Conference Paper

Qualitative Modeling of Broiler Farming with Partnership Pattern in Kabumen District

V Armelia, Ismoyowati and N A Setianto*

Faculty of Animal Science, Jenderal Soedirman University, Purwokerto, Central Java, Indonesia

ORCID
https://orcid.org/0000-0002-3190-1384

Abstract.
Broiler farming is a complex system involving various elements from upstream to downstream. This study aimed to determine the multiple factors and their relationship in broiler chicken farming with a partnership pattern. The research was conducted using a survey method. The samples were determined through census data of 76 open house, semi closed house and closed house farmers who are members of partnership patterns in Kebumen district. Data analysis was performed qualitatively using Causal Loop Diagram (CLD) modeling. The results showed that various factors influenced the broiler farming business with partnership patterns, such as the quality of cages (open house, semi closed house and closed house), farmer skills, technical know how, business motivation, willingness to follow programs, the effectiveness of information, power of investors, turnover, grade day old chick (DOC), output price, feed convension ratio (FCR), mortality, and bonus. This article extensively discussed the systemic linkage and relationship between these elements and how those interactions affected the performance in a broiler chicken farm with a partnership pattern.

Keywords: broiler chickens, partnership, qualitative modeling, quality of cage

Corresponding Author: N A Setianto; email: novie.setianto@unsoed.ac.id

Published: 13 Sepetmber 2022

Publishing services provided by Knowledge E

Selection and Peer-review under the responsibility of the ICASI Conference Committee.

1. Introduction

Broiler chicken farm is one of the providers of animal protein at affordable prices, much liked by the community, and has good nutritional value in the form of 21% protein, 2.6% fat, 1.5% carbohydrates, and 1.65% ash [1]. However, the production cost factor of this business is relatively high, which is almost 80% of the total income of farmers [2]. Also, fluctuations in selling prices, day old chick (DOC) prices, feed prices, and drug prices are also an obstacle to obtaining maximum profits [3] so that a partnership pattern is needed to avoid business risks [4].

Many partnerships have been chosen because of the limited resources of all parties. In principle, the partnership pattern provides benefits including capital support, production facilities, technical assistance, and a guaranteed marketing sector. However, poultry actors with a partnership pattern still experience various business constraints, including problems with the supply of raw materials, indications of imbalances in the input and output market structure, plasma farmers have not been fully benefited, they are vulnerable to external shocks such as economic crises and disease outbreaks, increases in livestock production facilities and broiler price fluctuations [5]. Based on this, it is necessary to study the factors and systemic linkages between elements that affect the performance of a broiler chicken farm in a partnership pattern.

Broiler farming with a partnership pattern is a complex system. System thinking using the System Dynamic Causal Loop Diagram approach is a reliable tool in identifying the root causes of complex problems [6] so that problems and improvement strategies can be identified in broiler chicken farming. This study aims to evaluate the complexity of the system in broiler chicken farming in a partnership pattern using qualitative causal loop diagram modeling. Qualitative modeling is a simple model but can provide an overview of the complexities faced in a livestock business system [7,8]. Through a qualitative approach, the factors that influence the operation of a broiler farm system with a partnership pattern can be explored.

2. Materials and Methods

This research was conducted using a survey method. Determination of the research sample was carried out by census on 76 broiler farmers who are members of the nucleus-plasma partnership company in Kebumen Regency, consisting of 4 open house farmers, 25 semi closed house farmers, and 47 closed house farmers. Sources of data were obtained from observations and in-depth interviews through Focus Group Discussion (FGD) with broiler farmers and broiler chicken partnership companies. Data analysis was performed qualitatively using Causal Loop Diagram modeling. Causal Loop Diagram (CLD) is a diagram that shows the relationship between elements in the system. The positive sign (+) shows the relationship that occurs in one direction, while the negative sign (-) shows an inverse relationship . Causal Loop Diagram consists of two types of loops, namely reinforcing loops (R) and balancing loops (B). The two loops illustrate the relationship between the elements that are formed [9]. The stages in compiling a qualitative model consist of observing the system, identifying problems, analyzing the structure and patterns of relationships, identifying the archetypes system in the causal loop diagram [10].

3. Results and Discussion

3.1. Quality of cages against business income

Broiler farmers who are members of the partnership in Kebumen Regency consist of farmers with closed house, semi closed house and open house types. Discussions with the core companies revealed that farmers with closed house and semi closed house types had greater advantages than open house cage farmers, namely in the form of higher output and turnover prices. Closed house cages results in lower feed convension ratio (FCR) and mortality so that the business income obtained by farmers is higher [11,12].

Farmers with closed house cages have a higher ability to maintain cages than farmers with open house types. This is shown through the R1, R2, R3, and R4 loops in Figure 1. Farmers with low quality cages in the partnership system will always be eliminated. Lower housing quality results in lower output prices (R1) and turnover (R2). Loop R1 explains that a high quality cage results in a high output price, increase business income, so that the income earned can be used again as capital to improve the quality of the cage. Loop R2 shows that the rate is positively influenced by the quality of the housing - turn over – business income - capital. The quality of the cage increases turnover, increases business income, increases business capital so that the ability of farmers to improve the quality of the cages also increases.

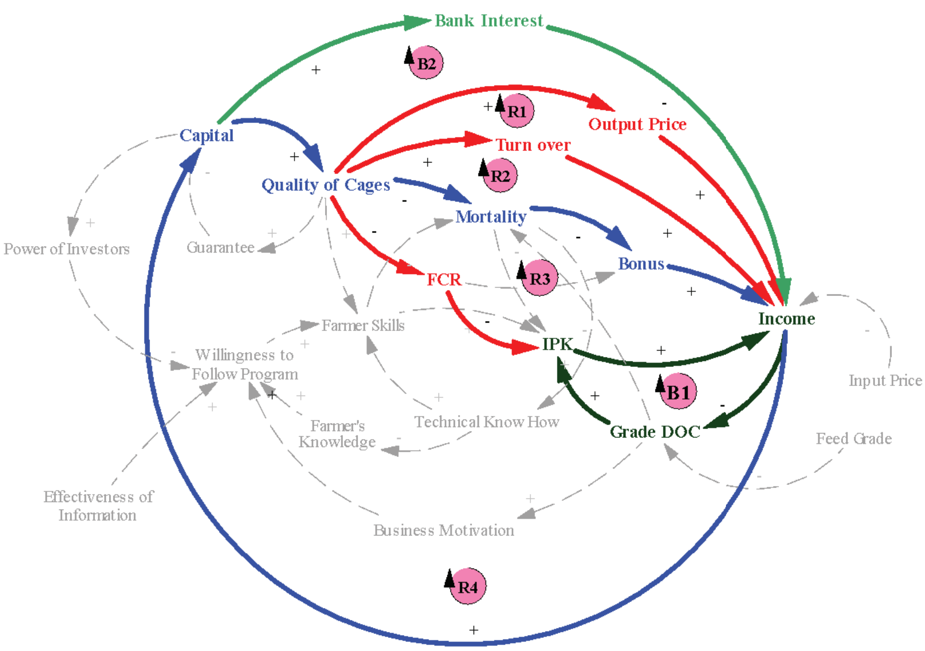

Figure 1: Loop quality of cages.

Farmers with low quality cages will be increasingly in a weak position because the impact is not only on output prices and turnover, but also affects mortality and feed convension ratio (FCR) so that the income received by farmers is also lower. This will further aggravate the situation of farmers because it results in the inability of farmers to upgrade their cages, and vice versa, which is illustrated by loops R3 and R4. Loop R3 explains that a good quality cage reduces mortality. Low mortality increases the bonus the farmer receives. Bonuses received by farmers increase business income thereby increasing the capital received by farmers. Higher capital increases the ability of farmers to improve the quality of their cages. Loop R4 shows that good enclosure quality reduces feed convension ratio (FCR). Low feed convension ratio (FCR) increases index performance (IP) and bonuses. Index performance (IP) and bonuses increase the farmer's income. Operating income increases farmer capital to upgrade the cage. All of these elements are reinforcing (R), which means that the engine rotation is fast.

In addition to the four reinforcing formed, in Figure 1 you can also find two balancing loops as a counterweight, namely loop B1 and loop B2. Loop B1 explains that index performance (IP) increases operating income, income reduces day old chick (DOC) grade, and grade day old chick (DOC) increases index performance (IP). Based on observations at the research location, when the index performance (IP) and income received by farmers decreased, the day old chick (DOC) grade was increased. Likewise, if the index performance (IP) and income earned by farmers are high, the company tends not to provide the best grade of day old chick (DOC). This instrument suppresses rotation that occurs very rapidly, with one existing balancing controlling four reinforcing loops (R1, R2, R3, and R4).

Loop B2, which is identified in Figure 1, explains that farmers with limited capital will find it very difficult to have a high quality cage due to the dependence of bank interest as an element that also slows down the system rotation. Capital increases the bank interest that the farmer must pay. Bank interest reduces operating income so that it affects business capital that is reused.

3.2. The ability of farmers to overcome problems

Loop B3 in Figure 3 shows a balancing loop that describes the character of broiler farmers in Kebumen Regency. High mortality increases the farmer's ability to overcome technical problems, thereby increasing farmer skills to reduce high mortality. The results of discussions with broiler farmers in Kebumen Regency revealed that in overcoming technical problems in broiler chicken cultivation, farmers rely more on their experience or technical skills. Farming experience and business constraints or risks are related to the adoption of more efficient business practices [13]. Farmers tend not to accept information or directions given by the core company until there is high mortality of their livestock. This is the farmer's learning method that has been carried out to solve the problem, so that the rotation of the B3 loop occurs slowly.

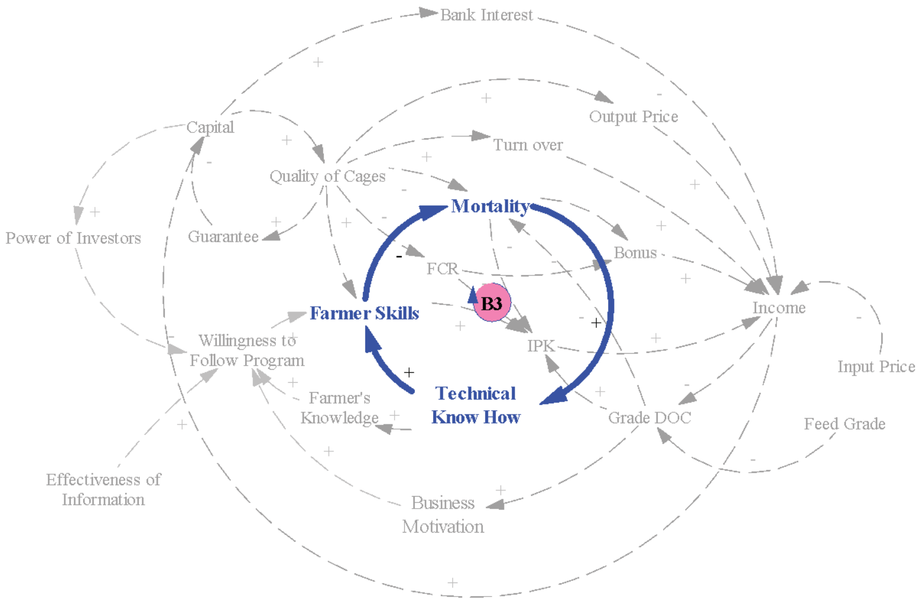

Figure 2: Loop technical know how.

3.3. Investor power and business motivation

In addition to the character of the farmers who do not want to receive information from the core company, the willingness of farmers to participate in the program is also low, influenced by the power of their investors, the effectiveness of information, motivation, and knowledge. Figure ?? consists of two balancing loops shown through B4 and B5. Loop B4 describes grade day old chick (DOC) as increasing business motivation, increasing farmers' willingness to join the program, reducing mortality, and increasing farmer income. Loop B5 illustrates that capital increases the power of investors. Strong investor power tends to decrease their willingness to join the program. Willingness to participate in the program improves farmer skills, increases index performance (IP), increases income, increases return on capital.

The results of discussions with farmers showed that the power of investors decreased the willingness of farmers to join the program. On average, farmers with high capital

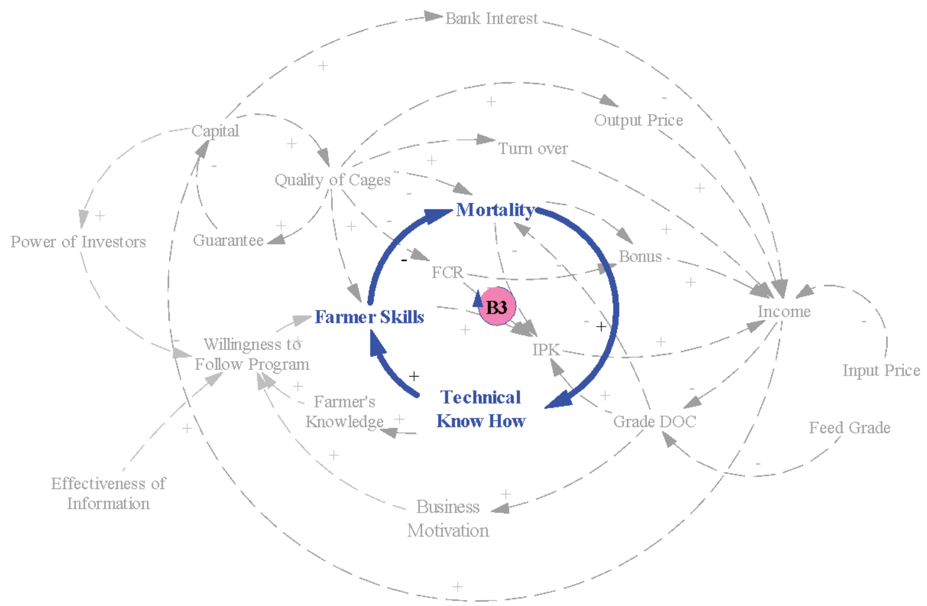

Figure 3: Loop power of investor and business motivation.

have a non-farmer or entrepreneur background, making it difficult to follow the programs recommended by the core companies. The grade of the day old chick (DOC) is directly proportional to the motivation of the farmer in his business activities. Business motivation plays a role in increasing farmers' income [13,14]. If the day old chick (DOC) grade given by the company is low, the farmers tend to lose motivation and enthusiasm in raising broiler chickens, and vice versa, the farmers are increasingly motivated in maintenance activities when the day old chick (DOC) grade is given is the best grade.

4. Conclusion

1. Based on the established model, farmers with low quality cages or open houses will find it increasingly difficult to compete with farmers with high quality or closed houses because the quality of the cages affects output prices, turn over, feed conversion ratio (FCR) and mortality.

2. The tendency of farmers to prefer learning from experience and adopting information after the high mortality rate in their livestock.

3. Farmers with large capital tend not to follow the programs and information provided by the core companies so that an approach that is not only technical but also sociological is needed.

References

[1] Rukmini N K S, Mardewi N K and Rejeki I G A D S 2019 Kualitas Kimia Daging Ayam Broiler Umur 5 Minggu Yang Dipelihara Pada Kepadatan Kandang Yang Berbeda *J. Lingkung. dan Pembang.* **3** 31–7

[2] Ismail I, Utami H D and Hartono B 2014 Analisa ekonomi usaha peternakan broiler yang menggunakan dua tipe kandang berbeda *J. Ilmu-Ilmu Peternak.* **23** 11–6

[3] Kurnianto A, Subekti E and Nurjayanti E D 2018 Analisis Usaha Peternakan Ayam Broiler Pola Kemitraan Inti-Plasma (Studi Kasus Peternak Plasma PT. Bilabong di Kecamatan Limpung Kabupaten Batang) *Mediagro* **15** 47–57

[4] Rondhi M, Aji J M M, Khasan A F and Yanuarti 2020 Factors Affecting Farmers' Participation in Contract Farming: The Case of Broiler Sector in Indonesia *Trop. Anim. Sci. J.* **43** 183–90

[5] Kementerian Perdagangan 2016 Kajian kebijakan Persaingan Usaha di Sektor Perunggasan

[6] Armelia V, Saleh D M and Setianto N A 2019 Identification of Factors Contributed to Beef Cattle Reproductive Disorders in Ogan Komering Ulu Timur Regency (OKU Timur) of South Sumatra Province in UPSUS SIWAB Program 2018 *Anim. Prod.* **20** 199

[7] Setianto N A, Cameron D and Gaughan J 2014 Structuring the Problematic Situation of Smallholder Beef Farming in Central Java Indonesia: Using Systems Thinking as an Entry Point to Taming Complexity *Int. J. Agric. Manag.* **3** 164–74

[8] Yuwono P, Hidayat N N and Setianto N A 2018 Protokol Penyusunan Pemodelan Kualitatif Pada Usaha Peternakan Sapi Potong *Pros. Semin. Teknol. dan Agribisnis Peternak. VI Pengemb. Sumber Daya Genet. Ternak Lokal Menuju Swasembada Pangan Hewani ASUH, Fak. Peternak. Univ. Jenderal Soedriman, 7 Juli 2018* 297–301

[9] Phelan A A, Ross H, Setianto N A, Fielding K and Pradipta L 2020 Ocean plastic crisis—Mental models of plastic pollution from remote Indonesian coastal communities *PLoS One* **15** 1–29

[10] Setianto N A, Hidayat N N and Yuwono P 2019 Modeling Smallholder Beef Farming: A Systems Thinking's Step by Step Approach *IOP Conf. Ser. Earth Environ. Sci. 247 012013* **247**

[11] Muharlien M, Sudjarwo E, Yulianti D L, Hamiyanti A A and Prayogi H S 2020 Comparative Production Performance of Broiler Under Opened House and Closed House System *J. Ilmu-Ilmu Peternak.* **30** 86–91

[12] Pakage S, Budi H, Fanani Z and Iyai D A 2018 Analisis Struktur Biaya dan Pendapatan Usaha Peternakan Ayam Pedaging dengan Menggunakan Closed House System dan Open House System Analysis of Cost Structure and Income of Broiler Chicken Farming Business by Using Closed House System and Open House System *J. Peternak. Indones.* **20** 193–200

[13] Rathod N and Devi G 2020 Socio-Economic Profile and Impact of SHGs on Tribal Migration in Dahod District of Gujarat **30** 191–4

[14] Setianto N, Hidayat N, Yuwono P, Sugiarto M, Muatip K and Widiyanti R 2019 Unintended Effect of Government Program on Beef Development in Indonesia; A System Approach *IOP Conf. Ser. Earth Environ. Sci. 372 012003* **372**