to protect livestock from the beginning, during the production period to being marketed [10], [11]. The classification of respondents based on the area of broiler breeders' cages in Kambu District, Kendari City can be seen in Table 7.

Table 7. Broiler Chicken Farmer Cage Area

Cage Size (m ²)	Number of Respondents (persons)	Total percentage (%)
280	1	25
320	3	75
Total	4	100

The results of the investigation report (Table 7) that the area of broiler chicken cages owned by farmers in Kambu District, Kendari City, from 4 respondents there is one farmer with a caged area of 280 m² with a total population of 2000 broiler chickens and the density of the cage owned is approximately seven birds/ m². Meanwhile, three breeders have the same cage area of 320 m² with a population of 2500 each or a cage density of approximately eight birds/m². Density spacious cages or enclosures owned by each farmer will determine the productivity of broiler chickens in the District Kambu Kendari. Situmorang *et al.* [12] & Maulana *et al.* [13] explained that the cage area guarantees the number of results obtained by the breeder; if the area of the cage increases, the farmer's income will increase and vice versa. If the area of the cage is used a little, the income earned by the farmer will also decrease because the number of chicken seeds kept by the breeder will decrease.

3.7.2. Type of disease

The success of the broiler farming business lies not only in development efforts but also in disease control and prevention so that the health of broiler chickens is maintained. The classification of respondents based on the type of broiler disease in Kambu District, Kendari

City, can be seen in Table 8.

Table 8. Classification of Broiler Chicken Diseases

Type of disease	Number of Respondents (persons)	Total percentage (%)
Gumboro	4	100
ND	0	0
Total	4	100

Table 8 identifies the type of disease that attacks broiler chickens as gumboro; this is based on interviews with farmers in Kambu District, Kendari City from 4 respondents, 100% have the same report. Gumboro transmission occurs through environmental pollution by viruses that come out with the feces of infected chickens. Farmers have routinely carried out the prevention of Gumboro disease by vaccination. However, some breeders do not vaccinate because they argue that even though vaccination is carried out, gumboro cases still occur. According to Wahyuwardani *et al.*[14] ; Wiedosari *et al.* [15]; Muller *et al.* [16], several factors contributed to the failure of gumboro vaccination, namely an outbreak on the same farm, exposure to gumboro virus from a source of persistent infection, vaccinations carried out when maternal antibodies were still high enough, doses are given at the time of vaccination were insufficient, and vaccinated chickens under stress conditions.

3.7.3. Cage Sanitation

The sanitation enclosure serves to prevent the transmission of bacteria in chickens. The classification of respondents based on the sanitation of broiler breeders' cages in Kambu District, Kendari City can be seen in Table 9.

Table 9. Classification of Broiler Chicken Diseases

Cage Sanitation	Number of Respondents (persons)	Total percentage (%)
One time	4	100
Two time	0	0
Total	4	100

Table 9 shows that 100% of the four broiler breeders in Kambu District, Kendari City, have good cage sanitation; this shows that farmers know how to take good care of the cage not to cause disease for their pets. Activity disinfects cages are regularly performed one time each harvest period broiler breeders to sterilize livestock pens of germs that will infect broiler chickens.

The respondent has already implemented cage sanitation activities to prevent disease transmission affecting broiler chickens and keeping the environment around the cage.

3.7.4. Feed Amount

The feed is a mixture of feed containing a complete nutrient and arranged in a particular way to meet the nutritional requirements of poultry consumed [17][18]. Classification of respondents based on the amount of broiler chicken feed in Kambu District, Kendari City during the period, can be seen in Table 10.

The results of the analysis (Table 10) show that broiler breeders in Kambu District, Kendari City. The

Table 10. Number of Broiler Chicken Feed

Feed Amount (kg)	Number of Respondents (persons)	Total percentage (%)
5500	1	25
6000	2	50
6500	1	25
Total	4	100

amount of feed spent during the maintenance period from 1 farmer was 5,500 kg from 2,500 birds of the initial population to the final production achievement of 2,400 birds, then followed by two farmers by spending 6,000 kg of feed with an initial population of 2,000 to 2,500 birds with a final production of 1,920 to 2,380 birds. While one broiler breeders spend the feed for as much as 6,500 kg with a population of early 2,500 birds with production performance of 2,380. According to Rachmawati *et al.*[15], feed is an essential *sapronak* in livestock production. It is estimated that feed costs can reach 60-70 percent of the total production costs. Feed management includes the type of feed, feed quality, the timing of feeding, and the feed concentration given to livestock. It is necessary to pay attention to regular feeding so that the need for protein, carbohydrates, fat, vitamins, and minerals can increase the weight of chickens. Substance requirements are an essential part of livestock for development, growth, and activity needs. Feeding must be done regularly with an amount that suits the livestock needs. Excess or deficiency in feeding will negatively impact livestock and production efficiency [11].

3.8. Production

3.8.1. Feeding Frequency

The level of feeding restriction will have a different effect on the chicken appearance and feed savings [19]–[21]. The classification of respondents based on the frequency of feeding broiler chickens in Kambu District, Kendari City, during the period can be seen in Table 11.

Table 11. Frequency Feeding Broiler Chickens

Feeding Frequency	Number of Respondents (persons)	Total percentage (%)
Two times	3	75
Three times	1	25
Total	4	100

Based Table 11 shows the frequency or timing of feeding broiler chickens in Kambu District, Kendari City, 75% of the three breeders feed two times a day. At the same time, 25% of 1 farmer provide feed three times a day. The frequency or timing of feeding broiler breeders in the district Kambu dominant use two times the frequency of feeding per day during the maintenance period. According to Sadri [22], the frequency or timing of feeding using a timer in chicks is usually up to 5 times a day. The older the chickens, the feeding frequency decreases to two or three times a day. Things that need attention in terms of time feeding are punctuality every day. Timeliness of feeding needs to be maintained because feeding at the wrong time every day can reduce production. The feed can also be supplied in a limited way at a specific time and tailored to the chicken's needs, for example, morning and afternoon. The feeding time is chosen at the right and convenient time so that the chickens can eat well and not a lot of feed is wasted [23], [24].

3.8.2. Harvest Age

Female or male broilers were generally harvested at 5-6 weeks to produce meat [25]. The classification of respondents based on harvest age of broiler chickens in Kambu District, Kendari City during the period can be seen in Table 12.

The study results (Table 12) explain that the harvest age of broiler chickens kept by farmers in Kambu

Table 12. Harvest of Broiler Chickens

Harvest Age (days)	Number of Respondents (persons)	Total percentage (%)
21	0	0
28	0	0
35	4	100
Total	4	100

District, Kendari City, is 100% of 4 respondents with each harvesting age of 35 days. In interviews with the farmers, the provisions of harvesting influence market demand and the condition of the body weight of broiler chickens. Suppose the body weight of broiler chickens is by market demand.

3.8.3. Chicken Body Weight

Body weight is one of the criteria used to measure the growth of chickens. The classification of respondents based on the body weight of broiler chickens in Kambu District, Kendari City, during the period can be seen in Table 13.

Farmers kept the body weight of broiler chickens during the Kambu District, Kendari City. One farmer 25%, has a 1.6 to 2.0 kg/bird (Table 3). Meanwhile, 75% of the three farmers obtained harvest weight above 2.0 to 2.2 kg/bird. The average harvest weight of broiler

Table 13. Broiler Chicken Body Weight

Chicken Body Weight (kg)	Number of Respondents (persons)	Total percentage (%)
1.6-2.0	1	25
>2.0-2.2	3	75
Total	4	100

chickens kept by breeders in Kambu District, Kendari City, is by the standard of chicken bodyweight gain set by PT. Ciomas Adisatwa, (2016) which is 1,608 – 2,206 kg/bird. According to NRC (1994), low body weight is caused by several factors such as maintenance management, ambient temperature, and low DOC quality. Meanwhile, according to Mahartih *et al.* [26], open system cages cause a negative response when weather conditions are not supportive or a very drastic change in weather.

3.8.4. Mortality Scale

Mortality or death is one aspect that can affect the success of a chicken farming business. The high mortality rate in broiler chickens often occurs in the early or starter period and is lower in the final or finisher period. The mortality rate is obtained by comparing the number of chickens that die with kept chickens [27]. The classification of respondents based on mortality or broiler mortality in Kambu District, Kendari City during the period can be seen in Table 14.

Table 14. Broiler Chicken Mortality Rate

Number of Respondents (persons)	Scale Mortality		Total percentage (%)
	Ownership Scale (bird)	Total mortality (bird)	
1	2,500	100	4.0
1	2,000	80	4.0
2	2,500	120	4.8

Table 14 shows that the highest mortality rate is found in 2 respondents on a 2,500 broiler chicken ownership scale with a mortality percentage of 4.8%, while the lowest mortality rate for two respondents on a different ownership scale is 2,000-2,500 birds with the same percentage 4.0%. It explains that the larger the scale of ownership does not tend to increase the number of mortality. However, the scale of ownership has a relationship with mortality (death) because, in a business scale of broiler chicken ownership, the increase in mortality is caused by poor maintenance management. So in an effort scale ownership, mortality remains the case, but the mortality rate cannot be predicted because of the influence on the mortality rate in the maintenance management. Rasyaf [28] says that the average maximum mortality is around 4% in the broiler group. Any death that exceeds this number should be considered a severe condition that must receive immediate attention from the farmer concerned. The death rate or mortality is influenced by several factors, including body weight, race, type of chicken, climate, environmental hygiene, sanitation equipment and enclosures, and diseases [29]. Saputri [30] said that the spread of disease in poultry could occur vertically and horizontally, requiring close supervision and more attention in case of infection (disease). Some considerations that need to be considered in treatment include the age of the chicken, the type and dose of antibiotics used to treat the chicken.

4. CONCLUSION

Based on the research results and discussion, it can be concluded that in Kambu District, Kendari City has the carrying capacity to develop broiler chickens. It can be seen from the availability of human resources such as the education level of Senior High School has reached 75%, the experience of raising 5-10 years and above has reached 50%, the utilization of labor is very efficient, the feeding is quite efficient two times a day, the harvest age is averaging 35 days with a dominant harvest weight of 2 – 2.2 kg/bird or has reached 75%, while the mortality rate in chickens only ranges from 4 – 4.8% from the ownership scale of 2,000 – 2,500 birds per farmer.

AUTHORS' CONTRIBUTIONS

Amiludin Indi & Deki Zulkarnain (writing draft articles); Asriamin Mursadat & Yamin Yaddi (Data analysis).

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