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# Analysis of broiler farming business systems without Antibiotic Growth Promoters (AGP) in traditional farms

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**Abstract.** The broiler farming industry cannot be separated from the use of Antibiotic Growth Promoter (AGP) in feed ingredients, but the negative impact of the utilization of AGP has led to a ban which has been in effect since January 2018. This study aims to analyze various factors and their relationship in broiler farming, so that it can be seen how the broiler farming business system runs after the ban of AGP. The research was conducted using a survey method on broiler farmers in one of the partner companies. Data analysis was carried out qualitatively using Causal Loop Diagram modeling. The results showed that the use of AGP was not the only factor that influenced the success of broiler farming. Other factors that affect broiler farming include maintenance management, cage quality and farmer quality. In addition to the regulation and arrangement of the broiler marketing trade system, efforts or strategies to improve broiler farming business include setting production standards based on the quality of the SAPRONAK used, upgrading open house cages to semi closed houses and improving the quality of farmers, especially motivation and education.

## 1. Introduction

One type of livestock with the most population is broiler chicken. Broiler chickens are spread in almost all parts of Indonesia and are concentrated on the island of Java. The population of broiler chickens in Indonesia has increased every year [1]. This increase is in line with the increase in Indonesia's population. Until now, broiler chicken farming is one of the most efficient businesses in producing highly nutritious food. Based on this, broiler farming has a significant role in contributing to the need for food of animal origin.

Broiler chickens are generally given commercial feed containing additives to accelerate meat growth, one of which is Antibiotic Growth Promoter (AGP), but the use of AGP in feed has the disadvantage of causing bacterial resistance to antibiotics. Resistant bacteria can infect humans through the food chain of animal origin. The existence of this negative impact has led to a ban on the use of AGP which has been regulated in Law No. 18 of 2009. The reality on the ground, farmers, and the feed industry are still very dependent on the presence of AGP because it is considered to greatly affect the success of the broiler business [2]. This study aims to examine how the broiler farming business system after the abolition of AGP.

Broiler farming with a partnership pattern is a complex system that requires systems thinking approach [3]. Qualitative modeling based on causal loop diagrams is one approach that can provide an



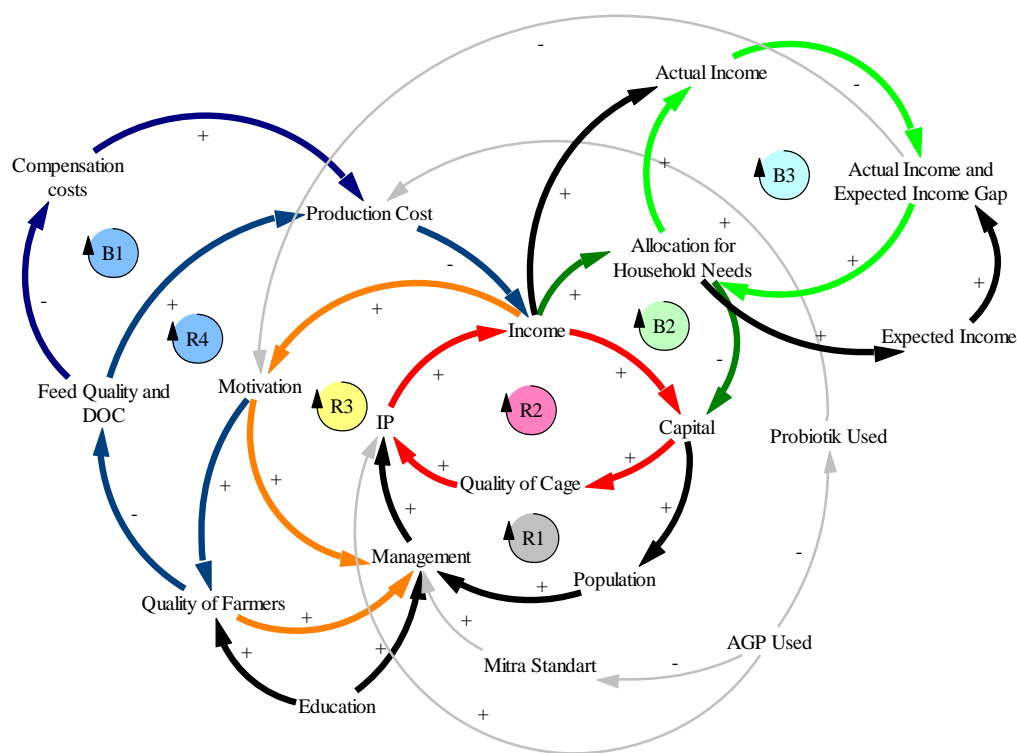
overview of the complexity of a system so that the factors that affect the operation of the broiler farming system can be explored [4].

## 2. Materials dan methods

This research was conducted using a survey method to broiler farmers who are members of a partnership company in 4 districts, namely Banyumas, Pemalang, Temanggung, and Banjarnegara Regencies. Sources of data were obtained through Focus Group Discussion (FGD) with broiler farmers and broiler chicken partnership companies. Analysis of research data using Causal Loop Diagram (CLD) qualitative modeling. Causal Loop Diagram is a diagram that shows the relationship between variables in a system. CLD consists of a positive sign (+) which indicates a one-way relationship, while a negative sign (-) indicates an inverse relationship [5]. The stages in compiling a qualitative model consist of system observation, problem identification, analysis of structure and relationship patterns, identification of system archetypes in causal loop diagrams [6].

## 3. Results and discussion

Causal Loop Diagram analysis in this study using the VENSIM PLE software. Based on the modeling analysis, we obtained four reinforcing loops and three balancing loops which are presented in the following figure 1.

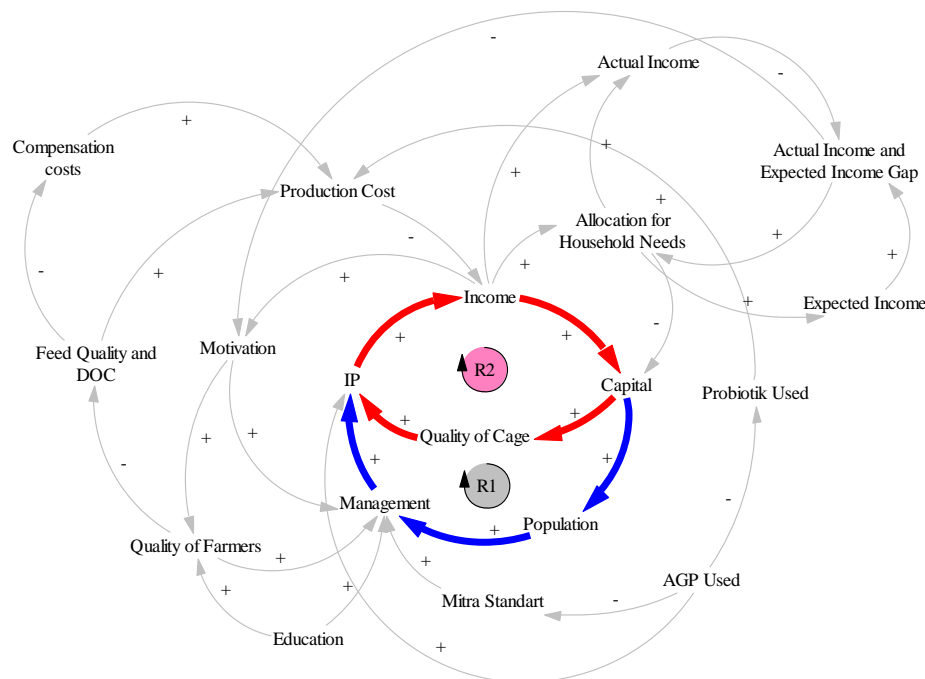


**Figure 1.** Qualitative modeling of broiler farms

The use of AGP plays a role in increasing the production of broiler farms. However, discontinuing the use of AGP also has a positive impact, namely increasing partner standards so that maintenance management is getting better. The abolition of AGP led to a partnership company policy that requires farmers who are members of the partnership to own land and cages. Ownership of land and cages increases the ability of farmers in business management so that the results obtained are better. Discontinuation of AGP also increases the use of probiotics and herbs which are known to be better than the use of AGP which causes residues.

### 3.1. Income and quality of cage

Figure 2 consisted of two reinforcing loops, namely R1 and R2. Loop R1 showed that good maintenance management increased the IP, a high IP increased the income of farmers so that capital increased, the capital owned by farmers increased the population, a high population increased maintenance management. This shows that income is a very important element in the rotation system. Conversely, when the income of farmers is not optimal, it will reduce the motivation to raise livestock. The motivation of raising livestock plays a role in increasing the income of farmers [7]. When the motivation to raise livestock is low, it will reduce maintenance management and IPK which will then have an impact on farmers' income.

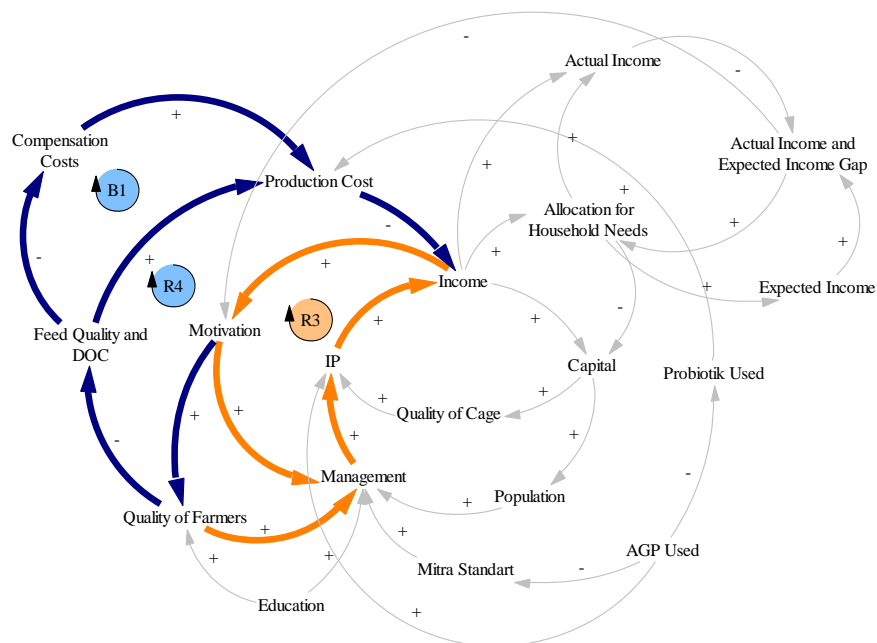


**Figure 2.** Income dan Quality of Cage Loop

Income is also related to the quality of the cage. Loop R2 shows the rate is positively influenced by income – capital – cage quality – IP – income. Income increases business capital to increase the ability of farmers to improve the quality of the cage. The quality of the cage increases the IP so that the income of the farmer also increases, and the cycle continues. That high cage quality results in lower FCR values and mortality so that the income obtained by farmers is higher [8].

### 3.2. Farmers quality

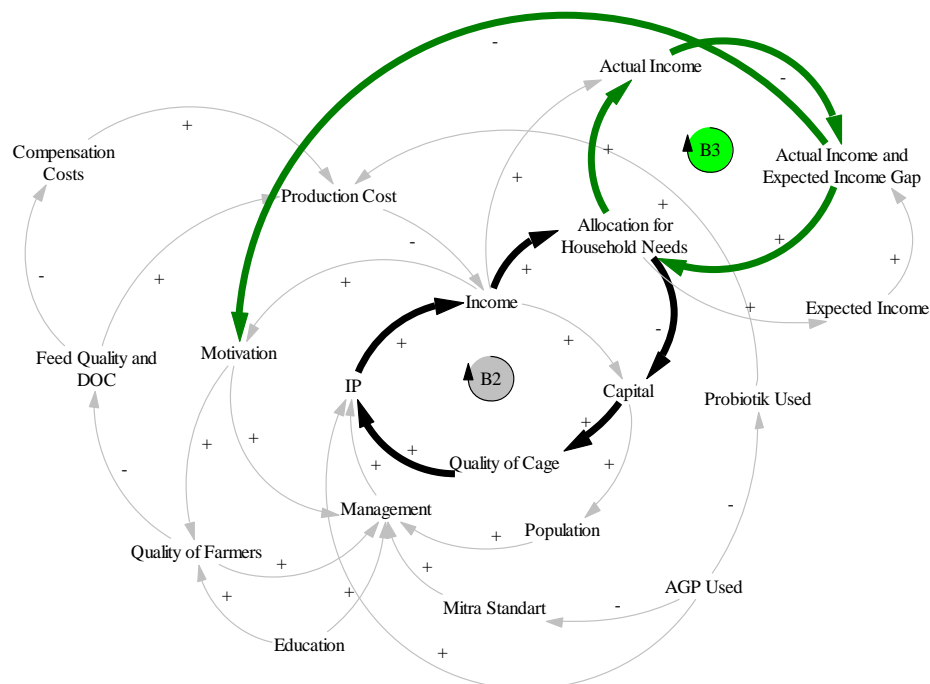
Figure 3 consisted of two reinforcing loops, namely loop R3, loop R4 and one balancing loop, loop B1. Loop R3 shows the quality of farmers to improve management, increase IP, increase income, increase motivation to raise livestock. In addition to Loop R3, the quality of broiler farmers also has an impact on Loop R4 turnover. Loop R4 shows that with high farmer quality, it does not require high-quality feed and DOC requirements so that it can save production costs. The more feed and DOC production costs can be reduced, the higher the income of farmers [9]. With lower production costs, it can produce the same production value so that the income of farmers is higher. The high income of farmers increases the motivation to raise livestock, improves the quality of farmers. That improving the quality of farmers is a very important factor because farmers control all activities in the production process, labor or farmers are factors that can increase production risk in broiler farming businesses [10].



**Figure 3.** Farmers quality loop

Loop B1 illustrates that a decrease in feed quality and DOC increases the cost compensation required for feed quality and DOC. Compensation costs increase the total cost of production so that it has an impact on farmers' income, motivation, and quality of farmers. With lower costs due to decreased feed quality and DOC, farmers need to bear the cost of compensation for decreased feed quality and DOC. The compensation can be in the form of additional heating costs during the broiler rearing period. However, the addition of cost compensation is still more profitable and efficient compared to the use of high-quality feed and DOC.

### 3.3. Actual income and expected income gap



**Figure 4.** Business income loop

Figure 4 consisted of two balancing loops, namely loop B2 and loop B3. Loop B2 shows that income increases the allocation for household needs, thereby reducing the capital of farmers to improve the quality of the cage, this affects the IP value and income of farmers. Loop B3 shows that there is a gap between actual and expected income. When the income of farmers increases, the needs of the farmer's household will increase so that the expectations of farmers on business results or income increase, when expectations do not match the conditions in reality, a gap occurs, the gap reduces the motivation to raise livestock. This gap is a common practice because human needs are increasing in line with the income earned [11]. The higher the income of the farmer, the more the desire to spend the income will increase [12].

#### 4. Conclusion

The use of AGP is not the only factor that influences the success of broiler farming business. Other factors that influence the success of broiler farming include: maintenance management, cage quality and farmer quality. In addition to the regulation and arrangement of the broiler marketing trade system, the strategy for improving the broiler farming business can be carried out through the following efforts: a) Improved maintenance management (production standards based on the quality of sapronak used); b) Improved quality of the cage (upgrade to semi close house); c) Improving the quality of farmers (motivation and education).

#### References

- [1] Badan Pusat Statistik [BPS] 2021 *Populasi Ayam Broiler Berdasarkan Provinsi* (Indonesia: Badan Pusat Statistik)
- [2] Sinurat A P, Bahri S, Muharsini S, Puastuti W, Priyanti A, Nurhayati I S and Priyono 2017 *Kebijakan Pengendalian Penggunaan Antibiotic Growth Promoters dan Ractopamine dalam Mendukung Keamanan Pangan Nasional* (Bogor: Livestock Research and Development Center)
- [3] Armelia V, Saleh D M and Setianto N A 2018 *Animal Production* **20** 199–209
- [4] Setianto N A, Cameron D and Gaughan J B 2014 *International Journal of Agricultural Management* **3** 164–74
- [5] Schaffernicht M 2010 *Systems Research and Behavioral Science* **27** 653–66
- [6] Setianto N A, Hidayat N N and Yuwono P 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **247** 012013
- [7] Rathod A D, Rani D and Ghasura R S 2017 *Guj. J. Ext. Edu.* **28** 224–7
- [8] Muharlien, Sudjarwo E, Yulianti D L, Hamiyanti A A and Prayogi H S 2020 *Jurnal Ilmu-Ilmu Peternakan* **30** 86–91
- [9] Vinanda G, Harianto dan Anggraeni L 2016 *Jurnal Manajemen dan Agribisnis* **13** 50–8
- [10] Burhanuddin, Harianto, Nurmalina R and Pambudy R 2013 *Media Peternakan* **36** 230–6
- [11] Sekhampu T J and Niyimbanira F 2013 *The International Business and Economic Research Journal* **12** 279
- [12] Setianto N A 2016 *Jurnal Agripet* **16** 114