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KOPERASI UNIT DESA
GIRI TANI

Assessing the Performance of Dairy Cooperative in Bogor Dairy Value Chain, West Java, Indonesia

Applied Research By:

Suhendi Irawan

Agricultural Production Chain Management
Specialization Livestock Chain Management

Assessing the Performance of Dairy Cooperative in Bogor Dairy Value Chain, West Java, Indonesia

Research Thesis Submitted to Van Hall Larenstein University of Applied Sciences in Partial Fulfilment of the Requirements for Degree of Master in Agricultural Production Chain Management, Specialization Livestock Chains

BY
SUHENDI IRAWAN

Supervised by:
FRED BOMANS

Examined by:
MARCO VERSCHUUR

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The Netherlands

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"Seek knowledge from the Cradle to the Grave" (Prophet Muhammad)

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Dedication

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List of Abbreviations

BPS	: Badan Pusat Statistik (Central Bureau of Statistics)
GKSI	: Gabungan Koperasi Susu Indonesia (Indonesia Dairy Cooperative Union)
KUD	: Koperasi Unit Desa (Cooperative Village)
TPC	: Total Plate Count
UHT	: Ultra High Temperature
MCC	: Milk Collection Centre
PESTEC	: Political Economic Social Technological Environmental Cultural
RR	: Rain Rate
SPSS	: Statistical Package for Social Sciences
FAO	: Food and Agriculture Organization
BRI	: Bank Rakyat Indonesia (Indonesian Citizen Bank)
BNI	: Bank Negara Indonesia (Indonesian Country Bank)
BCA	: Bank Central Asia
CIMORY	: Cisarua Mountain Dairy
IDR	: Indonesian Rupiah
MIDCA	: The Integral Model of Diagnosis for Cooperatives and Associations
TS	: Total Solid
TPC	: Total Plate Count

Abstract

The significant role of a dairy cooperative is determined by its performance. KUD Giri Tani as a dairy cooperative has low performance in its financial and supplying milk to milk processor company, such as low cash asset, large the debt to feed supplier, lack of support services provided, many farmer members do not on time to pay the credit, milk delivered to the processor is far from quota demand, and the milk produced by the farmer members is low quality and quantity. The objective of this research is aimed to assess the performance of KUD Giri Tani cooperative, by identifying the determinants of the cooperative's financial and farmer members' productivity performance, to recommend the best dairy value chain for KUD Giri Tani and the dairy farmer members. A qualitative and quantitative approach was used in this research to process both the primary and secondary data. A qualitative approach was used to describe financial performance such as stakeholders involved, financial construction, financial management, and institutional barriers. The quantitative approach was used to explain production performance which consists of farm management practices adopted, dairy farmer members' financial construction, and institutional barriers in dairy farmer members. Three data collection method was adopted for this research, consists of an online survey, face-to-face semi-structured interview, and online semi-structured interview. Secondary data was conducted by using desk study. The actors involved in the Bogor dairy value chain such as Input suppliers, milk producers, collector, processors, retailers, and consumers. For the supporters consist of Finance institutions, Indonesia Young dairy farmers Association, Indonesia Cooperative Union (GKSI), Ministry of Agriculture, Ministry of Cooperative, and educational institution (IPB-University and The University of Adelaide in Indodairy Project). KUD Giri Tani relies heavily on its income as financial construction, especially for the income from the sale of milk. To get additional income, KUD Giri Tani Provides support services such as animal feed, animal medicines, and dairy farming equipment. Cash flow in KUD Giri Tani is not smooth due to many farmer members do not pay credit on time in terms of credit concentrate and money. The majority number of productive milking cows on the farm is only in range 1 to 5. The ability of average milk production per-cow 10 to 15 litres per day, most of the farmer members produce the milk per-farm in the range 1 to 25 litres and 26 to 50. Everyday majority of the farmer members applied green grass and concentrate on their milking cows, to increase the quality of milk production they only give tofu dreg which was obtained directly from the supplier. Some of the farmer members have other jobs to meet the necessary. They are not satisfied with the income which is classified far from the standard expenditure in Bogor. Therefore, to get higher income some of the farmer members also process their milk into yogurt and sell directly to consumers. The farmer members encounter some barriers in operating the farms, especially knowledge about dairy farming and animal feed necessary. The majority of the farmer members have a middle level of knowledge about dairy farming, in which the knowledge is obtained from family, friends, and training.

Keywords: Performance, Financial, Milk production, Dairy cooperative

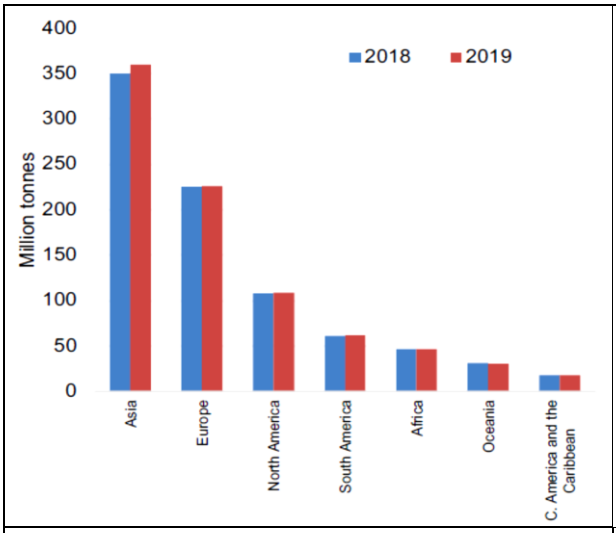
CHAPTER 1: INTRODUCTION

1.1 Research Background

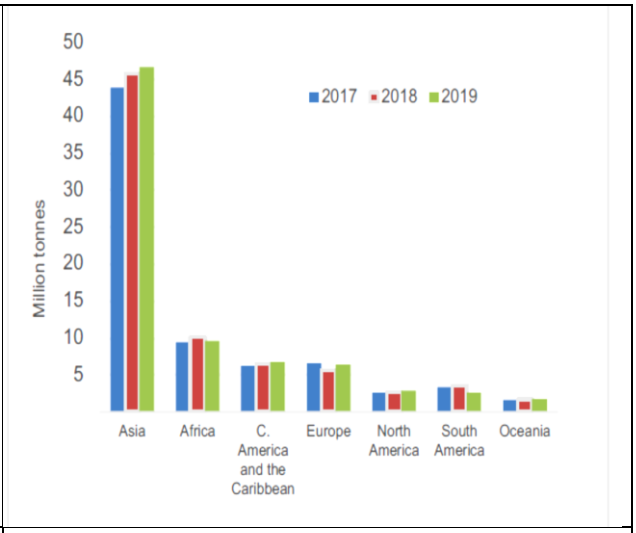
The growing world population (Roser, et al. 2013) has significantly led to an increase in global milk production and demand for dairy products across the globe (FAO, 2020). World consumption of fresh and processed dairy products is predicted to grow annually over the next decade (OECD-FAO, 2017). Until now, Asia has remained the world's largest milk importing and producing region where imports rose by 1.8 percent in 2019 (Fig.1). This growth in consumption of dairy products in South East Asia, in particular, is anticipated to continue to increase by 13% between 2017 and 2026 (OECD-FAO, 2017).

Although the Asian continent has taken the lead in milk production (Fig.1), Indonesia's milk imports have continued to increase, while the national cow milk production also increased from 835,124.60 tons in 2015 to 996,442.44 tons in 2019 (BPS-Statistics of Indonesia, 2020). Consumption of milk and milk products in Indonesia continues to increase annually which is attributed to the rising population and incomes of the Indonesian citizens (BPS-Statistics of Indonesia, 2019). For example, in 2010 the consumption of fresh milk rose from 13,2 to 16,5 per-kilogram/capita/year in 2016 (Taufik, 2019). Wouters & Van Der Lee (2010) link this consumption rise to urbanization, population growth, and higher consumption of animal protein.

Figure 1. World dairy market review



World milk production by region



World Dairy imports by region

Source: Dairy market review (FAO, 2020)

Taslim (2011) notes that in Indonesia, the livestock sector and dairy production, in particular, plays a significant role in the rural economy in general and on smallholder farmers who own between two to three cows. The dairy value chain is characterized by a large variety of market outlets or by a number of parallel value chains, which produce (mainly) for the local (urban) market, but as demand increases for dairy products in modern value chains in the country (Wouters & Van Der Lee, 2010) opportunities for increased milk production incomes and rural livelihoods are probable (De Vries & Wouters, 2017) in the area like West Java. Bogor Regency is one of the centers of milk production in the West Java Province, which makes it one of the biggest milk suppliers in Indonesia after East Java (Directorate General of Animal Husbandry and Health, 2013).

1.1.1 KUD Giri Tani Dairy Cooperative

In the Bogor Dairy value chain, Milk is traded through cooperatives such as KUD Giri Tani to the Cimory milk processor. KUD Giri Tani was established in 1973 and has 120 active dairy farmer members from nearby areas of Caringin, Ciawi, Mega mendung, and Cisarua (Hafidh, 2016). The cooperative is involved in the collection, trading of milk, and provision of bulking and bargaining services to the dairy farmers (Chagwiza et al., 2016), and they also face the challenge of promoting well-being among their members while simultaneously maintaining their financial sustainability (Lauermann et al, 2018). KUD Giri Tani as a cooperative provides services to support dairy farmers to improve both the quality and quantity of the milk; they offer the credit for money and animal feed to dairy farmers as support services (Zhong et al., 2018).

Cooperative management committees do not strive to maximize incomes (Machogu & Yegon, 2017) hence capital constraints affect their development in the value chain and confine them to marketing of unprocessed milk thus hindering their performance. Hafidh (2016) notes that in KUD Giri Tani, active members are reducing while there is a farmer who sells milk directly to other parties, besides in KUD Giri Tani milk is the major source of the cooperative's business revenue. As a result, milk production and supply in KUD Giri Tani by farmers in the last five years has decreased and is likely to have an impact on financial performance in terms of cash flows. In addition, the cooperative has to pay the debt to animal feed supplier in a high amount, unable to collect its receivables owed by the cooperative to members which affect its solvency and liquidity respectively while struggling to meet other financial needs such their administrative costs (KIT & IIRR 2010).

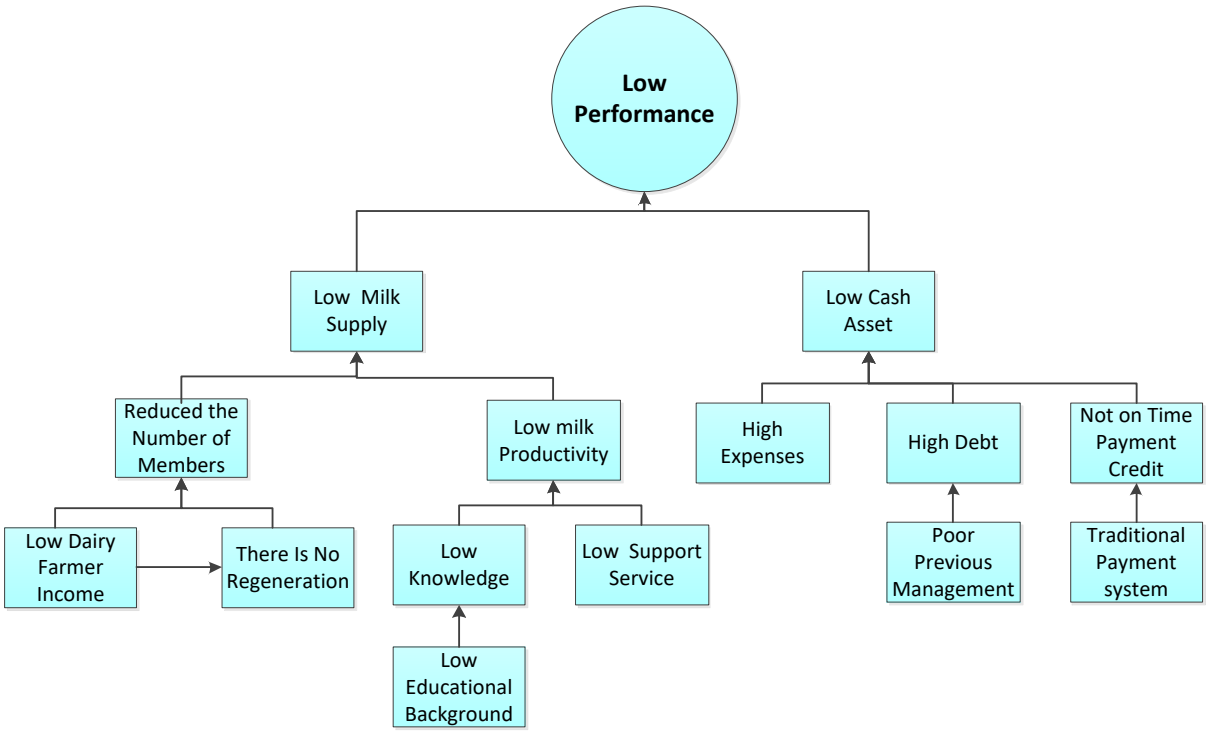
1.1.2 KUD Giri Tani's Farmer members

Dairy farmers in West Java operate with a productivity level well below potential (De Vries & Wouters, 2017). Maintaining milk quality and volume is challenging due to the manual methods of milking, less availability of good fodder, and handling of milk for distribution to the KUD Giri Tani (Morey, 2011) very limited land and capital feed availability (Sembada et al, 2016) problems continue to affect smallholder farmers' performance.

A study by (Asmara et al., 2017) found that the performance of small-scale dairy farms was relatively low both in terms of profitability and productivity. This is a challenge because many value chains cannot realize their full potential due to a lack of working capital which is the key restricting factor for further business growth (KIT & IIRR 2010).

As a way of increasing dairy farmers' incomes, there is a need to help farmers to increase the number of milking cows on their farm by introducing appropriate credit schemes. In addition, to promote appropriate milk production models that include the intensive cultivation of forage (Sembada et al, 2016).

Figure 2. A visual diagram of low performance of KUD Giri Tani



(Source: Author, 2020)

1.2 Problem Statement

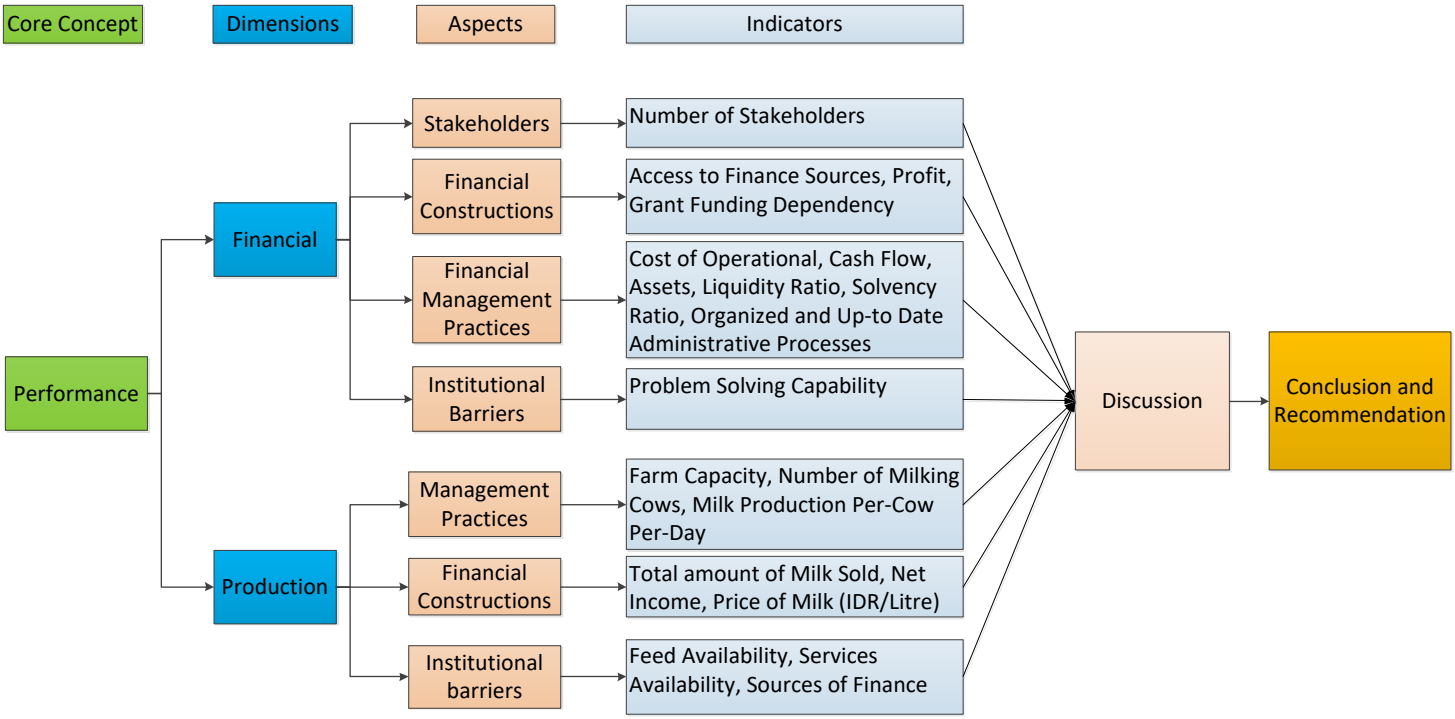
The significant role of a dairy cooperative is determined by its performance. KUD Giri Tani as dairy cooperatives have low performance on its financial and supplying milk to milk processor, such as low cash asset, large the debt to animal feed supplier, lack of support services provided, many farmer members do not on time to pay the credit, milk delivered to milk processor is far from quota demand, and the milk produced by the farmer members is low quality and quantity. These problems make it difficult for dairy cooperative and the farmer members to maximize their roles, as they have a dependence on each other. There is a knowledge gap on the causes of these problems, the cooperative must know, what causes the cooperative's financial performance and milk production performance of the farmer members to become low.

Therefore, the objective of this research is aimed to assess the performance of KUD Giri Tani cooperative by identifying the determinants of the cooperative's financial and farmer members' productivities performance, to recommend the best dairy value chain for KUD Giri Tani and the farmer members by providing information and insight, which possible to be applied by KUD Giri Tani and the farmer members in increasing performance financial and milk production. The objective of this research leads to the following two main research questions, which following by its sub-questions:

1. What are the determinants of KUD Giri Tani's financial performance?
   a. Who are the stakeholders involved in the Bogor dairy value chain?
   b. What are the available financial constructions for KUD Giri Tani?
   c. What are the current financial management practices in KUD Giri Tani?
   d. What are the institutional barriers to KUD Giri Tani's financial performance?

2. What are the determinants of dairy farmer members' productivity performance?
   a. What are the farm management practices adopted by KUD Giri Tani's farmer members?
   b. What are the financial constructions of KUD Giri Tani's farmer members?
   c. What are the institutional barriers affecting KUD Giri Tani's farmer members?

Figure 3. Conceptual framework in assessing performance



(Source: Author, 2020)

1.3 Definition of concepts

Stakeholders
In line with Resti (2017) and Wouter (2009) Stakeholders in dairy value chain is defined as institution or actors involved, and have a role to make contribution within the chain.

Financial constructions
In line with Wilkes (2018) and Resti (2017) financial construction in dairy value chain is defined as sources of fund in carrying out the role as an actor in the chain.

Financial management
Gitman (2011) defines financial management as the area of business management, devoted to a judicious use of capital and carefully selection of sources of capital, to enable an organization to move in the direction of reaching its goals.

Barriers
Regarding to Duteurtre (2018) and Hafidh (2016) barriers in dairy value chain is defined as constrains which make actors within the chain difficult to develop or carry out the activities properly.

Management Practices
In line with de Vries and Wouters (2017) management practices in dairy value chain is defined as implementation or management farming which is applied by dairy farmers.

CHAPTER 2: LITERATURE REVIEW

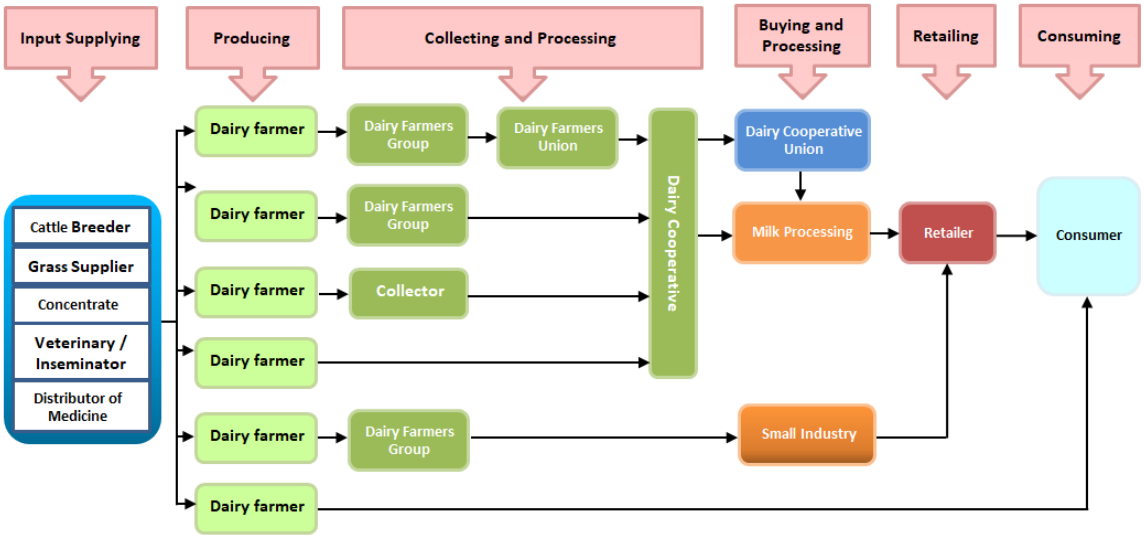
2.1 Performance of Dairy Value Chain Indonesia

The quality of raw milk in Indonesia suffers due to poor milking hygiene practices, both on-farm and post-farmgate. Milk Collection Centres and farmers lose considerable money each month through penalties from the milk processors for poor milking hygiene even though the price signals seem adequate to inspire investments in improving milk quality. Low milk quality is due to poor management practices and cool chain logistics. There is an opportunity to provide some regular training and information on better operational procedures to dairy farmers to improve their herd management skills and hygiene practices. However, the main issue of this is to minimize the time from the farm to the cooling unit. Therefore, milk cooling units should be placed as close as possible to the farmers at milk collection centers in the farmer villages (Morey, 2011).

Priyanti and Soedjana (2016) stated that small and medium enterprise model to process the milk has been developed in Java, Indonesia. They provide higher farm gate prices under a partnership agreement which created a good business model for the future dairy industry. This new attractive model gives a higher return to the farmers as opposed to the tradition of low farm gate prices. This step might stimulate dairy farmers to naturally improve the performance at the attractive farm gate price. Therefore, attention from the government to establish a control mechanism to improve milk prices from the buyers is needed to improve the performance of dairy farmers.

Indonesia has a high demand for milk, until 2018 only 19% of demand for milk can be supplied by local product, while 81% of the demand is supplied from import. The development of milk consumption is 5% in one year; this makes supply for milk in Indonesia difficult because the increase of milk production is only 2% in a year (BPS-Statistics of Indonesia, 2018). The quality and quantity of milk production are difficult to increase due to the farmers as a producer have poor financial to develop the quality of production, it because of the long chain of dairy milk in Indonesia (Ministry of Coordinating for Economic Affairs, 2019).

Figure 4. Dairy chain map in Indonesia



(Source: Ministry of Coordinating for Economic Affairs, 2019)

2.2 Financial Performance in Dairy Cooperative

The dairy cooperative can improve their financial performance by applying several strategies. Firstly, growing the productivity of business units on the economic scale by utilizing a loan from the government and support from GKSI. Secondly, raising awareness of the importance of the role of the farmer members through fostering skills and strengthening the roles and functions of the livestock. Furthermore, strengthening strategies to improve financial performance in dairy cooperatives can be through efficiency in operational costs and adding equity by exploiting government assistance to reduce the burden of cooperative debt, and optimizing the business units to get optimal income (Rahman, 2020).

The dairy cooperatives needs shed excess in manpower to have good productivity as market demand. Skill to set the employees needs to be improved to get desire performance. As the dairy cooperatives usually do not have the capacity to recruit high-caliber professionals, another way is by investing in extensive training and education to upgrade the skills of the existing manpower. The staff cooperative needs to be educated to meet the merits of scientific and modern management practices and processes. Furthermore, dairy cooperatives have effectively used the toil of farmer members to develop self-reliance. Dairy cooperative can maximize the welfare of millions of farmer members by making collaboration with the government (Anbu, 2020).

To achieve good performance, financial institutions have important roles in financing dairy cooperatives‘ operations, as well as in facilitating payments for the inputs and support services. Therefore, dairy cooperatives need financial services from financial institutions to run their day to day activities such as milk collection, payment for milk deliveries, and other operation costs. Moreover, to get good performance, cooperatives should able to provide financial visibility for their farmer members by providing an automated documentation system (Wilkes, 2018).

2.3 Dairy Farmers Production Performance in Indonesia

There was a relationship between the performances of Dairy cooperative services to the farmer members' performance. Therefore, the service in terms of capital will help the farmer members in meeting capital requirements. The cooperative is one of the alternative sources of financing for the members because of the face of the constraints. The performance of small-scale dairy farms was relatively low, both in terms of profitability and productivity. Marketing milk, financing, consulting, and training of cooperative have a relationship with the farmer members’ performance (Asmara, 2017)

Declining milk production will have an impact on financial performance, capital to dairy cooperatives that are difficult to operate. Therefore, for carrying out its function as an institution that provides social benefits and economically, it is important for cooperatives to measure performance in terms of both financial aspects and non-financial (Hafidh, 2016).

One of the main crucial issues related to dairy farmer production was special attention from the government, dairy farmers need to be facilitated and a control mechanism to improve milk prices from the buyers. By the higher price dairy farmers can naturally improve production performance, they have a better capacity to solve the challenge and take the opportunity to increase production (Priyanti, 2015).

2.4 Stakeholders in Dairy Value Chain

According to Resti (2017), stakeholders in the West Java dairy value chain were divided to become two, actors and supporters or influencers. Actors in dairy value chain consist of input suppliers, milk producers, milk collectors, small-scale and large milk processors, retailers, and consumers, while supporters or influencers consist of international and national NGO's, and public or private institution such as Ministry of Cooperative, Ministry of Forestry, Ministry of Agriculture, Financial institutions, Indonesia Dairy Cooperative Union (GKSI), and educational institutions (Padjajaran University and IPB-University).

Main actors in the dairy value chain Indonesia consisted of input suppliers, dairy farmers, cooperatives, milk processors, the government, and private services. From those actors, only 5 actors who were active in the formal chain in Indonesia, consist of milk producers, village cooperative (KUD), Indonesia Dairy Cooperative Union (GKSI), milk processors or dairy industry, and the government (Wouter, 2009).

According to Morey (2011), stakeholders involved in Indonesia's dairy value chain consist of artificial insemination centers, importers of milking cows, and importers of skim milk and powdered milk. In terms of milk production, there were individual dairy farmers and dairy farmer companies. While in the milk collection there were GKSI (Cooperative Union) and KUD (Village Cooperative). Continue to milk processors, and retailers for the sales to domestic consumers and exporters for overseas sales.

2.5 Financial Construction in Dairy Cooperative

Usually the cooperative in Indonesia has main source income from large milk processor, the large milk processor has an agreement with the cooperative and they paid to the village cooperative (KUD) with an average price for per-liter milk is IDR 3,600, with the range price between IDR 3,400 to IDR 3,900 per-liter. The price was set and agreed for every three months for both cooperative and milk processors, depending on the milk quality such as the total plate count (TPC), total solids, fat content, and protein content. Then by using money from the milk processor, the cooperative paid the milk to the farmer members and provide support services for the farmer members as other businesses, they take a commission of 10 percent to 25 percent for various services on the cooperative (Morey, 2011).

The sale of milk was the main source of income for dairy cooperative, and to get additional income, the cooperative provides support services to help the farmer members. Other sources of a cooperative to construct their business were loaned by financial institutions, and also grants from several institutions such as NGOs, national or international organizations, and government or corporate social responsibility programs of private companies (Resty, 2017).

2.6 Financial Management in Dairy Cooperative

Odhong (2015 cited in Wilkes, 2018) identified that dairy cooperatives allocate their finances in several ways such as milk transport, cooling machine, processing equipment, and digital procurement and payment systems. Moreover, by investing in digital procurement and payment systems, the cooperative can assist the farmer members to make a loan to the bank by providing milk delivery records.

In managing financial, cooperative use the money to buy fresh milk from the farmer members and to provide support services. Money from the milk processor was collected by the cooperative to be distributed to the farmers based on milk quality and quantity. Cooperative also use their money in

technical services such as training at milk collection center or cooperative (KUD), animal health advise for the farmer members, and artificial insemination (AI), animal feed concentrates, health insurance, and also loans for the farmer members with no interest (Morey, 2011).

Capital formation (net capital accumulation) by business enterprises was necessary for working capital and capital investments for the continued operation of the business (mandatory investment), replacement of existing parts when they break down or wear out, and expansion investments that were expected to add substantially to revenue generation. The management committees of the dairy cooperatives were found not to strive to maximize earnings (Yegon, 2017).

2.7 Institutional Barriers in Financial Performance

The achievement was not in accordance with the target because some things such as the number of active members are decreasing and there were some farmers who send or sell milk directly to parties besides KUD Giri Tani. The source of the cooperative's business revenue comes from sales of milk, while milk sales were influenced by the quantity and quality of milk from farmer members. In 2015, the amount of milk production and milk quality was still below the cooperative target, so it is thought to have an impact on achievement financial perspective (Hafidh, 2016).

Cooperative faces the challenge of promoting well-being among their members while simultaneously maintaining their financial sustainability. Responding to this dual-purpose (social and financial) emerges as a relevant theme in the studies of non-profit organizations, especially because of the difficulty in adopting indicators that enable the measurement of the social purpose of these entities (Lauermann et al, 2018)

2.8 Farm Management Practice in dairy farmers

Currently, dairy production mostly takes place in small-scale dairy farms on Java Island, with a productivity level well below potential. Increasing milk production on farms was expected to be challenged by difficulties around feeding, reproduction, animal health, labour, and other farm management aspects. Besides this, waste management on dairy farms is currently poor, with manure causing local nuisance and pollution of water streams and rivers. Results indicate there was room for improvement of feeding and manure management practices, which may not only contribute to improved farm productivity, but also improved resource use efficiency and reduction of environmental impacts of dairy farming. Sufficient land base was a key condition to the sustainable development of dairy farming in the Lembang district (de Vries and Wouters, 2017).

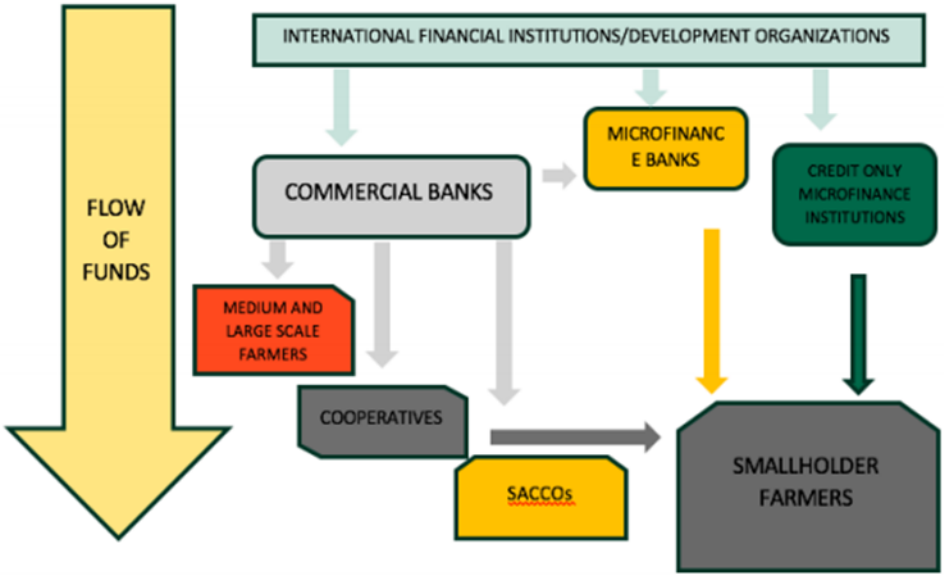
Possible solutions to increase production and profitability were focus on the improvement of farm management practices, especially on feeding for cows. Fluctuation in milk price, lack of interest of dairy farmers to invest, and part-time farming, these resulting in less attention paid to farm management. Local production in Java was difficult to increase due to low profitability at the farm level, relative high feed prices, and low production level per-cow caused by lack of feeding management practice, and limited possibilities to expand dairy farming, so improved management practices are possible solutions to increase local milk production and profitability at farm level (Wouter, 2009).

2.9 Financial Constructions in dairy Farmers

Most of the banks and financial corporations related to dairy farmers have one or more products that targeting dairy farmers. These products were mostly to invest in financing milking cows, input

supply such as feeds, farm equipment, infrastructure, working capital, and invoicing financing. There were several ways that can be done by dairy farmers to obtain these supporting funds through milk cooperatives, local banks, or microfinance institutions (Wilkes, 2018).

Figure 5. The flow of financial resource to the dairy sector



(Source: Wilkes,2018)

Most farmers have too little money. During the production season, they often lack the working capital to buy seeds and other inputs, or to hire workers to plow the land, sow, irrigate, weed and harvest the crop and to care for the animals. Especially in the months before the harvest, many farm families cannot even pay for food, household expenses, or medicines. In addition, few farmers have investment capital to buy equipment such as plows or draught animals, or to invest in irrigation, terracing, or farm buildings. So the farmers' finance needs include loans to pre-finance the crop, and prompt cash payment for their crops after harvest (or even beforehand) (KIT and IIRR 2008).

Farmers also need credit to invest in livestock, equipment, drying and storage facilities, and to cover the costs of labour (for harvesting). If they cannot get such financial support, they will not be able to produce the quantity and quality that the buyers need, diversify their output, stay competitive, or increase their share in the final value of their products (UNCTAD 2004).

2.10 Institutional Barriers in Dairy Farmers

According to Wilkes (2018), a number of challenges at the farmer level are limiting the ability to borrow money to financial institutions. The most common reason for this problem is the lack of a demonstrated financial track record of the farmers. This because the farmers did not keep proper records of their dairy enterprises.

Farmers face many challenges for their general business such as small cow herd which less than 0.3-hectare per-farm, traditional production technic, limited access to credit, limited access to land and capital, low milk price, low profitability, low productivity, long-distance milk chain, poor market access, and irregular milk quality (Duteurtre, 2018).

Poor productivity of milch animals constrains the rapid development of the dairy industry. Systematic planning and integrated policies and programs for animal breeding, genetic up-gradation, and feed and fodder management could only improve the situation. For all these to happen, the Government has to intervene and creat funds (maybe called Dairy Development Fund) for such programs to be implemented on mission mode integrating various schemes (Anbu, 2020).

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Study Location

This research will be conducted in Bogor Regency, West Java. Indonesia. Bogor Regency has an area of about ± 2,664 km² with 40 sub-districts and 435 villages (BPS-Statistics Bogor Regency, 2019). Bogor Regency is located 500 meters above sea level with morphology consisting mostly of highlands, hills, and land. Climatologically, the location has very wet tropical in the South region and wet tropical in the north region. The average temperature is 20^{o} - 30^{o}C, with the annual average temperature, is 25^{o}C (The Government of Bogor Regency, 2019) with an average rainy day per-month is 13 days (BPS-Statistics Bogor Regency, 2019).

The population of Bogor Regency in 2019 was 5,965,410 with a composition of 3,045,174 men and 2,920,236 women (BPS-Statistics Bogor Regency, 2020) with a population density of 2,239 people/km^2 (BPS-Statistics Bogor Regency, 2019). Bogor Regency is one of the highest milk producers in Indonesia; in 2019 this location produced 18,860,308 liters of milk and the number of production increase continually. It was supported by highly the number of population of milking cows in this area. In 2019 the population of dairy cattle in Bogor Regency was 8,475. There are 4 the biggest areas which produce milk in Bogor Regency that are Ciawi, Cisarua, Pamijahan, and Ciampea with the production in 2019 are 3,484,984; 2,488,003; 3,048,805; and 2,663,810 liters in each area. Cisarua is the location where KUD Giri Tani is located with a population of 1,118 milking cows in that area (BPS-Statistics Bogor Regency, 2020).

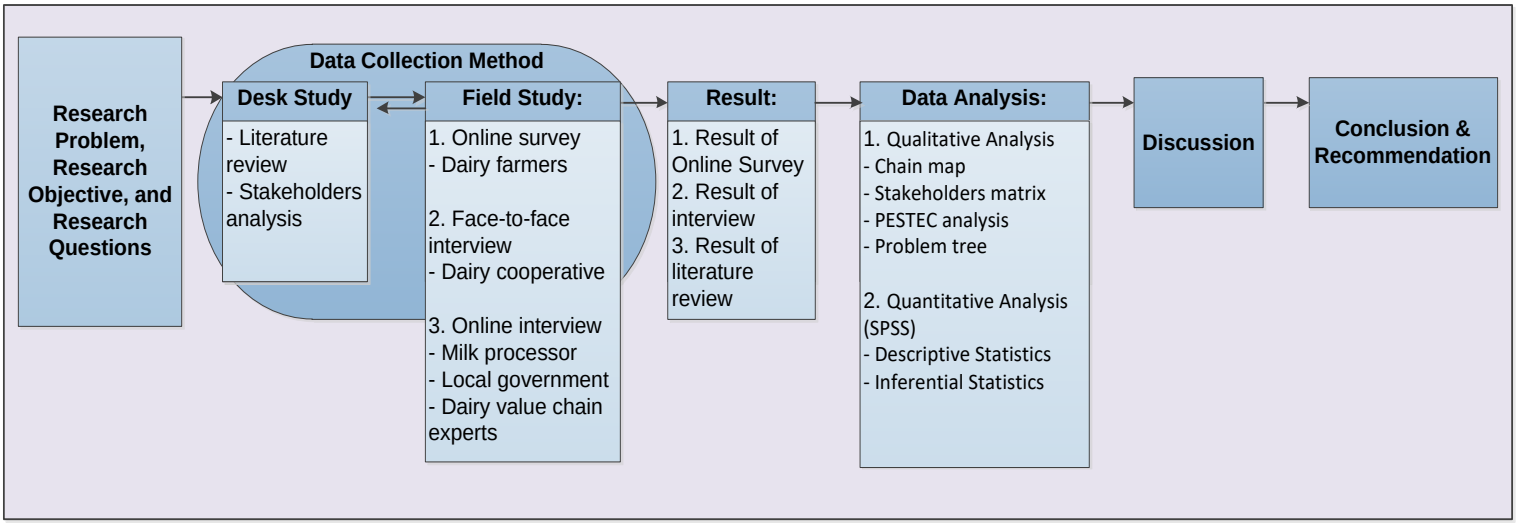
Figure 6. The location of KUD Giri Tani

(Source: Cibinong Public Court, 2020)

3.2 Research Framework

The summary of this research is visualized as in the research framework (Figure 7).

Figure 7. Research framework



(Source: Author, 2020)

3.2.1 Research Design

The research employed both qualitative and quantitative approach to assess the performance of cooperatives at Bogor. Qualitative data was collected using a face-to-face semi-structured interview by a research assistant and an online semi-structured interview using google meet to the key informant. Quantitative data was collected using an online questionnaire; a questionnaire was created using Microsoft form and administered to the research assistant who visited respondent individually to fill out the questionnaire to dairy farmer members of the cooperative. Coding, PESTEC, and value chain map were used to analyze qualitative data whiles IBM SPSS version 25 was used to analyze quantitative data.

Qualitative analysis was used to describe financial performance such as stakeholders involved, financial construction, financial management, and institutional barriers. while the quantitative analysis was used to explain production performance which consists of farm management practices adopted, dairy farmer members' financial construction, institutional barriers in dairy farmer members.

3.2.2 Research Unit

Online survey

Cluster and simple random sampling were used for online surveys in this research. First, this study has clustered the respondent based on the area. The area was clustered to become 4 areas consist of Cisarua, Ciawi, Mega mendung, and Caringin, because most of KUD Giri Tani farmer members come from these 4 areas. Then for each area, 10 respondents were taken by using simple random sampling, so that the total for the entire area was 40 respondents (from 120 active members).

Online semi-structured interview and face-to-face semi-structured Interview
To gain information about cooperative performance, 6 stakeholders involved in the chain were interviewed to give their opinion, suggestion, and relevant information regarding the financial and production performance of KUD Giri Tani. The stakeholders consist of 2 Dairy cooperatives, 1 Milk processor, 1 Livestock government, and 2 Dairy value chain experts. Two dairy cooperatives were taken for interviews, in order to get a comparison of the price of milk and the support services provided to its members.

3.3 Data Collection Methods

In gathering primary data, three data collection method was adopted for this research, which consists of an online survey, face-to-face semi-structured interview, and online semi-structured interview, while secondary data was conducted by using desk study.

3.3.1 Limitation in Data Collection

The field study of this research was conducted amidst the Covid-19 pandemic. The situation makes the researcher had to deal with restrictions during data collection. At the location, there were restrictions for people who want to go out or enter the area, someone who needs to go out or enter the area must bring a letter of assignment from the relevant agencies, and for people who do not have an interest, they were not allowed to leave or enter the region. Therefore, the data collection from the field study was conducted through an online survey questionnaire, online semi-structured interviews, and face-to-face semi-structured interviews for the stakeholders who were not possible to do an online semi-structured interview. During data collection, two research assistants were tasked to distribute online questionnaires to dairy farmers and conducting face-to-face semi-structured interviews. The research assistants are colleagues of the author. They were guided through Whatsapp application to distribute online survey questionnaires to the dairy farmers and to do a face-to-face semi-structured interview with the dairy cooperative. Furthermore, because the time was approaching the deadline, the balance sheet cannot be shown in this study.

3.3.2 Desk Research

Desk research was conducted to obtain information for a literature review and stakeholder analysis. The secondary data was gathered through the internet such as journals, eBooks, and annual reports from relevant institutions. Moreover, with desk research, more information about the dairy value chain, demographic, and economic environment in the study area was obtained as well.

3.3.3 Online Survey Questionnaire

A survey with an online structure questionnaire was conducted to focus on the dairy farmer members who sell the milk to KUD Giri Tani. An online structured questionnaire was used through Microsoft form to gain information, opinion, and suggestions from dairy farmer members. On this online survey, two research assistants traveled to a certain area to find the farmer members one by one.

3.3.4 Face-to-face and Online Semi-structured Interview

During data collection, Face-to-face semi-structured interviews and online semi-structured interviews were conducted to gain information from several stakeholders. Face-to-face semi-structured interviews were conducted by two research assistants to the head and the staff of dairy cooperative. The face-to-face semi-structured interviews were recorded by the research assistants and were sent to the author, for the online semi-structured interviews, the author conducted via Google meet to the milk processor, livestock government, and dairy value chain experts.

Table 1. An overview of the interview

Method	Function	Via	Date of Interview
Face-to-face Semi-structured interview	Treasurer in dairy Cooperative	Sent the recorder interview by Google Drive	13 July 2020
	Treasurer in dairy Cooperative	Sent the recorder interview by Google Drive	29 July 2020
Online Semi-structured Interview	Head of Indonesian Young Dairy Farmers	Google Meet	9 July 2020
	Senior researcher in the field of milk	Google Meet	15 July 2020
	Plant Manager in Milk Processor Company	Google Meet	23 July 2020
	Staff at sub-directorate for dairy ruminants (Ministry of Agriculture)	Whatsapp	24 July 2020

Table 2. Data collection methods

Data Collection Method	Purpose – related to the research questions	Data Collection Tool	Sources
Desk research	To collect the literature review, stakeholders analysis, and information relevant related to the research questions.	Google Search engine; Greeni Search engine; Google scholar; Science direct; Research gate; etc.	Journals, Websites, and Stakeholders relevant.
Online survey questionnaire	To gain a broad overview of aspects related to production performance.	A structured online survey questionnaire	A random sample of KUD Giri Tani's farmer members with 40 respondents.
Face-to-face and online semi-structured interview	To dig information and opinion from the stakeholders related to financial performance.	Semi-structure interview	Cooperatives (2), Milk processor (1), Livestock government (1), Dairy value chain experts (2).

Table 3. Research questions and methods of data collection

Research Question	Type of Data	Source of Data	Method of Data Collection
1. What are the determinants of KUD Giri Tani's financial performance?			
a. Who are the stakeholders involved in the Bogor dairy value chain?	Qualitative data	KUD Giri Tani, Livestock government, and Desk research	Face-to-face semi-structured interview, Online semi-structured interview, and Literature review
b. What are the available financial constructions for KUD Giri Tani?	Qualitative data	KUD Giri Tani, and Milk Processor, Livestock government, and Dairy experts	Face-to-face semi-structured interview, and Online semi-structured interview
c. What are the current financial management practices in KUD Giri Tani?	Qualitative data	KUD Giri Tani, and Dairy experts	Face-to-face semi-structured interview, and Online semi-structured interview
d. What are the institutional barriers to KUD Giri Tani's financial performance?	Qualitative data	KUD Giri Tani, Milk Processor, Livestock government, and Dairy experts	Face-to-face semi-structured interview, and Online semi-structured interview
2. What are the determinants of dairy farmer members' productivity performance?			
a. What are the farm management practices adopted by KUD Giri Tani's farmer members?	Quantitative data	Dairy farmer members	Online structured questionnaire
b. What are the financial constructions of KUD Giri Tani's farmer members?	Quantitative and qualitative data	Dairy farmer members, Livestock government, Dairy experts	An online structured questionnaire, and Online semi-structured interview
c. What are the institutional barriers affecting KUD Giri Tani's farmer members?	Quantitative and qualitative data	Dairy farmers, Livestock government, Dairy experts	An online structured questionnaire, and Online semi-structured interview

3.7 Data Processing and Analysis

The data collected was analyzed by using quantitative and qualitative analysis, data from an online survey was analyzed by using software application Statistical Package for Social Sciences (SPSS) version 25. By using this software, the data processing for descriptive and inferential statistics was

generated such as Bar chart, table frequency data, and the result of inferential statistics calculation. Several tools for qualitative analysis was used to identify the things that affect financial performance, such as Chain map, Stakeholder matrix, PESTEC analysis, Problem tree, and Coding analysis.

In quantitative analysis, Bar chart and table frequency were used because this study needs to explain how many percent the respondents' answers for a question, and also inferential statistics were used because there was some information that only can be obtained through analysis inferential statistics. In quantitative analysis, chain map and stakeholder matrix were used because this study needs to identify stakeholders involved, PESTEC analysis was used because the institutional barriers to KUD Giri Tani's financial need to be identified from several aspects in PESTEC, Problem tree to find out the root cause of low performance in KUD Giri Tani, and Coding analysis was used because the points of the interview from the key informants need to be identified based on the sub-research questions.

Table 4. Summary of data processing and analyzing

Strategy	Purpose	Analysis Tools
Desk research	Analyzing the Stakeholder involved	Chain map, Stakeholders matrix
Online survey questionnaire	Processing responses and information from respondents by using quantitative analysis	Descriptive and inferential statistics
Face-to-face and Online semi-structured interview	Analyzing information and opinion from various stakeholders	PESTEC analysis, Problem tree, and Coding analysis

Chapter 4: Results

This chapter reports the results from the field survey and interviews. The first section reports about the financial performance of the cooperative. The sub-sections are as follows; stakeholders involved in the dairy value chain, available financial constructions for KUD Giri Tani, current financial management practices in KUD Giri Tani, and institutional barriers to KUD Giri Tani's financial performance. The second section reports about the production performance of the farmer members of KUD Giri Tani. The sub-sections are as follows; farm management practices adopted by KUD Giri Tani's farmer members, financial constructions of KUD Giri Tani's farmer members, institutional barriers affecting KUD Giri Tani's farmer members, and overall the performance of KUD Giri Tani.

A. Financial Performance

Section A presents the interview findings of the financial performance of KUD Giri Tani. Each sub-questions on the research question number one is explained based on the finding from interviews to key informants.

4.1 Stakeholders Involved in the Bogor Dairy Value Chain

There are actors and supporters in the Bogor dairy value chain, all stakeholders involved are active in terms of carrying out their roles. Unfortunately, the cooperation between actors is not optimal, the actors involved are not connected to making collaboration.

"The actors in the chain are not connected to each other in making collaboration, they just doing as they function" Source: Anonymous (9/07/2020).

Table 5 describes the stakeholders involved and its activities in the Bogor[1] dairy value chain.

Table 5. Stakeholders analysis

No	Stakeholders	Activities
A	**Actors**	
1	Input Suppliers	
	a. Cattle Breeders	a. Breeding milking cows to sell to dairy farmers
	b. Animal Feed Company	b. Producing animal feed, and supplying to KUD Giri Tani
	c. Tofu Dregs Suppliers	c. Supplying Tofu Dregs to dairy farmers
	d. Veterinary / Inseminators	d. Giving animal health services, including Artificial Insemination services
	e. Suppliers of animal medicines	e. Supplying animal medicines to dairy cooperative
2	Milk Producers	
	a. Dairy Farmers Members	a. Producing milk, and sell to KUD Giri Tani Cooperative
3	Collector	
	a. KUD Giri Tani (Cooperative)	a. Collecting milk from farmer members, Provides support services for the farmer members, and supplying milk to milk processor company

[1] Bogor is the name of city in Indonesia

4	Processors	
	a. Small Medium Enterprises	a. Processing milk to become dairy products and sell them to local society
	b. PT Cisarua Mountain Dairy (Cimory)	b. Processing milk to become dairy products and sell it throughout Indonesia
5	Retailers	
	a. Hotels, Restaurants, Cafés (HORECA), Retailers, Cimory Restaurants, and Cimory Ladies	a. Selling fresh milk and dairy products to the consumers
6	Consumers	a. Buying fresh milk and dairy products from retailers or directly to collectors or dairy farmer members and consume them with or without processing
B	**Supporters**	
1	Financial Institutions (BRI Bank, BNI Bank, BCA Bank, Mandiri bank)	Provide loan, credits, and saving accounts services for actors in the dairy value chain
2	Indonesian Young Dairy Farmers Association	Sharing information about dairy farmer technicals, and conducting training for dairy farmer members.
3	Indonesian Cooperative Union (GKSI)	Organizing dairy cooperative, negotiate milk selling price on behalf of a dairy cooperative, and supply support services to cooperative such as animal feed, medicine, and equipment for dairy farmer activities.
4	Ministry of Agriculture	Conducting training to dairy farmers, give subsidize for dairy farmers necessary such as the equipment needed, and formulating policy to support the dairy value chain.
5	Ministry of Cooperative	Delivering incentive to cooperative as a stimulus to develop, and training for cooperative staffs.
6	IPB-University, The University of Adelaide (Indodairy Project)	Researching appropriate milk selling price to improve milk quality and quantity, including conduct training to dairy farmers and dairy cooperative.

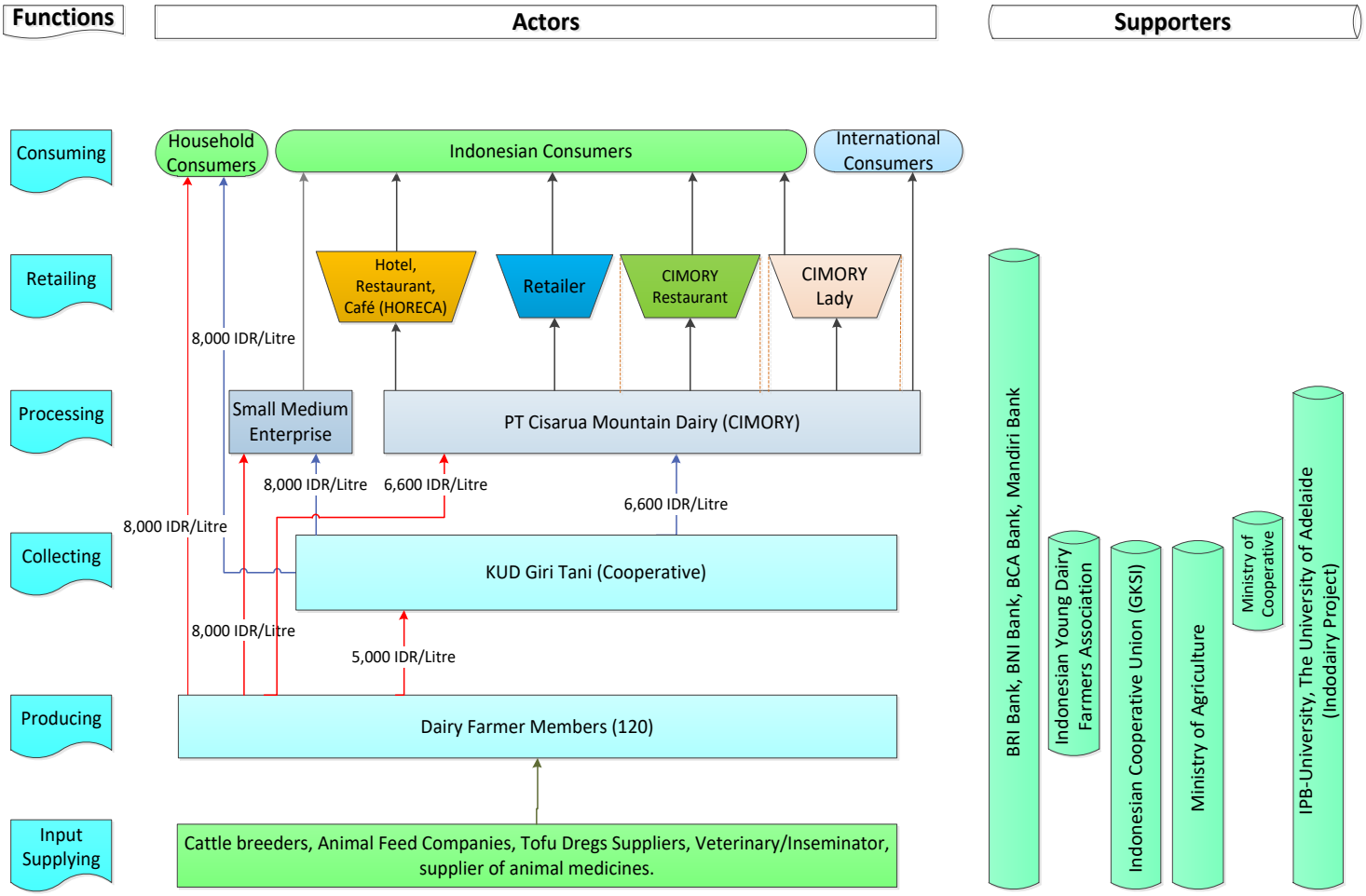
(Source: Author, 2020)

To get greater profits, some dairy farmers and cooperatives also sell their milk to the end consumers and small-medium enterprises directly, but it is only in a small quantity to get additional income for the farmer members and the cooperative. The price in selling directly to the end consumers and small-medium enterprises is IDR[2] 8,000.

[2] IDR is Indonesian Rupiah which is 1 euro equals to IDR 17,341.66 (Bank of Indonesia, 2020) – Updated 5th August 2020

As shows in Figure 8, Cisarua Mountain Dairy (Cimory) is the only one large processing milk company in the Bogor dairy value chain. The market of Cimory is not only in Indonesia, they also export their products to several countries nearby Indonesia such as the Philippines, Vietnam, China, and Malaysia. For the market in Indonesia, Cimory supplies to the hotels, restaurants, cafes (HORECA), and retailers. Cimory also marketing through its restaurant subsidiaries, and Cimory ladies as individual distributors who sell Cimory's products directly to the end consumers.

Figure 8. Chain map of Bogor dairy value chain



(Source: Author, 2020)

4.2 Available Financial Constructions for KUD Giri Tani

As a dairy cooperative, KUD Giri Tani relies heavily on its income as financial construction, especially the income from the sale of milk. KUD Giri Tani gets additional income from support services and others such as animal feed, animal medicines, profit sharing of the farmer who sells milk directly to Cimory, shares, and loan from Cimory. Currently, KUD Giri Tani only can make a loan from Cimory. Until now they have been blacklisted by banks throughout Indonesia.

1. Income from the sale of milk
   a. Sale of milk to Cimory
      Every day KUD Giri Tani always delivers milk collected to Cimory. Usually, the milk delivered is in grade 1 or 2, and sometimes they get quality 3. This grade is determined based on

Total Solid (TS) and the number of bacteria / Total Plate Count (TPC). Grade 1 is in the range of bacteria numbers ≤1 million, grade 2 is in the range 1< TPC ≤3 million, grade 3 is in the range 3< TPC ≤5 million, grade 4 is in the range 5< TPC ≤10 million, and the grade 5 is in the range 10< TPC ≤15 million. In determining this quality, the higher TS obtained, the higher the price given from the Cimory. Detailed specifications of this grade can be seen in appendix 1.

Milk prices gave by Cimory to KUD Giri Tani always changes following the availability of milk powder in Indonesia, usually, the price is increased by IDR 100 per kilogram, and sometimes the price goes back down to the previous price and then goes back up to the new price.

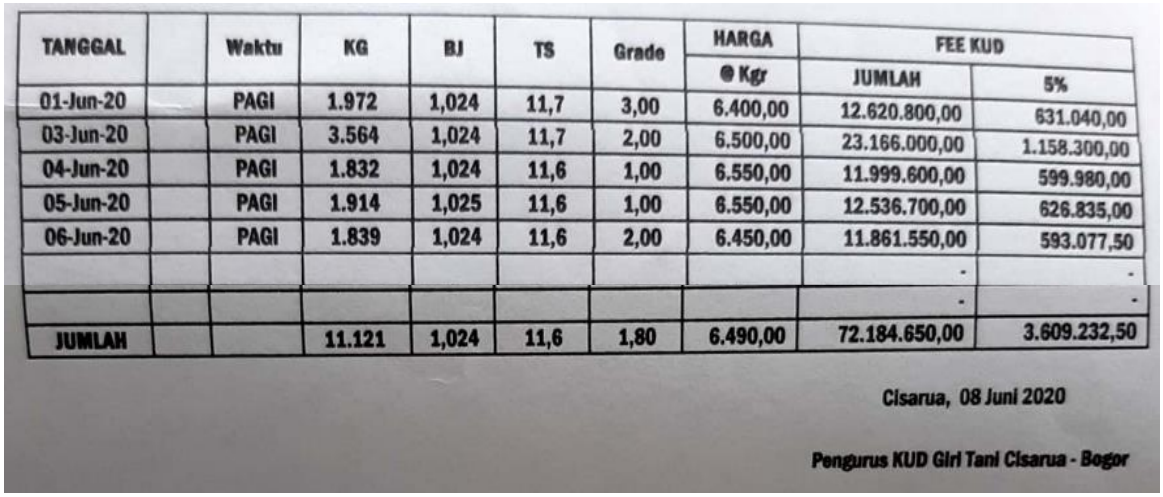
"Usually the price of milk is increased by IDR 100 per kilogram, even though sometimes the price goes back to the previous price, but it will come back to the new price, and it is beneficial for the farmers and cooperative" Source: Anonymous (23/07/2020).

The price of milk in grade 1 is at IDR 6,600 per-kilogram, grade 2 is at IDR 6,500 per-kilogram, and grade 3 is at IDR 6,400 per-kilogram. If the cooperative delivers grade 4, Cimory gives a price reduction as a penalty, and the milk in grade 5 is rejected. Although KUD Giri Tani has the equipment to check the quality, the grade is determined when the milk arrived at Cimory company, KUD Giri Tani usually only checks the specific gravity of the milk from every farmer before the milk is put into the tank.

Payment for milk delivered to Cimory is usually done once a week on every Thursday. Cimory transfers money to KUD Giri Tani based on the quality and amount of the milk sent. If KUD Giri Tani has a debt to Cimory, then the milk payment to KUD Giri Tani is deducted as an installment payment of the debt. Then KUD Giri Tani makes payments to the farmer members based on the quantity sent. If the farmer members have a debt to KUD Giri Tani, the payments to the farmer member will be deducted as an installment payment of the debt. Unfortunately, this installment is not always going smoothly because sometimes the farmer members negotiate with the staff cooperative to postpone the debt payment. Alternatively, farmer members ask the staff to make small payment deductions because of the farmer gets small incomes from the selling milk.

Figure 9, an example of a bill that must be paid by Cimory to KUD Giri Tani. Every morning the average milk delivered to Cimory is about 2 tons, with a specific gravity of 1,024 or 1,025. TS of milk delivered is usually in the range (11.5 to 11.8), with the grade of quality milk in the range 1 to 3.

Figure 9. Invoice for milk payments to Cimory Company



TANGGAL		Waktu	KG	BJ	TS	Grade	HARGA	FEE KUD	
							@ Kgr	JUMLAH	5%
01-Jun-20		PAGI	1.972	1,024	11,7	3,00	6.400,00	12.620.800,00	631.040,00
03-Jun-20		PAGI	3.564	1,024	11,7	2,00	6.500,00	23.166.000,00	1.158.300,00
04-Jun-20		PAGI	1.832	1,024	11,6	1,00	6.550,00	11.999.600,00	599.980,00
05-Jun-20		PAGI	1.914	1,025	11,6	1,00	6.550,00	12.536.700,00	626.835,00
06-Jun-20		PAGI	1.839	1,024	11,6	2,00	6.450,00	11.861.550,00	593.077,50
								-	-
								-	-
JUMLAH			11.121	1,024	11,6	1,80	6.490,00	72.184.650,00	3.609.232,50

Cisarua, 08 Juni 2020

Pengurus KUD Giri Tani Cisarua - Bogor

(Source: KUD Giri Tani, 2020)

2. Income from support services
    a. Animal feed
    Animal feed (Concentrates) is sold to support the availability of animal feed for the farmer members. Concentrates at KUD Giri Tani is supplied by animal feed producer Berkah Rahayu Mandiri. KUD Giri Tani sells the concentrates to dairy farmer members by credit and cash. Farmer members will get a discount when they buy the concentrates. The price of the concentrates given to the farmer members is IDR 3,250 per-kilogram, and KUD Giri Tani takes a profit of IDR 150 for every kilogram sold. Furthermore, KUD Giri Tani also sells minerals to the farmer members and non-member at the same price, they make a profit of IDR 500 per-kilogram for each sale of mineral.

    b. Animal medicines
    Other supporting services provided by KUD Giri Tani are veterinary medicines, such as worm medicine, dry medicine, and mastitis medicine. For worm medicine, KUD Giri Tani makes a profit of IDR 500 to farmer members and IDR 2,500 to non-members. For the sale of dry medicine, KUD Giri Tani makes a profit of IDR 1000 to the farmer members and IDR 6000 to non-members. For mastitis medicine, KUD Giri Tani makes a profit of IDR 1,000 for farmer members and IDR 6,000 for non-members.

    c. Dairy farming equipment
    KUD Giri Tani also sells dairy farming equipment such as; machetes, boots, milk tanks, and milk filter cloth (Pasmin). For the sale of dairy farming equipment, KUD Giri Tani sells at the same price to both farmer members and non-members. For the sale of machetes, the profit is at IDR 5,000, for the sale of boots the profit is at IDR 10,000, for the sale of milk tank the profit is at IDR 50,000, and for the sale of milk filter cloth (Pasmin) the profit is at IDR 5,000.

3. Profit-sharing of the farmers who sell milk directly to Cimory
Since the establishment of the Cimory, KUD Giri Tani has an agreement with Cimory to make dairy farmers in the KUD Giri Tani membership area only sell their milk through the KUD Giri Tani. Over time, the agreement changed, the farmers are allowed to sell their milk directly to Cimory, with the requirement that KUD Giri Tani must get IDR 50 from every kilogram of direct sales to Cimory, and Cimory must pay IDR 100 to KUD Giri Tani from every kilogram of milk sold by the farmer. Every month, the farmer sells the milk directly to Cimory at around 40,000 kilograms, and KUD Giri Tani gets income from this sale of around IDR 6,000,000.

4. Shares
Apart from the milk sales and support services, KUD Giri Tani has a source of income from 180 shares in the Indo Kordsa (Textile Company). The old government distributed shares to dairy cooperatives as additional income for dairy cooperative. In the last dividend, the value for 1 share is IDR 350,000, and KUD Giri Tani received additional income from 180 shares at IDR 63,000,000.

5. Loan from Cimory
As the company's business partner, KUD Giri Tani can make a loan from Cimory. The loan is subjected to the interest of 10%, with a payment system by deducting milk payments to KUD Giri Tani. If KUD Giri Tani has a debt to Cimory, every milk payment will be deducted as a debt payment to Cimory. The debt to Cimory usually can be paid in one or two years. Cimory is always willing to provide new loans to KUD Giri Tani, as long as the previous debts have been repaid. By using a loan from Cimory, KUD Giri Tani shares money as dividend to the farmer members, this because the cooperative is not allocating money to share to the farmer members.

4.3 Current Financial Management Practices in KUD Giri Tani

In managing funds, KUD Giri Tani allocates its funds into several groups, such as operations, liabilities, employee salaries, debt payments to Cimory and supplier concentrates, and payment of milk to the farmer members. The allocation of funds for operations is usually done every week, considering the KUD Giri Tani activities that are carried out every day. Allocation for liabilities, employee salaries, and debt payments to concentrate supplier is issued at the beginning of the month, different from the payment of milk to the farmer members which is done every two weeks.

Financial management in KUD Giri Tani uses a manual system, the revenues and expenses are recorded manually by using the accounting ledger. KUD Giri Tani only uses a computer to send an e-mail for bills to Cimory. Sometimes this manual system makes the debts of the farmer members are not detected by administrative staff and it delays credit payments by the farmer members to KUD Giri Tani. Moreover, sometimes the administrative staffs make mistakes in recording data.

Funds Allocation

1. Allocation of funds for operations
   a. Transportation
      KUD Giri Tani uses 4 vehicles daily to deliver milk to Cimory collected from the farmer members in each of the four areas. Every week, the cost of fuel for transportation at around IDR 2,710,000, without maintenance and staff salary.

Figure 10. Transportation for collection and delivering milk

(Source: Author, 2020)

   b. Maintenance machine
      The maintenance machine is carried out on the transportation, cooling machines, and equipment owned by the cooperative. Maintenance for transportation is carried out regularly once a month while maintenance for the cooling machine is usually done once a year.

   c. Procurement
      When the items needed are out of use, damaged, or should be replaced. The staff who need the item will report to the procurement section to procure the item needed. The various items that are being procured such as the necessity to check milk quality, the equipment for staff and farmers, and spare parts for transportation.

2. Support services
   KUD Giri Tani provides concentrates, animal medicines, dairy farming equipment, and credit as its support services. The concentrates is supplied by the animal feed company Berkah Rahayu Mandiri. Every month the concentrate is supplied to KUD Giri Tani with a payment system at the end of the month after the concentrate is sold out. KUD Giri Tani sells the concentrates for both

cash and credit. The credit payment system sometimes makes the farmer members do not pay credit on time and make KUD Giri Tani difficult to pay the concentrate to the supplier. KUD Giri Tani also provided animal medicine and dairy farming equipment. These are provided to make the farmer members easier when they need for farming, as well as additional income for the cooperative. Money credit is provided as assistance to the farmer members, the members can get this credit if the money available, maximum loan for this credit was IDR 5,000,000, with the payment period no more than 10 months and rate interest of 20%.

3. Liabilities
    a. Milk payment
    Milk collected from the farmer members is always done every day, but for the payment, KUD Giri Tani makes the payments to its members every two weeks. The payment is given only based on the quantity of milk supplied by the farmer members. Every litre of milk supplied is paid for IDR 5,000 per-litre, so the farmer receives payment for total litres in two weeks, but if the farmer has a debt to cooperative, the milk payment is deducted from the farmers' debt.

    b. Utilities
    Payment for electricity, water, and the internet is done at the beginning of each month. Among these liabilities, electricity takes the largest payment in every month.

    c. Debt payment to Cimory and feed supplier
    As a business partner, KUD Giri Tani can make a loan from KUD Giri Tani. Both Cimory and KUD Giri Tani have agreed that the payment of the loan is paid by deducting milk payments. Meanwhile, for debt to the feed supplier, KUD Giri Tani pays in installments every month. Previous management of the cooperative do not pay concentrates regularly every month, it makes KUD Giri Tani has a large debt to the supplier concentrates.

    d. Staff salaries
    30 people have to be paid by KUD Giri Tani in every month. Those staffs consist of 3 people cooperative management such as the chairman, secretary, and treasurer, 6 employee staff who work in the cooperative, 3 cooperative supervisors, and 18 people of the group administrator. In every month KUD Giri Tani must be spent quite large for staff salaries with IDR 55,000,000 million.

Cash Flow In KUD Giri Tani

KUD Giri Tani has not smooth cash flow, it can be seen from several times when there were difficulties in making payments to supplier concentrates and the small amount of cash in the cooperative. The farmer members do not pay credit on time is the main factor of this problem, both the payment credit in concentrates and money. Furthermore, low net income in every month makes the cooperative has low cash asset.

" KUD Giri Tani has much money outside, this because many farmer members do not pay credit on time to cooperative" Source: Anonymous (29/07/2020).

Assets

as a cooperative that has been established since 1973, most of the assets of KUD Giri Tani is owned assets, their owned assets such as building, 4 vehicles consisting of 2 trucks and 2 pick-ups, 9 milking cows, and 4 baby cows, and a separate land of 4,400m^2. All of these assets have been paid off, so there is no installment for the payment of assets.

Financial Administrative

Financial administrative in KUD Giri Tani is managed manually by using books to record the data

transactions. This often makes cooperative and farmer members difficult when they need information related to financial transactions such as the price of goods, the number of items purchased, and information when the transaction is carried out. Furthermore, sometimes the farmer members have difficulty when they want to know how many litres the milk they have supplied and how much debt left to be paid.

Table 6. Average income per-month of KUD Giri Tani

No	Income	Total (IDR/Month)	Percentage
1	Sales of milk	IDR 396,000,000	67%
2	Sales of support services	IDR 166,455,000	28%
3	Farmer who sells milk directly to Cimory	IDR 6,000,000	1%
4	Shares	IDR 5,250,000	1%
		IDR 20,800,000	3%
Total Income		**IDR 573,705,000**	**100%**

Source: KUD Giri Tani (July 2020)

Table 7. Average money allocated per-month of KUD Giri Tani

No	Money allocated	Total (IDR/Month)	Percentage
1	Transport	IDR 10,840,000	2%
2	Maintenance machine	IDR 5,000,000	1%
3	Procurement	IDR 2,500,000	0.4%
4	Support services	IDR 156,080,000	27.6%
5	Milk Payment to farmer members	IDR 300,000,000	53%
6	Utilities	IDR 4,500,000	1%
7	Debt payments to Cimory	IDR 22,000,000	4%
8	Debt Payment to Berkah Rahayu Mandiri (concentrate suplier)	IDR 9,000,000	1%
		IDR 55,000,000	10%
9	Staff salaries	**IDR 564,920,000**	**100%**
	Total allocated		
Net Income		**IDR 8,785,000**	

Source: KUD Giri Tani (July 2020)

Table 8. Allocation of net income

No	Purpose	Percentage of net profit is allocated
1	Saved for any necessary of cooperative	90%
2	Attending invitation of cooperative event/meeting	10%
	Total	**100%**

Source: KUD Giri Tani (August 2020)

4.4 Institutional Barriers to KUD Giri Tani's Financial Performance

KUD Giri Tani encountered several barriers in the operational, such as a shortage of milk supply from the farmer members, fluctuation of milk quality, reduced the number of active members, traditional financial administration management, low cash asset, and unable to borrow money to the banks. Despite these limitations, KUD Giri Tani keeps trying to survive. Currently, from the quota given of 7 tons per-day, KUD Giri Tani can only supply milk to Cimory at around 2 tons per day. Quality of milk

from the farmer members unstable which the awareness of hygiene in the farmer members need to improve to increase the quality. There are farmer members who do not continue their farming, they do not have regeneration and some of them choose to work as another profession. KUD Giri Tani uses a manual system by using a ledger in recording data of income and expenses, sometimes this makes data to be inaccurate. It also makes difficult to find information related to income and expenditure. To get additional funds, KUD Giri Tani cannot make a loan from the banks, the previous management made large amounts of loan illegally from the banks on behalf of KUD Giri Tani, this makes KUD Giri Tani is blacklisted by banks throughout Indonesia.

Table 9. PESTEC analysis of KUD Giri Tani's financial performance

PESTEC	**Barrier**	**Suggested solution to increase KUD Giri Tani's financial performance**
Political	1. Unfair and high taxation 2. Inconsistent government's programs for milk cooperative and dairy farmers 3. Absence of government intervention to assist milk cooperatives	1. Taxes must be taken based on the income cooperative earned 2. Development programs for dairy cooperatives and dairy farmers are made as a priority 3. The government provides special facilities to dairy cooperatives in terms of finance and provides relief in obtaining funds
Economic	1. Poor feed animal linkage 2. High staff payment salary 3. High expense for cooling machine every year 4. High of rate interest	1. Make more linkage to animal feed supplier to provide other animal feeds 2. Decrease staff salaries by rearranging staffing structures 3. Applying good maintenance machine and efficiency of use 4. Design low-interest loans for cooperatives and dairy farmers
Social	1. Low awareness of milk hygiene in dairy farmers and handling 2. Low educational background in dairy farmers and cooperative staff 3. Low of campaign and promotion to consume local fresh milk 4. Low milk consumption of citizen	1. Conduct hygienic milk handling training for staff cooperative and dairy farmer members and push to be implemented 2. Recruiting staff from universities and make education program for farmers' children 3. The government promotes advertisements for local fresh milk consumption
Technological	1. Traditional method for financial administration 2. Absence of adoption of innovation technology 3. Do not maximize the use of the internet in business processes 4. Dependence research from other institutions	1. Start implementing a computerized system in administration 2. Starting to maximize the use of the internet in business matters 3. Start researching by internal cooperative

Environmental	1. Prone corruption 2. There were staff who do not care about improving the welfare of cooperative	1. Eliminate all possibilities for corruption 2. Hold motivational seminar to increase staff awareness of care the company

(Source: Author, 2020)
Reference: (Rastogi, 2016)

From those barriers based on the PESTEC analysis, three the most possible to be applied to increase the performance of KUD Giri Tani are; make more linkage to animal feed supplier to provide other animal feeds, decrease staff salaries by rearranging staffing structures, and start implementing a computerized system in financial administration.

B. Production Performance

Section B explains the results of the production performance of KUD Giri Tani. Each sub-questions on research question number two is explained based on the finding from an online questionnaire.

4.5 Farm management practices adopted by KUD Giri Tani's farmer members

The majority of the farmer members are male. Based on the culture, most of the women are not work and only focus on being housewives. It can be seen from Table 10, there is a significantly different number between males and females who are involved in dairy farmers. Based on the age of the respondents, most of the dairy farmers are between the ages of 36 to 55 in adulthood, while at the young age less than 26 only 5% based on Table 10. This shows that there is a lack of interest among young people to be involved in dairy farming, and this is one of the reasons also some farms do not continue farming. Based on the level of educational background, most of the dairy farmers only have an education until primary school or senior high school. Regarding the total respondents, no dairy farmer has a university background.

Table 10. Characteristic of dairy farmers

Farm size	Frequency	Percentage (%)	Valid Percent (%)	Cumulative Percent (%)
Sex				
Male	33	82	82	82
Female	7	18	18	10
Age of dairy farmers				
0 – 25	2	5	5	5
26 – 35	7	18	18	23
36 – 45	11	27	27	50
46 – 55	16	40	40	90
> 55	4	10	10	100
Educational background				
No school	5	13	13	13
Primary school	13	32	32	45
Junior high	8	20	20	65
Senior high school	14	35	35	100
University	0	0	0	100

(Source: Author, 2020)

Generally, in Bogor, Indonesia the dairy farmers have small farms size without any land to plant the green grass in the farm area, the density of the population is one of the reasons for the difficulty of land availability. Based on Table 11, it can be seen that most of the dairy farmers have a farm area of

less than 51 m^2 or in ranging from 100 m^2 to 250 m^2, only one farm that has an area of more than 500 m^2.

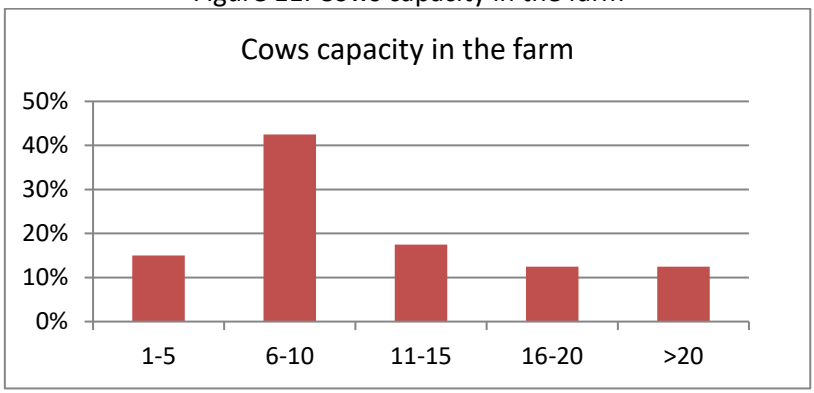
Table 11. Farm size area

Farm size	Frequency	Percentage (%)	Valid Percent (%)	Cumulative Percent (%)
0 – 50 m2	16	40	40	40
51 – 100 m2	6	15	14	54
100 – 250 m2	16	40	40	94
251 – 500 m2	1	3	3	97
>500 m2	1	3	3	100

(Source: Author, 2020)

Most of the farmers have small cows' capacity on the farm. It can be seen in Figure 11 which shows that more than 40% of the respondents have cows' capacity in the farm in the range 6 to 10, only 13% of the respondents have cows' capacity in the farm more than 20.

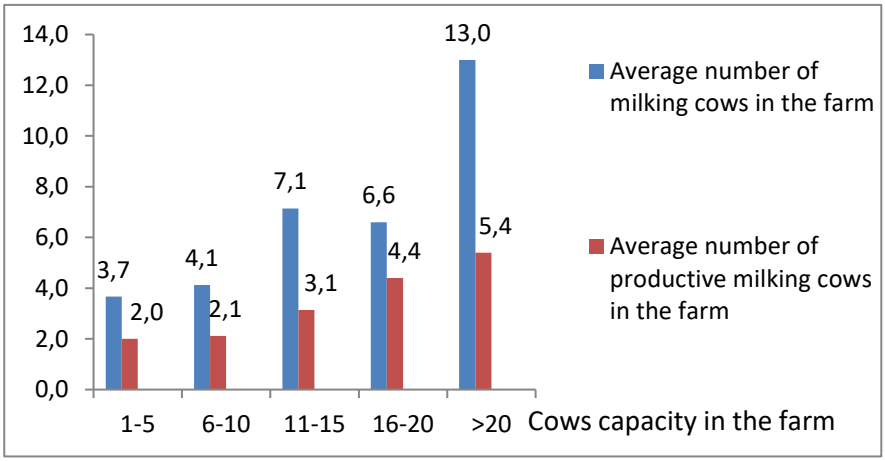
Figure 11. Cows capacity in the farm



(Source: Author, 2020)

The majority of the farmer members are not maximizing their farm capacity. Figure 12 shows that with capacity 1 to 5 cows on the farm, the average number of cows in the farm only 3.7, and from those average only 2.0 the average of cows which can be producing milk. Even with cows' capacity in the farm more than 20, with the average number of cows in the farm 13.0, only 5.4 the average number of cows which can be producing milk. There are several reasons the farmer members are not maximizing the farm capacity, such as they sell the cows, they have no capital to buy milking cows, and lacks the manpower to assist dairy farming.

Figure 12. The average number of cows and productive milking cows in the farm



(Source: Author, 2020)

To get higher total milk production, the farmer members should increase the number of productive milking cows. The correlation test shows that there is a strong correlation between the number of productive milking cows and total milk production in the farm. Table 12 shows the result of the correlation test between the number of productive milking cows and total milk production on the farm. The hypothesis said H0: there is no correlation between the number of productive milking cows and total milk production in the farm; H1: there is a correlation between the number of productive milking cows and total milk production in the farm. By using alpha 5%, the correlation test in Table 12 shows the significant value is 0.000, which means that reject H0 and accept H1 because 0.000 < 0.05, so there is a correlation between the number of productive milking cows and total milk production in the farm. Furthermore, the rho value is 0.875 which means that both variables correlate 87.5%.

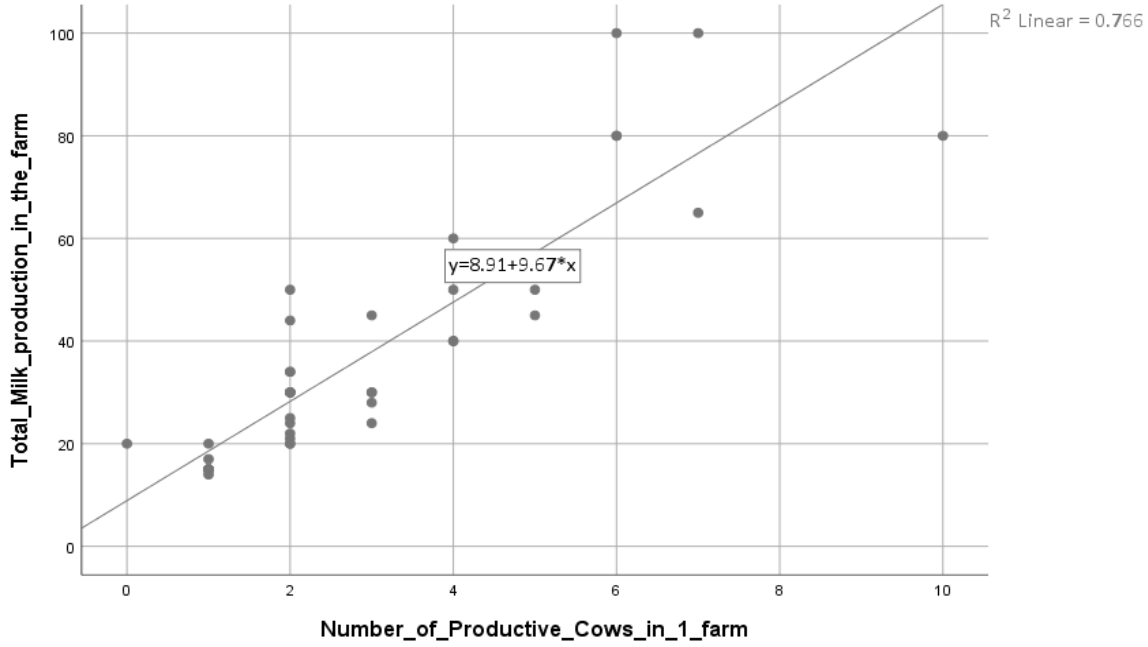
Table 12. Correlation test between the number of productive milking cows and total milk production in the farm

		Number of productive cows in the farm	Total milk production in the farm
Number of productive cows in the farm	Pearson Correlation	1	.875**
	Sig. (2-tailed)		.000
	N	40	40
Total milk production in the farm	Pearson Correlation	.875**	1
	Sig. (2-tailed)	.000	
	N	40	40

(Source: Author, 2020)

Figure 13 shows how the trend of regression of both variables. By regression formula y=8.91 + 9.67 (x), it means that if the farmer adds 1 productive milking cows, the milk production will increase by 9.67 litres. Furthermore, the rho quadrat value is 0.766; it means that the variable number of productive milking cows to the variable total milk production has influence 76.6%.

Figure 13. Regression of the number of productive cows and the total milk production in the farm



(Source: Author, 2020)

The average of milk production per-cow per-day of each farmer is different. It can be seen on Table 13, 67% of the respondents only can produce 10 to 15 liters of milk per-cow per-day. This shows that it is very potential to increase the milk production of each farmer. Only 18% of the respondents who have an average of milk production per-cow per-day between 16 to 20 liters, and only 5% of the respondents who have an average of milk production per-cow per-day between 21 to 25 liters, no farmer has milking cows can produce milk more than 25 liters per day.

Table 13. Average of milk production per-cow per-day in the farm

Range average of milk production per-cow per-day (liter)	Frequency	Percentage (%)	Valid Percent (%)	Percent Cumulative (%)
1 – 9	4	10	10	10
10 – 15	27	67	67	77
16 – 20	7	18	18	95
21 – 25	2	5	5	100
>25	0	0	0	100

(Source: Author, 2020)

With low production per-cow per-day of dairy farmers, KUD Giri Tani is difficult to meet quota demand from Cimory. Table 14 shows that 40% of the respondents can produce at range 1 to 25 liters of milk per-farm per-day and 42% of the respondents can produce at range 26 to 50 liters of milk per-farm per-day. For the rest, only 5% of the respondents can produce 51 to 75 liters of milk per-farm per-day and only 13% of the farmers can produce 76 to 100 liters of milk per-farm per-day. No farmer can produce milk more than 100 liters per-farm per-day.

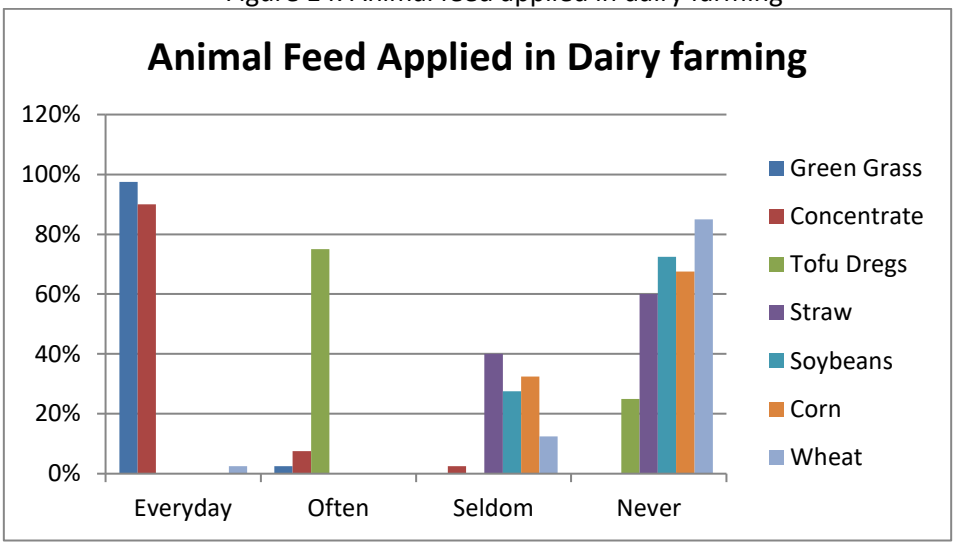
Table 14. Milk production per-farm per-day

Range average milk production per-farm per-day (liter)	Frequency	Percentage (%)	Valid percent (%)	Cumulative Percent (%)
1 – 25	16	40	40	40
26 – 50	17	42	42	82
51 – 75	2	5	5	87
76 – 100	2	13	13	100
>100	0	0	0	100

(Source: Author, 2020)

Green grass is the easiest animal feed to obtain by the farmer members. They usually collect the green grass from the empty land near their location. Based on Figure 14, almost all respondents give the green grass to their milking cows every day. Apart from the green grass, almost every day also farmer members give concentrate on their milking cows. The availability of concentrate at the KUD Giri Tani and credit payment system make the farmer members are easy to obtain. To increase the quality and quantity of milk production, the farmers usually gave tofu dregs to their milking cows. Usually, tofu dregs are obtained from a supplier who delivering directly to the farmers, but this is not available every day. Other animal feeds such as straw, soybeans, corn, and wheat, the dairy farmers rarely or do not give it to their milking cows since difficult to gain and costly.

Figure 14. Animal feed applied in dairy farming



(Source: Author, 2020)

Figure 15. An example of farmer who has finished collecting the green grass in the nearby area

(Source: Author, 2020)

4.6 Financial Constructions of KUD Giri Tani's Farmer Members

Sales of milk are the main income for the farmer members. To get additional income, some farmer members have other jobs to meet their necessaries, such as driver, staff hotel, entrepreneur, and freelance. According to Table 15, it can be seen that 58% of the respondents are not satisfied with their income while 42% of the respondents are satisfied with the income from dairy farming.

Table 15. Dairy farmers' satisfaction with the income

Dairy farmers satisfaction with the income	Frequency	Percentage (%)	Valid Percent (%)	Cumulative Percent (%)
Satisfied	17	42	42	42
Not Satisfied	23	58	58	100

(Source: Author, 2020)

The average net income from dairy farming is IDR 79,578 per-day. It can be seen on Table 16, there is a farmer who earns the income IDR 0 in a day, very far from the farmer who gets an average net income of IDR 250,000 in a day. This is one reason some farmers left dairy farming.

Table 16. The average of dairy farming net income per-day

N	Valid	40
	Missing	0
Mean net income per-day		IDR 79,578
Median net income per-day		IDR 71,786
Minimum net-income per-day		IDR 0
Maximum net income per-day		IDR 250,000

(Source: Author, 2020)

Even though some farmers sell directly to end consumers and process the milk into yogurt to get a higher income, majority of dairy farmers only sell the milk to KUD Giri Tani. If compared to two years ago, current farmer members have better milk production. Higher payment and on-time payment triggered farmer members to produce better milk quality. Furthermore, new cooperative management interrupted the farmer members to produce better quality by aware hygiene in milk production. Currently, the majority of milk produced by the farmer members is always accepted by KUD Giri Tani, although there is milk production which is rejected by KUD Giri Tani. Table 17 shows that 10% of the respondents sometimes are rejected when they deliver the milk to KUD Giri Tani. Table 17 shows that 28% of respondents on average obtain the first quality for milk production, while 72% of respondents on average get second quality on their milk production. In the payment system, KUD Giri Tani pays the milk only based on the quantity. This makes the farmer members have a mind-set to produce milk as much as possible and not really care about the quality.

Table 17. The milk sells characteristics

Milk sell characteristics	Frequency	Percentage (%)	Valid Percent (%)	Cumulative Percent (%)
The farmer sells all the milk to KUD Giri Tani				
Yes	35	88	88	88
No	5	12	12	100
The milk production always received by KUD Giri Tani				
Yes	36	90	90	90
No	4	10	10	100
The milk quality was sent to KUD Giri Tani				
First quality	11	28	28	28
Second quality	29	72	72	100

(Source: Author, 2020)

To get a higher net income, farmer members should increase milk production. The correlation test shows that there is a correlation between the total milk production in the farm and the net income of the farmer members. Table 18 shows the result of a correlation test between total milk production in the shed and the net income of the farmer members. The hypothesis said H0: there is no correlation between total milk production in the farm and net income of the farmer members; H1: there is a correlation between total milk production in the farm and net income of the farmer members. by using alpha 5%, the correlation test in Table 18 shows the significant value is 0.000, it means that reject H0 and accept H1 because 0.000 < 0.05, so there is a correlation between total milk production in the farm and the net income of the farmer members. Furthermore, the rho value is 0.706 which means that both variables correlate 70.6%.

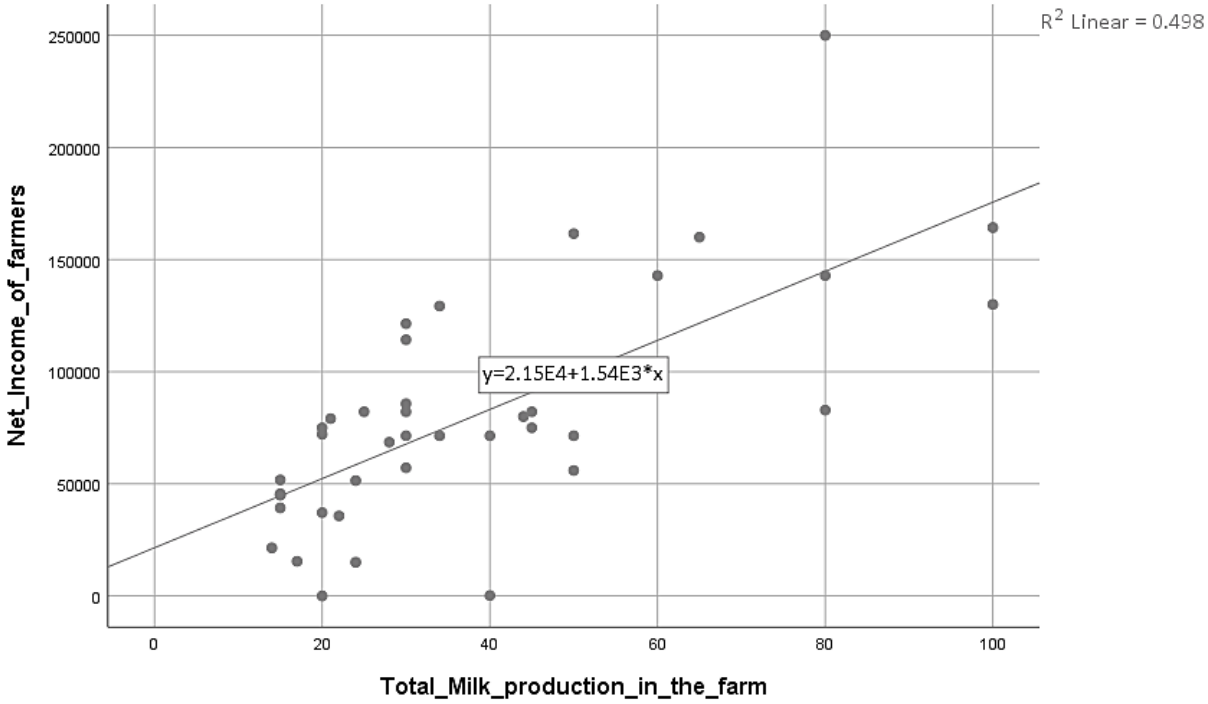
Table 18. Correlation test of total milk production in the farm and net income of farmer members

		Total milk production in the farm	Net income of farmer members
Total milk production in the farm	Pearson Correlation	1	.706**
	Sig. (2-tailed)		.000
	N	40	40
Net income of farmer members	Pearson Correlation	.706**	1
	Sig. (2-tailed)	.000	
	N	40	40

(Source: Author, 2020)

Figure 16 shows, how the trend of regression both variables. With regression formula y=21,500 + 1,540(x), it means that if the farmer members increase 1 litre of total milk production in the farm, the net income of the farmer members will increase IDR 1,540. Furthermore, the rho quadrat value is 0.498, which means that the variable total milk production in the farm to the variable net income of the farmer members has influence 49.8%.

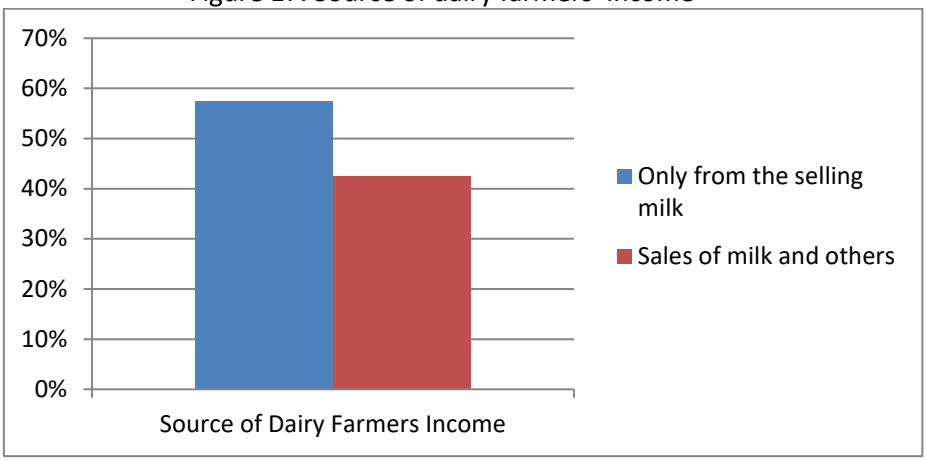
Figure 16. Regression of total milk production in the shed and Net income



(Source, Author, 2020)

Most of the dairy farmers have small net income per-day for their daily necessities, with an average net income of IDR 79,578 per-day (Table 16) they are quite deficient to meet daily necessities. This condition also makes dairy farmers difficult to develop their farm to produce milk with better quality and quantity. Although many of the farmers can borrow money from the bank, this is avoided by the farmers, they are worried about not being able to pay the debts. Figure 17 shows that 58% of the respondents only have income from selling milk, while 42% of the respondents have income from sales of milk and others.

Figure 17. Source of dairy farmers' income



(Source: Author, 2020)

4.7 Institutional Barriers Affecting KUD Giri Tani's Farmer Members

The farmer members encounter some barriers in running their farms, one of the barriers related to the knowledge of dairy farming. Knowledge about dairy farming needs to be improved among dairy farmers. Many of them feel a lack of knowledge about dairy farming. Table 19 shows that 30% of farmers obtained knowledge about dairy farming from their families, 33% from their friends by sharing information, 35% from training, and 3% autodidact.

Table 19. Source of knowledge the farmers obtained

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	Family	12	30	30	30
	Friends	13	32	32	62
	Training	14	35	35	97
	Autodidact	1	3	3	100
	Total	40	100	100	

(Source, Author, 2020)

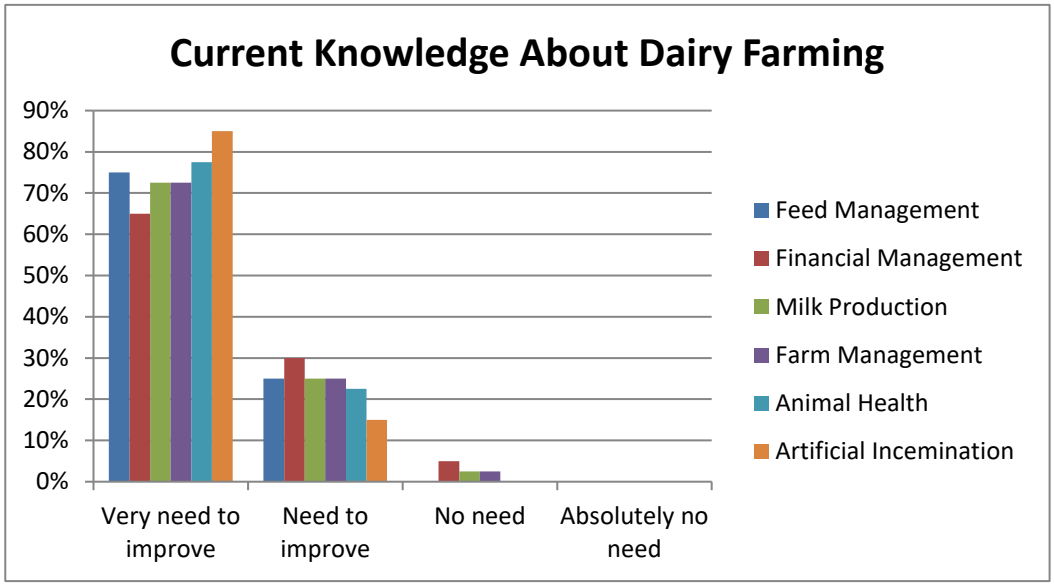
Table 20 shows that the majority (90%) of respondents have a middle level of knowledge about dairy farming. For the rest, 5% have a low level of knowledge and 5% are experts. To increase knowledge, training for farmer members is only held when there is a program from the government or agricultural institution, with the schedule is usually held once in a year. Apart from training, the farmers will ask people around about the knowledge they need.

Table 20. Level Knowledge about dairy farming of the farmer members

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	Low	2	5.0	5.0	5.0
	Middle	36	90.0	90.0	95.0
	Expert	2	5.0	5.0	100.0
	Total	40	100.0	100.0	

The farmers' knowledge needs to be improved in all categories of dairy farming. Figure 18 shows how current farmers' knowledge about dairy farming. In term of feeding management, the farmers do not know how to make a good animal feed composition to make the cows producing high-quality milk. The majority of farmer members only providing green grass and concentrate for their milking cows, sometimes they add tofu dregs to increase the milk quality, without knowing how much the cows need for feed in a day.

Figure 18. Current farmers' knowledge about dairy farming



(Source: Author, 2020)

In terms of financial management, most of the farmers do not understand how to make financial records. The farmers do not record how much the income and expenditure every day, there is no financial analysis regarding the business feasibility of their farms. This condition makes the farmers difficult to borrow money from the banks.

Not only in terms of financial management, but also in terms of milk production the farmers do not make a record. After the milk is produced, it immediately is sold to the KUD Giri Tani. The main reason for this condition is the farmers have a mindset that recording their milk production is not important to do, so the majority of them do not record milk production. Knowledge in terms of milk production is important to increase, many of the farmer members want to increase their milk production, but limited knowledge makes it difficult for them.

Related to milk production, farm management is important to pay attention to. Knowledge related to hygiene in milk production or handling needs to be improved among farmers, it can be seen from the fairly dirty condition of the cows and the shed. Not only that, but most of the farmers also do not recycle the cow dung. Usually, the dung is thrown away without any further management.

Figure 19. Farm condition of the farmers

(Source: Author, 2020)

In terms of farm management, in a certain condition some farmer members applied traditional methods in taking care of the cows. For example, when a cow is injured or diarrhea, some farmers provide treatment by giving certain leaves to treat the cows, but generally, when the cows getting sick the farmers usually depend on veterinarians around the farm. Regarding the care and health of cows, farmers feel that not only the knowledge they need to improve, but also the application techniques about care for cows. There are many farmers who do not know how to cut cow's hooves.

Among several categories of knowledge related to dairy farming, artificial insemination is the most category of knowledge that wants to improve by farmer members. Many farmers want to increase the number of cows through an artificial insemination process by themself, as well as they want to improve their cows' quality. So far, they only get artificial insemination services through one veterinarian who provided by the Ministry of Agriculture, the majority of the farmer members depend on this veterinarian.

Table 21. Farmers ability to obtain support funding

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	Very difficult	4	10	10	10
	Difficult	11	28	28	38
	Easy	15	37	37	75
	Very easy	10	25	25	100
	Total	**40**	**100**	**100**	

(Source, Author, 2020)

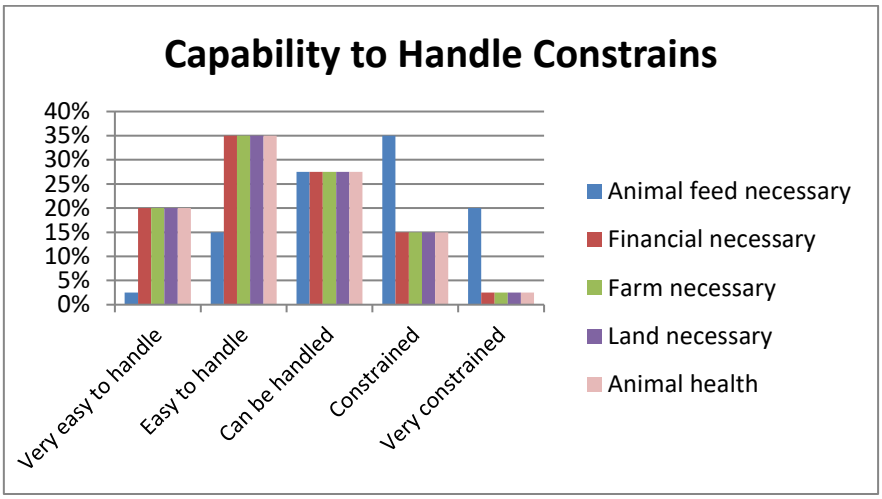
In the Bogor dairy value chain, some access to get support funding can be obtained by dairy farmers. The farmers can go to the banks, microcredit institutions, or borrow money from dairy cooperatives, but the existence of requirements from the banks makes farmers have different levels of difficulty in gaining access to get support funding. Moreover, they have a fear of not being able to pay off the debt from the bank. Table 21 shows that the farmers' ability to obtain support funding. 10% of the respondents say it very difficult and 28% of respondents say it difficult, 37% of respondents say it easy, and 25% of respondents say it very easy. KUD Giri Tani provided loan for farmer members with a maximum loan of IDR 5,000,000 for each farmer members.

In contrast to the farmer's knowledge, the capability of the farmers in dealing with constraints in their farming seems to be more varied. Figure 20 shows that the most constrained in managing dairy farming is related to animal feed, 35% of respondents feel constrained to handle animal feed

necessary, and 20% of respondents are very constrained to handle the animal feed necessary. Furthermore, sometimes they have difficulty in getting a supply of tofu dregs, and they have to scramble to get the green grass in the nearby area. For financial necessary, farm necessary, land necessary, and animal health, the majority of respondents say they can handle these constraints easily.

According to those barriers, the main problem for farmer members is limited knowledge and money makes them difficult to develop the farm, and rely on the green grass and concentrate make them difficult to improve milk production. Furthermore, the lack of veterinarian and artificial insemination services makes them difficult to breed their milking cows.

Figure 20. The capability of dairy farmers to handle constraints in dairy farming

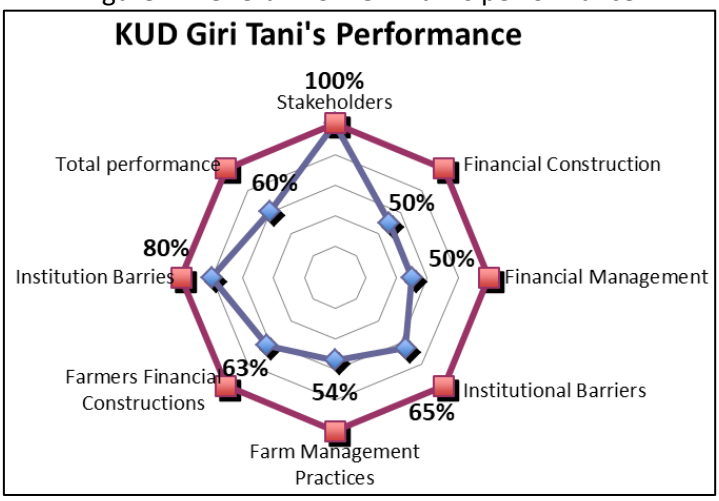


(Source: Author, 2020)

4.8 Overall performance of KUD Giri Tani

Overall, based on Figure 21 with the criteria in financial and production, KUD Giri Tani has a total performance of 60%. Stakeholders in the value chain 100% are active stakeholders and carry out their respective duties, but the less linkage between actors makes the performance of the Bogor dairy value chain not maximal. Financially, KUD Giri Tani has obstacles to get support funding; it can be seen of 50% on the financial construction. Blacklisted by banks throughout Indonesia make them only relied on their income and loan from Cimory to cover the needs of the cooperatives.

Figure 21. Overall KUD Giri Tani's performance



(Source: Author, 2020)

In terms of financial management, KUD Giri Tani also has a low performance. The cooperative has high expenditure per-month, they have not smooth cash flow due to many of the farmer members are not pay credit on time, and low cash in the cooperative make them have 50% for performance in financial management. Moreover, financial management in KUD Giri Tani is less well organized; they are implementing manual systems by using ledger in the administration. Institutionally, KUD Giri Tani has been good enough at overcoming financial constraints; they cover the need by using the income of selling milk. It can be seen on Table 7, most of the allocation for their activities is covered by using income from the selling milk, and it made the cooperative only gained small net income at 1.5% of the total income.

In terms of production performance, majority of the farmers are not maximizing the number of cow capacity in the shed. Furtheremore, many number of cows that cannot producing milk and have below-average milk production per-cow per-day makes the performance of farm management practices only get 54%. In terms of farmers' financial construction, farmer members get 63% in the performance of financial construction. Most of the farmers' income is classified as very standard and only comes from the sale of milk. It makes them difficult to build farms and be dissatisfied with the income. Despite those limitations, farmer members get 80% in performance to overcome the barriers even though they have many limitations to solve barriers. Detail MIDCA analysis of KUD Giri Tani's performance can be seen in appendix 2.

Chapter 5: Discussion

5.1 Stakeholder Involved

Stakeholders involved in the Bogor Dairy Value chain consist of actors and supporters. Likewise (Resti, 2017) reported that actors and supporters or influencer in the dairy value chain West Java consist of input suppliers, milk producers, milk collectors, small-scale and large milk processors, retailers, and consumers, while supporters and influencers consist of international and national NGO's, and public or private institution such as Ministry of Cooperative, Ministry of Forestry, Ministry of Agriculture, Financial institutions, Indonesia Dairy Cooperative Union (GKSI), and educational institutions (Padjajaran University and IPB-University). Among the several actors, dairy farmers and KUD Giri Tani themselves are the actors who most determine the performance of cooperative. Therefore, both the performance of cooperative and farmer members must be improved because they depend on each other. It can be achieved by maximizing support services in the cooperative. (Asmara, 2017) reported that there was a relationship between the performances of dairy cooperative services to the performance of farmer members. Therefore, dairy cooperative can be an alternative to provide marketing milk, financing, consulting, and training services for the farmer members. This can be done by collaborating with actors who are already involved or related to the dairy value chain, such as collaborating in the provision of animal feed other than concentrate, providing artificial insemination services, facilitating bank loans for farmer members, and dairy training.

For the provision of other animal feed besides concentrate, KUD Giri Tani can cooperate with suppliers of tofu dregs, rice straw, and corn silage. Currently, farmer members have uncertainty about buying tofu dregs. This is because there is no coordination between tofu dregs supplier and dairy farmers, so that the tofu dregs can be obtained when only the supplier comes to the farmer. Meanwhile, for artificial insemination, the farmer members look very enthusiastic. This can be seen in Figure 18, which wants to increase knowledge about artificial insemination. Currently, the majority of dairy farmers rely on one veterinarian provided by the Ministry of Agriculture. One veterinarian is considered insufficient because he has to serve all members of the dairy farmer, it will be easier if the cooperative provides cement and special personnel who can provide artificial insemination services. Also, the dairy cooperative should be able to make it easy for its farmer members to make a loan to the bank. This can be done by making cooperation with the banks to make farmer members easier to get a loan, especially in giving milk supply records by the cooperative. The technical capacity and knowledge of cooperative staff and farmer members still need to be improved. Sundararaj (2011) reported that Skill to set the employees needs to be improved to get the desire performance. As the dairy cooperatives usually cannot recruit high-calibre professionals, another way is by investing in extensive training and education to upgrade the skills of the existing manpower. The staff cooperative needs to be educated to meet the merits of scientific and modern management practices and processes. Furthermore, dairy cooperatives have effectively used the toil of farmer members to develop self-reliance. To improve the technical and knowledge of staff, cooperatives can work with associations and educational institutions involved in the value chain. This training can be done independently considering the lack of training provided by the government. By doing that cooperation, the actors involved as can be seen in Table 5 and Figure 8 can be more connected to work together in the dairy value chain.

5.2 Financial Constructions

KUD Giri Tani has several sources for their financial construction such as income from selling milk, support services, profit sharing from the farmer who sells the milk directly to Cimory, shares, and loans from Cimory. Likewise (Resty, 2017) reported that the sale of milk is the main source income

for KUD Giri Tani, and to get additional income, the cooperative provides support services to help the farmer members. Other sources of cooperative to construct their business are loan funding from financial institutions. Unfortunately, because KUD Giri Tani has been blacklisted by the bank, an alternative way they lent money to Cimory as their business partner. It can be seen in Table 6, the highest income of KUD Giri Tani's comes from the selling milk, while other income is only as additional income for the cooperative. So far, the quota of milk supply given by Cimory has not been fulfilled. It can be seen in Figure 9, from 7 tonnes of quota milk supply given, KUD Giri Tani can only meet the supply of about 2 tonnes per day, so this greatly affects the income of the cooperative. The revenue from support services is relatively small, (Morey, 2011) reported that dairy cooperatives only take 10 to 25% of the various support services provided. as well as income from profit sharing and shares which are only as additional income. Therefore, to get support funding the cooperative borrows money from Cimory as one of its financial constructions.

5.3 Financial Management

KUD Giri Tani allocates their income into several categories, such as operations, support services, liabilities, employee salaries, and debt payments to Cimory and animal feed suppliers. This is relevant to Odhong (2015 cited in Wilkes, 2018) who identified that dairy cooperatives allocate their finances in several ways such as milk transport, cooling machine, processing equipment, and digital procurement and payment systems. In terms of operational, allocation is divided into transportation, maintenance machine, and procurement. Everyday KUD Giri Tani allocates their fund for transportation; three vehicles collect milk every day from the farmer members based on area, and 1 vehicle that is devoted to delivering milk to Cimory. Fund in maintaining the machine is allocated for vehicle maintenance and cooling machines, every year the cooling machine undergoes repairs which quite expensive, so the allocation for cooling machines must always be prepared because the function of the cooling machine is important. Another operational allocation is procurement, this is done when the required items are damaged or have run out of life, the items required such as quality checking tools, transportation spare parts, and the items related to administrative.

Another allocation is in terms of support services, such as concentrate, animal medicine, dairy farming equipment, and money credit. Among these support services, concentrate requires the largest allocation in every month. Based on Table 7, the total expenditure on support services is IDR 156,080,000 per-month, and around IDR 155,000,000 of that allocation was spent on payment concentrate. Also, KUD Giri Tani allocates their funds in terms of liabilities, these liabilities consist of payments for milk to farmer members, utilities, payment of debts to Cimory and animal feed suppliers, and payment of employee salaries, among those allocations, payment of milk to the farmer members is the biggest allocation. It can be seen in Tables 6 and 7, from the total income of IDR 573,705,000 KUD Giri Tani allocates their income for the payment of milk to the farmer members in around IDR 300,000,000 per-month. This is relevant to Morey (2011) which stated that in managing financial, cooperative use the money to buy fresh milk from the farmer members and provide support services. Money from the milk processor is collected by the cooperative to be distributed to the farmers based on milk quality and quantity.

Large expenditure per-month makes KUD Giri Tani has a small net income. It can be seen on Table 7, in one month KUD Giri Tani only has a net income IDR 8,785,000. While Machogu and Yegon (2017) reported that Capital formation (net capital accumulation) by business enterprises is necessary for working capital and capital investments for the continued operation of the business (mandatory investment), replacement of existing parts when they break down or wear out and expansion investments that were expected to add substantially to revenue generation. Moreover, this is exacerbated by not smooth cash flow because many of the farmer members who are not on time in paying money credit and credits concentrates, so that the cooperative sometimes have difficulty when they want to paying concentrate to suppliers. Luckily, because KUD Giri Tani has been

established for a long time, the assets of the cooperative are own assets and there is no instalment for the assets. However, in administrative handling, KUD Giri Tani still applies a manual system in its financial management. They still apply cash and carry payment system to the farmer members, and recording data for the income and the expenses still uses accounting ledger. This is one of the factors that makes farmer members not pay credit on time, because sometimes the cooperative staff forgets to collect debt payments from the farmer members, and sometimes the farmer members bid on cooperative staff to the debt payments can be delayed. Therefore, KUD Giri Tani needs to implement a computerized financial system because it can prevent the delay of the debt payments from farmer members by automatically deduction payment to farmer members. Moreover, a computerized financial system makes cooperatives more transparent because every expense and income is recorded, and making provision of data transaction easier. Wilkes (2018) reported that to get good performance, cooperatives should able to provide financial visibility for their farmer members by providing an automated documentation system.

5.4 Farm management practice

Most of the farmer members have a shed with a capacity of 6 to 10 cows. However, with this capacity, the majority of productive cows in the shed are only about 1 to 5. Many farmers do not maximize their sheds. This is unfortunate because KUD Giri Tani has a shortage of milk supply from farmer members to meet the quota supply from Cimory. Therefore, the farmer members should maximize the number of cows in the shed to produce milk as much as possible. It can be seen on Table 12 and Figure 13; there is a strong correlation (87.5%) between the number of productive milking cows and the total milk production in one farm, which is higher the number of productive milking cows, higher the total milk production then.

In producing milk, each cow of the farmer members has a different average amount of milk production capabilities. It can be seen on Table 13, most of the farmer members can produce milk between 10 to 15 litres per-cow per-day. This range is normal for standards in Indonesia, where Morey (2011) reported that the average of milk production in Indonesia is 10 liters per-cow per-day. However, some large scale dairy farmers achieve the average milk production per-cow of 26 liters per day. Therefore, it report indicates that the milk production of the farmer members very the potential to increase. The milk production can be increased through better farm management practice. Currently, everyday almost all farmer members just provide green grass and concentrate as the main food for the cows, and sometimes, to get better production they provide tofu dregs as an addition formula for their cows, while Wouter (2009) was reported that possible solutions to increase production and profitability are focus on the improvement of farm management practices, especially on feeding for cows. Local production in Java was difficult to increase due to low profitability at the farm level, relative high feed prices, and low production level per cow was caused by lack of feeding management practice, and limited possibilities to expand dairy farming, so improved management practices are possible solutions to increase local milk production and profitability at farm level. According to Table 14, most of the respondents are only able to produce the milk in range 1 to 25 litres and 26 to 50 litres per day. Therefore, besides increasing milk supply to Cimory, by improving milk production, the income of farmer members will increase as well. Tables 18 and Figures 16 show that there is quite a strong correlation between total milk production in the farm and the net income of the farmers, which greater the milk produced by the farmers, greater the income earned by farmers. This is relevant to Sembada (2016) who reported that to increase dairy farmers' income in the future, the farmers need to help in increasing the number of milking cows on their farm.

5.5 Financial Construction of farmer members

Most of the dairy farmers only earn income from selling the milk, and from this sale, most of them are not satisfied with the income they earn. It can be seen in Figure 17, some farmer members choose to work in other professions to get additional income, this is due to the small average income of dairy farmers. Based on Table 16, the average net income of farmer members per day is IDR 79,578. This income is classified as low income because according to Cost and Rate (2019) the average monthly cost of living in Bogor is IDR 4,472,462 or IDR 149,082 per-day. Hafidh (2016) was reported that the empirical evidence in Indonesia showed that the majority of dairy farms of cooperative members had not reached the level of income as expected yet. For this reason, to get bigger income, some farmers process the milk into yogurt and they sell directly to the end consumer, it can be seen in Table 17, as many as 12% of the respondents do not sell all the milk to KUD Giri Tani.

The farmer members need support funding to develop their farms and to increase milk production, but the existence of requirements from the banks makes farmers have different levels of difficulty in gaining access to get support funding. Wilkes (2018) reported that several challenges at the farmer level are limit the ability to borrow money to financial institutions. The most common reason for this problem is the lack of a demonstrated financial track record of the farmers. This is because the farmers do not often keep proper records of their dairy enterprises. Moreover, the farmers have the fear of not being able to pay the debt to the bank. This relevant to KIT and IIRR (2008) which reported that most of the farmers have too little money, during the production season, they often lack the working capital to buy input supply, hire workers, irrigate, sow, harvest the crop, and to care the animal. Especially before the harvest many of them cannot even pay for food, household expenses, or medicine. UNCTAD (2004) reported that if the farmer cannot get such financial support, they will not able to produce the quantity and quality required. Therefore, the cooperative has an important role to help the farmer members to get additional funds to develop their farms and to increase the milk production.

5.6 Reflection

The reason for the author choosing the topic on the dairy value chain because since the author take his master's degree, he started to be interested in studying the dairy value chain. Especially because the performance of the dairy value chain in Indonesia is still low. Therefore, the authors decided to do research related to the dairy value chain. To get approval to research in a dairy cooperative, the author asked for help from colleagues who have acquaintances in one of the dairy cooperatives. The cooperative that is being targeted is KUD Giri Tani, because this cooperative is the largest in Bogor Regency. When knowing that the cooperative was willing to accept the author to do research, the author confidently contacted the cooperative and asked permission to do research, and the cooperative management agreed and was also happy because he felt helped.

The cooperative was very welcome to assist in this research process, they were willing to tell what happened regarding the situation of the cooperative and were willing to share the data needed related to the research. Discussions were held to identify problems that occurred in the cooperative, until finally it was determined that the cooperative had problems with financial performance and milk supply to processors.

After discussing and determining the problem, the problem then applied to the research proposal. During the process of designing a research proposal, I thought that to improve the performance of the cooperative it was enough just to make improvements to the payment system, but after I presented my research proposal, I received input that performance should be divided into several aspects, so that finally this research focused on aspects finance and production. Finally, my research proposal was made new, by dividing the performance into finance and production.

The methodology in this research applies qualitative and quantitative approach, both analyzes were applied because the data collection in this study applied literature reviews, semi-structured interviews, and online questionnaires, so qualitative and quantitative approach were very suitable to be applied in this study. A qualitative approach is applied to process data obtained from interviews with several key informants, where the qualitative approach is intended to analyze financial performance. Several tools were used such as chain map, stakeholder analysis, PESTEC analysis, and problem tree. For the quantitative approach that was focused on analyzing production performance, information data obtained from online questionnaires were processed statistically by descriptive and inferential.

Literature review, semi-structured interviews, and online questionnaires were applied in the data collection of this study. In conducting a literature review, the author gets a feeling of increasing ability in terms of literature study. By installing data access on a computer, searching for literature review becomes easier because the resulting journal was more complete and relevant. For semi-structured interviews, several key informants from different institutions were interviewed, while for online questionnaires only focused on KUD Giri Tani fermer members.

Two research assistants were hired during data collection, this because the research was conducted amid Corona pandemic and also there were key informants who can only be interviewed by face-to-face interviewed because they were not familiar with the online interview. This research assistant interviewed 2 dairy cooperatives, KUD Giri Tani and another large cooperative in Bogor city. The interview was conducted face to face and then the recording of the interview was sent via Google Drive to the author. For online semi-structured interviews were conducted with milk processors, ministry of agriculture, and 2 dairy value chain experts by using Google meet and the Whatsapp platform. This is a new experience for me, I thought interview online would be more difficult because I couldn't meet the person, but after I did the interview, I found that online interview was more effective and efficient. Not much time is wasted because what is being discussed is targeted. Besides that, there is no need for transportation costs to meet the key informants, only need to ensure that the internet users can run properly. To conduct interviews with several key informants, there were no significant obstacles, because to be able to connect with the key informants, I asked my colleague to help me to contact the key informants first. Only for the interview with the Ministry of Agriculture, the bureaucracy is quite complicated because the letters made must be following the intended sub-department and must get approval first, so I have to write letters several times and wait several weeks.

All findings in this study are written based on situations and circumstances in the field according to research needs. Each data is recorded using a mobile voice recorder and saved in the cloud on the internet. it makes easier for the author to identify the data (coding analysis). The author realizes that being neutral and avoiding biased in conducting research must be maintained to make the study has good validity and reliability. During the data collection process until the writing of research findings, there was no intervention from any party. Confirmation is always done when the data unclear or incomplete during the writing process, the cooperative is willing to share data even though the data is related to finances.

CHAPTER 6: CONCLUSION

In this chapter, findings are concluded and linked to the literature to answer the main and sub questions of the study. It consists of performance in terms of the financial of KUD Giri Tani and milk production in the farmer members.

6.1 The determinants of KUD Giri Tani's financial performance

6.1.1 The stakeholders involved in the Bogor dairy value chain

Stakeholders involved in the Bogor Dairy Value chain consist of actors and supporters. The actors in Bogor dairy value chain such as Input suppliers, milk producers, collector, processors, retailers, and consumers. While for the supporter consist of Finance institutions, Indonesia Young dairy farmers Association, Indonesia Cooperative Union (GKSI), Ministry of Agriculture, Ministry of Cooperative, and educational institution (IPB-University and The University of Adelaide in Indodairy Project). The stakeholders involved are active but less cooperation among the actors makes the performance of the dairy value chain are not optimum.

6.1.2 Financial constructions in KUD Giri Tani

KUD Giri Tani relies heavily on its income as financial construction especially for income from the sale of milk. To get additional income, KUD Giri Tani Provides support services and others such as animal feed, animal medicines. The cooperative also earns income from profit sharing of the farmer who sells directly to Cimory, shares, and the loan to Cimory. From that income, only the income from selling milk to Cimory which has significant income to the financial performance as it is the main income of the cooperative. KUD Giri Tani only can get additional funding through a loan to Cimory, but high rate interest makes the cooperative quite consider.

6.1.3 Financial management practices in KUD Giri Tani

In managing the financial, KUD Giri Tani allocates its finances into several groups such as operations, liabilities, employee salaries, debt payments to Cimory and concentrate supplier, and payment of milk to the farmer members. In operational, the allocation consists of transportation, maintenance machine, and procurement. Allocation support services consist of concentrate, animal medicines, dairy farming equipment, and money credit. In liabilities they allocating to milk payment to the farmer members, electricity, water, and internet, debt payments to Cimory and supplier, and staff salaries. From these liabilities, staff salaries are the highest expenditure with the total IDR 55,000,000 per-month.

Cash flow in KUD Giri Tani is not smooth due to many farmer members do not pay credit on time in terms of credit concentrate and money. While as they established since 1973, the assets of them have owned assets, and they have no instalment for the asset. Until now, they still manage their financial by using the manual method; income and expenditure are recorded by books which sometimes make them difficult to find data.

6.1.4 Institutional barriers of KUD Giri Tani's financial

KUD Giri Tani encountered several barriers, such as a shortage of milk supply, fluctuation of milk quality from farmer members, reducing the number of active members, traditional financial administration management, low cash asset, and unable to borrow money to the banks due to they have been blacklisted. Despite all these barriers, KUD Giri Tani keeps trying to survive, they try to solve each barrier to continue operating.

In Political aspect they have high taxation and the absence of government intervention to assist milk cooperative. In the economic aspect, they find a high rate of interest in the loan, low feed animal linkage to support milk production, and high staff salaries. In social aspect poor awareness of hygiene in dairy farmer members and handling make the milk quality increased, low educational background farmer members and cooperative staff make them difficult to improve the business, and low milk consumption of citizen make the price of milk is low in the market. In technological aspect, KUD Giri Tani absence of adoption of innovative technology, they do not maximize the use of the internet in business process. While in the environmental aspect the cooperative is prone to corruption.

6.2 The determinants of dairy farmer members' productivity performance

6.2.1 Farm management practices in KUD Giri Tani's farmer members

Most of the farmer members have the farm size less than 50 m^2 and between 100 m^2 to 250 m^2, with those size majority number of productive milking cows in the farm only between 1 to 5, while most of the farmer members have shed capacity between 6 to 10 cows, even there is a farmer who has farm capacity more than 20 cows. With the ability of average milk production per-cow 10 to 15 litres per day, most of the farmer members produce the milk per-farm in the range 1 to 25 litres and 26 to 50 litres. There is a strong correlation between the number of productive milking cows and the total milk production per-farm, by that reason the farmer members only can produce the milk in that range. Furthermore, everyday majority of the farmer members applied green grass and concentrate on their milking cows, to increase the quality of milk production they only give tofu dreg which is obtained directly from the supplier, but this is not available every day.

6.2.2 Financial constructions in KUD Giri Tani's farmer members

Sales of the milk are the main income for the farmer members, while to get additional income, some of the farmer members have other jobs to meet the necessary. They are not satisfied with the income which is classified far from the standard expenditure in Bogor. There is still a farmer member who gets net income IDR 0 in a day. This is very far from the farmer who gets net income IDR 250,000 in a day. Therefore, to get higher income some of the farmer members process their milk into yogurt and sell directly to consumers. There is a correlation between total milk production and the net income of the farmers. To get a higher income the farmer members have to increase the total production.

6.2 3 Institutional barriers in KUD Giri Tani's farmer members

The farmer members still encounter some barriers in running the farms, especially knowledge about dairy farming and animal feed necessary. The majority of the farmer members have a middle level of

knowledge about dairy farming, in which the knowledge is obtained from family, friends, and training. Almost all categories of the knowledge about dairy farming they feel need to increase, but artificial insemination they want to increase most. In operating the farm, they have tried to overcome the obstacles, but animal feed necessary is quite difficult for them because they have a dependency on the green grass in the nearby area, and sometimes they have to scramble with other farmers to get the green grass. Furthermore, dependency on supplier makes the farmers difficult to get the tofu dregs in a certain period, sometimes the supplier do not come to supply the tofu dregs.

CHAPTER 7: RECOMMENDATION

This study proposes an applicable recommendation for KUD Giri Tani and the farmer members. The recommendation consists of the financial aspect and production aspect in increasing the performance.

7.1 Financial Aspect

1. Solving blacklist to the bank
   KUD Giri Tani must come to the bank to solve the blacklist problem. By obtaining a loan from the bank, the rate interest will be lower, so it makes the net income achieved to become higher.

2. Adopting software application
   Cooperatives must immediately implement application software to manage and record all financial transactions. By implementing application software for financial administration, providing income and expenditure data will be easier. The finance becomes more transparent so that it can avoid corruption. Moreover, by implementing application software, milk payments to farmers can be done automatically; this can avoid credit payments that are not on time.

3. Efficiency in staff cooperative
   With the current number of employees (30 people), it is considered too many to manage the cooperative. It makes the cooperative have a large expense in paying employee salaries. Therefore, the cooperative must rearrange the number of staffing and division of tasks, given the current small total net income.

7.2 Production Aspect

1. Make more linkage with other animal feed suppliers
   To increase milk production in farmers, the availability of forage should be increased. Therefore, the cooperative can work with tofu dregs supplier to make tofu dregs available in cooperative. Also, the cooperative can work with suppliers of straw and corn silage to increase the availability of animal feed for the farmer members.

2. Providing credit milking cows and Artificial Insemination services
   To make easier for farmer members to maximize the number of cows in their farm, the cooperative must provide convenience to the farmer members by providing dairy cow credit and artificial insemination credit services.

3. Maximizing shed capacity
   The number of farmer members who do not maximize the capacity of the shed makes the milk supply from the farmer members lower. Therefore to increase milk supply, farmers must maximize the number of milking cows in the shed. Because the more productive milking cows in the farm, the more milk is produced then, and the income of the farmer members will be increase as well.

4. Collaboration in training with an education institution
   To increase the knowledge and skills of the farmer members and cooperative staff, collaboration can be done with the closest educational institution such as IPB-University. This collaboration

can be part of community service for IPB-university lecturers so that KUD Giri Tani does not have to make payments to trainers who provide training.

5. Education program for the farmer members' children
   Most of the farmer members have a low educational background; this makes them difficult to develop the farm due to lack of knowledge. Therefore, by an educational program in the cooperative, the farmer members have the next generation who have a higher education background, and it will help to manage their farms properly.

Table 22. Theory of change for the new business model of KUD Giri Tani

Intervention	Activities	Output	Outcome	Impact
Providing other forages in cooperative	- Negotiate and make contacts with the suppliers - Distributing forages to cooperative	- Animal feed availability	- Increased milk production - Increased milk supply to Cimory	- Increased net income of the cooperative - Improved farmer members welfare
Providing credit milking cows and Artificial Insemination services	- Distributing cement - Distributing Artificial Insemination and milking cows credit services	- Increased number of productive milking cows in the shed	- Increased total milk production - Increased milk supply to Cimory	- Increased net income of the cooperative - Improved farmer members welfare
Maximizing shed capacity	- Identifying shed capacity in each farm - Offering to take credit milking cows or Artificial Insemination services	- Increased number of productive milking cows in the shed	- Increased total milk production - Increased milk supply to Cimory	- Increased net income of the cooperative - Improved farmer members welfare
Collaboration in training with an education institution	- held training related to dairy farming to the farmer members	- Improved the knowledge and skills in dairy farming	- Better farm management practices	- Climate-smart dairy farming
Education program for the farmer members' children	- Allocating money for the education of the farmer members' children	- regeneration of the farmer members have a Higher education background	- High education background of the farmer members	- Good management practices in dairy farming

Table 23. New Business model for KUD Giri Tani

<table>
<tr>
<td rowspan="2">Key Partners
Dairy farmer members
Cimory Company
Animal feed suppliers (Concentrates, Tofu dregs, straw, Corn silage)
Education Institution (IPB-University)
Ministry of Agriculture
Ministry of Cooperative</td>
<td>Key Activities
Collecting milk from the farmer members
Supplying milk to milk processor company
Organizing farmer members
Providing support services to the farmer members</td>
<td rowspan="2">Value Propositions
Surplus high quality milk supply from the farmer members
Support welfare for the farmer members and family
Computerized management system
Largest dairy cooperative in Bogor
Experience more than 45 years in dairy cooperative</td>
<td>Customer Relationships
Good quality product and services</td>
<td rowspan="2">Customer Segments
Milk Processor Company
Small medium enterprises</td>
</tr>
<tr>
<td>Key Resources
Owned complete asset
Small scale dairy farmer members
Laboratory
Owned dairy farm
Staff</td>
<td>Channels
Website and mail order
Call centre</td>
</tr>
<tr>
<td colspan="3">Cost Structure
Milk Payment to the farmer members
Operational
Liabilities</td>
<td colspan="3">Revenue Streams
Sales of milk
Sales of support services</td>
</tr>
</table>

7.3 Sustainability of a new business model

The implementation of the new business model will contribute to the economic, social, and environmental sustainability. This new business model will benefit the actors involved, especially for KUD Giri Tani as a cooperative, farmer members, and milk processing company (Cimory).

Prosperity
KUD Giri Tani will be profitable as a milk cooperative because by increasing the supply of milk, the cooperative's income will increase, this will have a positive impact on the financial performance of the cooperative. Meanwhile for farmer members, with an increase in the total milk produced, the farmer members' income will increase. By getting more and better milk supply, Cimory as a milk processing company can produce according to market demand. Production can be increased to get a bigger income for the company, considering the high demand for milk in the market.

People
The skills training and educational programs that are held will improve the ability of farmer members in managing their farms. Farmer members and cooperative staff will have a better life with increased income, and hygiene in milk handling will increase through applying the knowledge from the training. Moreover, by increasing milk production for the farmer members, this will contribute to food security in Indonesia.

Planet
Training programs and educational programs will improve the ability of farmer members in managing their farms. This will reduce the negative impact of dairy farming, because farmer members can manage waste from the farm properly.

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APPENDICES

Appendix 1. specifications of grade determination

TS (%)	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5
	TPC ≤1 Mio	1< TPC ≤ 3 Mio	3< TPC ≤5 Mio	5< TPC ≤10 Mio	10< TPC ≤15 Mio
13,0					
12,9					
12,8					
12,7					
12,6					
12,5					
12,4					
12,3					
12,2					
12,1					
12,0					
11,9					
11,8					
11,7					
11,6					
11,5					
11,4					
11,3					
11,2					
11,1					
11,0					

Appendix 2. MIDCA analysis of KUD Giri Tani's performance

Concept	Indicator	Criteria	Max. Score	Comments/ Observations/ Information	Percentage	Score
Stakeholders			**5**			**5**
Number of Stakeholders	% of active stakeholders	Percentage (%) * 5	5	All of Stakeholders are active		5
Financial Construction			**15**			**7.5**
Access to financial sources	The organization has access to local bank/financial institutions to cover their financial needs.	Yes=5, No= 0	5	The Cooperative are blacklisted by finance institution		0
Profit	Level of profit earned by cooperative	Low=0, Middle=3, High=5	5	The cooperative has middle level profit from the operation		3
Grant Funding Dependency	The organisation's dependency on sources of grant funding.	% of operations costs covered by donations 5-(%*5)	5	Just for staff training the cooperative has dependency on grant funding		4.5
Financial Management			**30**			**15**
Cost of Operational	Total cost of Operational compared to total income	High=0, Normal=5	5	The cooperative high cost operational if compared to total income		0
Cash Flow	The Cooperative has good cash flow in the operational	Yes=5, No=0	5	The cooperative has poor cash flow due to the dairy farmer members are not pay the debts on time		0
Assets	the cooperative has adequate assets for the operational	Yes=5, No=0	5	The cooperative has adequate assets for the operational		5
Organized and up-to date administrative processes	Financial information of the last three years is available	Yes=5, No=0	5	the administrative is not really good organized, they still operate by using tradional method		0
Liquidity Ratio	Good score on liquidity ratio, every month is above 1.	Yes=5, No=0	5	The cooperative has liquidity ratio above 1 for every month		**5**
Solvency Ratio	Good score on solvency ratio, above 30%	Above 30%=5, less than 30% is 0	5	The cooperative has solvency in the organization and the ratio above 30%		5
Institutional Barriers			**5**			**3.25**
Problem solving capability	Percentage of financial problems can be solved	% of ability to solve financial problems * 5	5	with limited money sometimes they have difficult to pay the debt to feed supplier and fulfill the necessary	65%	3.25

Concept	Indicator	Criteria	Max. Score	Comments/Observations / Information	Percentation	Score
Farm Management Practices			**15**			**8**
Farm Capacity	% of farm used from capacity	Percentage (%) * 5	5	Many farmer members were not maximzing their farm capacity	48%	2.4
Number of Milking Cows	% of milking cows can produce	Percentage (%) * 5	5	many cows in the farm were not milking	47%	2.3
Milk Production Per-Cow Per-Day	% of dairy farmers' cows produce milk more than average	Percentage (%) * 5	5	Some farmers have milk production per cow in below the average	68%	3.4
Farmers Financial Constructions			**15**			**9**
Total Amount of Milk Sold	% of milk sold	Percentage (%) * 5	5	The milk of majority farmers always accepted by cooperative	98%	4.9
Net Income	% of dairy farmers' net income more than average	Percentage (%) * 5	5	Many farmers who have net income in below the average of	48%	2.4
Price of Milk (IDR/Liter)	% of dairy farmers say satisfied	Percentage (%) * 5	5	Many farmers were not satisfied with their income	43%	2.1
Institution Barries			**15**			**12**
Feed Availability	% of dairy farmers can handle feed availability	Percentage (%) * 5	5	availability of green grass in nearby area and concentrate in cooperative make them can handle barrier in feed availability	83%	4.1
Services Availability	% of dairy farmers can handle the service necessary	Percentage (%) * 5	5	Cooperative provide the necessary of farmer members	93%	4.6
Sources of Finance	% of dairy farmers can handle finance necessary	Percentage (%) * 5	5	Some of farmers have difficult to handle finance necessary	65%	3.3

		Max	Score	%
Production	Farm Management Practices	**15**	**8**	**54%**
	Farmers Financial Constructions	**15**	**9**	**63%**
	Institution Barries	**15**	**12**	**80%**
Internal Organization	Stakeholders	**5**	**5**	**100%**
	Financial Construction	**15**	**7.5**	**50%**
	Financial Management	**35**	**18**	**51%**
	Institutional Barriers	**5**	**3.25**	**65%**
	Total performance	**105**	**63.2**	**60%**

Appendix 3. Interview Checklist For Kud Giri Tani Cooperative

Organization :
Position in the organization :
Experience :

Sub-Research Questions	Interview Questions
1a. Who are the stakeholders involved in Bogor dairy value chain?	1. Stakeholders involved 2. The roles of the stakeholders
1b. What are the available financial constructions for KUD Giri Tani?	3. Sources of KUD Giri Tani finance 4. Profit of KUD Giri Tani 5. Revenue of KUD Giri Tani 6. Price of KUD Giri Tani products
1c. What are the current financial management practices in KUD Giri Tani?	7. Cash flow in KUD Giri Tani 8. Expenses in KUD Giri Tani within the operational 9. Method report 10. Support services provided 11. Milk payment scheme of KUD Giri Tani 12. Assets of KUD Giri Tani 13. Liabilities of KUD Giri Tani 14. Liquidity and solvency Ratio 15. Provided services 16. Products managed by KUD Giri Tani
1d. What are the institutional barriers to KUD Giri Tani's financial performance?	17. Institutional barriers of KUD Giri Tani related to Financial 18. Actions to solve the barriers

Appendix 4: Interview Checklist For Milk Processor

Organization :
Position in the organization :
Experience :

Sub-Research Questions	Interview Questions
1a. Who are the stakeholders involved in Bogor dairy value chain?	1. The roles in dairy value chain
1b. What are the available financial constructions for KUD Giri Tani?	2. Financial supports from milk processor company to KUD Giri Tani or the Farmer members 3. Payment scheme applied from milk processor to pay the milk from KUD Giri Tani 4. Expectation of company about the quality and quantity of milk
1d. What are the institutional barriers to KUD Giri Tani's financial performance?	5. Barriers related to financial within doing business with KUD Giri Tani 6. Action from milk processor to solve the barriers

Appendix 5: Interview Checklist For Livestock Government

Organization :
Position in the organization :
Experience :

Sub-Research Questions	Interview Questions
1a. Who are the stakeholders involved in Bogor dairy value chain?	1. Stakeholders involved in Bogor dairy value chain 2. The roles of the stakeholders
1b. What are the available financial constructions for KUD Giri Tani?	3. Financial supports given to KUD Giri Tani 4. Policy to support financial constructions of the dairy cooperative
1d. What are the institutional barriers to KUD Giri Tani's financial performance?	5. Financial barriers of KUD Giri Tani 6. Livestock government actions to solve the financial barriers of dairy cooperative
2b. What are the financial constructions of KUD Giri Tani's farmer members?	7. Financial supports given to KUD Giri Tani's farmer members 8. Policy to support financial constructions of the dairy farmers
2c. What are the institutional barriers affecting KUD Giri Tani's farmer members?	9. Institutional barriers of KUD Giri Tani's farmer members 10. Livestock government actions to solve the institutional barriers of dairy farmers

Appendix 6: Interview Checklist For Dairy Expert

Organization :
Position in the organization :
Experience :

Sub-Research Questions	Interview Questions
1a. Who are the stakeholders involved in Bogor dairy value chain?	1. Stakeholders involved in Bogor dairy value chain 2. The roles of the stakeholders
1b. What are the available financial constructions for KUD Giri Tani?	3. Current financial constructions in KUD Giri Tani 4. Strengths and the weaknesses of the current financial construction of KUD Giri Tani and the farmer members 5. What should be done by KUD Giri Tani related to financial constructions
1c. What are the current financial management practices in KUD Giri Tani?	6. Financial management practices in KUD Giri Tani 7. Strengths and the weaknesses of the current management practices of KUD Giri Tani 8. What should be done by KUD Giri Tani and related to management practices
1d. What are the institutional barriers to KUD Giri Tani's financial performance?	9. Institutional barriers in the KUD Giri Tani related to financial 10. Appropriate solution to solve the barriers
2b. What are the financial constructions of KUD Giri Tani's farmer members?	11. Current financial constructions of KUD Giri Tani's farmer members 12. Strengths and the weaknesses of the current financial construction of KUD Giri Tani's farmer members 13. What should be done by KUD Giri Tani's farmer members related to financial constructions
2c. What are the institutional barriers affecting KUD Giri Tani's farmer members?	14. Institutional barriers in the KUD Giri Tani's farmer members related to the production 15. Appropriate solution to solve the barriers

Appendix 7: Interview Checklist For Other Dairy Cooperative

Organization :
Position in the organization :
Experience :

Sub-Research Questions	Interview Questions
1c. What are the current financial management practices in KUD Giri Tani?	1. Products managed by the cooperative 2. Support services provided 3. Payment of milk in the cooperative
1d. What are the institutional barriers to KUD Giri Tani's financial performance?	4. Turnover of dairy farmer members

Appendix 8: Online Questionnaire

Respondent Profile

1. Gender of the respondent
   a. Male
   b. female

2. Age of the farmer? ☐

3. Educational Background?
   a. Never have been school
   b. Elementary school
   c. Junior high school
   d. Senior high school
   e. University

4. Marital status of the farmers?
   a. Married
   b. Single

5. Number of family dependents? ☐

2a. What are the farm management practices adopted by KUD Giri Tani's farmer members?

1. How wide the total of your farm is (m^2)? ☐
2. How many milking cows your farm capacity? ☐
3. How many milking cows do you have? ☐
4. How many liters the average of milk production per-cow per-day? ☐
5. What kind of fodders you give to your milking cows? You choose more than one.
   a. Green local grass ( )
   b. Clover ( )
   c. Maize ( )
   d. Soya ( )
   e. Barley/Hey ( )
   f. Concentrate ( )
   g. Others ( )
   If your answer is others, please indicate what other fodders you give ☐
6. How the quality of feed you give to your milking cows?
   a. Very low

b. Low
c. Good
d. Very good

7. Where do you get the knowledge about dairy farming from? You can choose the answer more than one.
   a. School/university ( )
   b. Training/short course ( )
   c. Family ( )
   d. Friends ( )
   e. Others ( )
   If others, please indicate where you get from? ☐

8. What is your knowledge level about dairy farming?
   a. Expert
   b. Medium
   c. Low

9. What knowledge you need to improve related to dairy farming? Please leveling from 1 to 4, which 1 means the least needed to improve and 4 means the most needed to improve.

Knowledge	**Ranks**				
Fodder management					
Financial management					
Milking production					
Herd management					
Animal health					

2b. What are the financial constructions of KUD Giri Tani's farmer members?

1. How many liters the total of your milk production per-day? ☐
2. How many liters you usually sell the milk to KUD Giri Tani? ☐
3. Do you sell all the amount of milk production or not?
   a. Yes
   b. No
   If no, please give the reason ☐
4. Do you sell the milk only to KUD Giri Tani?
   a. Yes
   b. No
   If no, please where else you sell the milk and how many liters? ☐
5. Is your milk production always accepted by KUD Giri Tani?

a. Yes
b. No
   If no, please indicate the frequencies of rejection. For example, once in a week, three times in a month, etc. [ ]

6. What do you do if your milk production rejected by KUD Giri Tani? [ ]

7. What grade usually you get when you sold the milk to KUD Giri Tani?
   a. Superior
   b. Standard
   c. Inferior

8. How much the average of net income from selling milk per-day? [ ]

9. How much the average of expenses for milk production per-day? [ ]

10. Do you satisfied with your income from milk production?
    a. Very not satisfied
    b. Not satisfied
    c. Satisfied
    d. Very satisfied

11. Where is your income come from?
    a. Only from dairy farming
    b. Mix from dairy farming and others.
       If your answer is mix, Please indicate others income come from? [ ]

12. Where do you get financial support for your herd from? You can choose the answer more than one.
    a. Bank ( )
    b. Cooperative ( )
    c. Social / Government funding ( )
    d. Micro finance ( )
    e. Others ( )
       If your answer is others, please indicate where others financial support come from? [ ]

13. Are you easy to get financial support?
    a. Very difficult
    b. Difficult
    c. Easy
    d. Very easy

2c. What are the institutional barriers affecting KUD Giri Tani's farmer members?

1. What barriers or challenges are you facing within your operational? Please indicate by giving grade from 1 to 5 which 5 means the most and 1 means the least, and give explanation.

Barriers / Challenges	**Ranks**					**Explaination**
Food						
Financial						
Herd						
Land						
Cows						

2. Are there any other barriers or challenges that you are facing related to milk productions that are not mentioned in this questionnaire? If any, please indicate

3. What did you do so far to solve the barriers or challenges for your dairy farm?

Appendix 9: Coding analysis for sub-structured interview

Sub-Questions \ Informants	Dairy Expert 1	Dairy Cooperative 1 (KUD Giri Tani)	Milk Processor	Dairy cooperative 2	Dairy Expert 1	Livestock Government
Background	1). Indonesian young dairy farmer assosiasion (Leader). 2). Has been started to farm since 2009. 3).Beeing a leader in assosiasion since 2018	Two years as treasurer in cooperative since new management, and also as a dairy farmer	Plant Manager of Cimory	Treasurer in dairy cooperative	Lecturer, More than 20 years research about dairy farming	Staff in sub-directorate dairy ruminants
1a. Who are the stakeholders involved in Bogor dairy value chain?	1) nearby dairy farmer, around Bogor and from lembang. 2). Ministry of Agriculture (need more clarify-> bantuan mesin and credit for the farmers), the government provide insurance for the farmers through cooperative.	1). KUD Giri Tani as collector with active members 120. 2). Big scale farmer from rich people. 3). (Berkah Rahayu Mandiri) BRM as feed supplier, sanbe farma as madicine supplier. 4) indodiary which gave training how to be ideal farm 5). Training from government also every year to cooperative, but since the last 2 years there no training. 6).keswan	1). cimory products are sold throughout Indonesia by Generak trade (wet market), modern trade (shops), food service (HORECA), direct sales (kaya yakult lady), online channel (rich grab food). export to vietnam, filiphine, china, malaysia	1). Distributing milk to Indolakto, Orang tua grup, Ponusa, and Baros. 2). 150 farmer members active. 3). Turnover farmer members relative stable	1). Indonesia seems open to stakeholders who want to establish new milk processing company.	
1b. What are the available financial constructions for KUD Giri Tani?	1, first from Mandiri Bank, then BNI, BRI, BCA available now. 2). Sell the cows to buy the new one. 3).every year the cooperative gain grant from the government, it can be money or kind of training. 3). The farmers applied traditional system in the farm, while in the last 2 some farmers realize to focus to increase the quality	1). Retail sales of 8000 / liter milk, feed, equipment, medicines, 180 shares. The difference between the milk price from Cimory and the payment to the farmer. 2). The profit margin from selling milk to Cimory is around 5%, that margin seems moderate for KUD GT. 3). Cimory pays once a week. 4). The average milk from Cimory is priced at Rp. 6000. 5). get a loan from Cimory 1th once with a fairly large interest of 10%. 6). erif farm Rp. 50 / kilo n from cimory Rp. 100 / kilo a month around 6 million with 4000 liters. 5). selling milk to cimory around 3000 liters / day sometimes shrinks to 1800.	1). Cimory gave a loan to KUD GT, the payment was cut into the bill. 2). Payment from Cimory to KUD GT every Thursday, payment term is 7 days ex. Send milk on Monday, the bill from KUD GT comes next Tuesday, Thursday meal is transferred to KUD GT. 3). Payment is determined when milk is received at the factory. 4). The price of milk from cimory tends to increase. up to 100rupiah / liter / grade.	1) we sell fresh milk, and we have support services, provide animal health services include medicine, concentrates. 2). Provide loan for farmer members. 3). They can supply at around 9 tonnes.	1). Current dairy cooperative has better financial construction, because the milk processor involve to help, and the milk production from the farmer member also better.	
1c. What are the current financial management practices in KUD Giri Tani?	1). Insurance for the cows. 2). KUD GT has traditional method in financial (by using a book), and they still use cash and carry system for the payment. 3). They have been too long applying traditional method in milk marketing and financial report. 4). KUD Giri Tani gas enough money for the operational. 5).	1). They manage the money to buy n sell milk, concentrate, credit, farm equipment, operational, paid the staff n supervisor of group. 2). Operational expenses per week consist of transport, around Rp. 2,710,000 for transport to Cimory n breeders around Ciawi. 3). cash out for operations, unexpected funds, ex.cooling failure (usually once a year), purchase of cooperative equipment, car repair, employee salaries, supervisory board, most of the electricity. 4). close to a balance of expenditure and income. 5). reporting is still using the ledger. 6). cash n carry payment method. 7). expenditures around 80 million / month. consist of employee salaries, management, honorarium of all staff around 55 million. 8). procurement of test kits	1). Cimory quality check tools such as brin recess rapid check, antibiotic test, TS measuring instrument, by cutting bills.	1). Price of fresh milk for farmer member 5,700/kg (kualitas dipertimbangkan). 2). Indolakto buy milk, IDR 6,500, while Baros, ponusa and Orang tua 7000/kg. 3). Sistem transfer for the payment to the farmer members.	1). Now the cooperative has more transparant in financial.	

Appendix 9: Coding analysis for sub-structured interview (continue)

Sub-Questions \ Informants	Dairy Expert 1	Dairy Cooperative 1 (KUD Giri Tani)	Milk Processor	Dairy cooperative 2	Dairy Expert 1	Livestock Government
1d. What are the institutional barriers to KUD Giri Tani's financial performance?	1). Difference standard between KUD GT and Cimory. 2). lack of transparances of bureaucracy from milk processors company, the farmers do not know the price gave from milk processor to cooperative, and the cooperative do not know how much the milk processor can give the price to the farmers. 3). the farmers quit from the cooperative because of problem in the payment, sometimes the payment is late, so they have a debt to get the fodder. furthermore, when the milk was broken, the farmer get the info when they get the payment, not when the milk sold to the milk processor, and then due to the small income the farmers change to another profession. also they want to try to another cooperative. 4) the demand of milk is hih but the supply limited 5). KUD GT does not has person who specialist to handle financial administration. 6).	1). Some dairy farmer members sell the milk to consumers directly, and there is also sell to cimory directly, so it makes the supply of KUD GT less of target. 2). Many farmers transition to another profession (sell the cows). Some farmers was not continue because there was no regeneration, because they cannot cover the debts to cooperative, so they decided to stop farming. 3). tradional method in managing the money. 4). difficult to find quota from cimory. 5). grade from the farmers ups and down. 6). current financial constraints are limited. approaching very limited. 7). sometimes the cage dries up. 8). small income and difficult to manage data. 9). they cannot borrow maney to the bank bacause of they are in black list. 10). continue the old management which is heavily indebted and has no purpose. 11). can not pay for feed because many debts from farmers have not been paid. 12). much money of cooperative outside because of farmer members do not pay credit ontime. 13). difficulty when trying to track financial expenses / records. 14). prone to corruption because they still use the traditional system.		1). Farmer member difficult to get additional animal feed to increase the quality during covid-19. 2) farmer members are not familiar with transfer payment system, they do not know to take money from ATM.		
2a. What are the farm management practices adopted by KUD Giri Tani's farmer members?	1). More concerned to quantity than quality (the farmers do not realize to calculate between quality n price). 2). The farmers only focus sell the milk without initiative to process the milk and manure they applied (traditional method). 3). If the farmers treat the cows well, they will get the productive period of cows up to 6 or 7 years. 4). the average farm size in Bogor is medium farm with about 50 cows.	1). the farmers still adopting traditional method, not fully adopt the method from training bacuse they are not comfortable. 2). The farmers are not really aware to hygiene. 3). Some dairy farmers farming as part of the jobs. 4).	1). 2019-2020, the supply of milk from KUD GT has begun to improve.			1). Training/sosialisation/seminar to improve the knowledge
2b. What are the financial constructions of KUD Giri Tani's farmer members?	1). The farmers gain money just from the milk payment. 2). The farmers are not realize that they can get money from processing for milk and manure	1). The farmers are paid flat by kud gt Rp.5000 / liter for any grade. 2). KUR so the price is low.				1). Provide kredit with low rate interest. 2). Program to breed the cows.

Appendix 9: Coding analysis for sub-structured interview (continue)

Sub-Questions \ Informants	Dairy Expert 1	Dairy Cooperative 1 (KUD Giri Tani)	Milk Processor	Dairy cooperative 2	Dairy Expert 1	Livestock Government
2c. What are the institutional barriers affecting KUD Giri Tani's farmer members?	1). Fluctuative feed price where milk price stable. 2). The farmers do not really know how to get milk with high quality. 3). The price of milk from milk processors company often changing, not decrease but changes (need more clarify). 4). The price from the cooperative changes so. 5). lack of transparances of bureaucracy from milk processors company, the farmers do not know the price gave from milk processor to cooperative, and the cooperative do not know how much the milk processor can give the price to the farmers. 6). the farmers are do not know how to calculate the BEP of the cows. 7). **there is no aplication or computerization system to help the farmers** 8). the cooperative only provide concentrate as support services. 9). many farmers who got trainings, but they are not get further actions. 10). as cooperative KUD GT has limited services to support the farmer members and need initiative to process the milk to become product. 11). feed price changes 2 to 3 in one day.	1). The farmer does not know how to dry the cage dry. When it is dry, usually the cost of raising livestock is not covered (-). 2). Farmers are short of money to buy feed. 3). Sometimes milk in Kud gt is accepted but in Cimory it is not. 4). Feed quality from cooperative is not really good, while dregs know from industry is difficult.	1). Farmers do not understand how to make financial reports such as cash flow, feasibility analysis, etc., so they cannot borrow money from the bank.		1). farmer members have lack knowledge, they cannot make financial report and analysis, and it makes the farmer cannot make a loan from the bank. 2). Farmers must be aware to provide financial report and analysisi.	
Suggestions	1). The cooperative must be know the farmers, the ability of the farmers (knowledge, facility, etc.) 2). Processing the by the farmer make the income to become higher while they have a risk for the market. 3). The it will be very nice if the cooperative process the milk by them. 4). KUD GT have to applied the financial report by using computer.	1). Has plan to applied application and make milk products in the future.	1). The KUD GT test results should be the same as the KUD GT test results in Cimory. 2). The cooperative must be able to devise a scheme that can trigger peters to produce good quality milk.			
others	1). KUD GT has good quite big and good as cooperative. 2). KUD GT compete in selling milk to manufacture, not selling milk product to consuments. 3). Need new circle to solve fluctuative feed price. 4). Need collaboration between farmers and cooperative to increase the price through selling in milk product 5). currently, the development increase just for each of them, not in collaboration. 6). the farmers to become faster to increase after they quit from the cooperative. 7). the farmers have restrictions when if they are members of the cooperative. 8). Asosia young df functions to exchange information, such as how to make feed, milk products, etc. and support (to solve problems in breeders, help each other n sharing information). Provide direct on-farm training. Provide information according to farmer shortages.	1). computer just to save file and send an email. The farmers just get Rp.5000 / liter for any grade milk as long as they the milk accepted. 2). Different standard check QC between KUD and Cimory. 3). KUD GT gains training from the Ministry of Agriculture but not in the last 2 years. 4). the farmers gain training from livestock government. 5). they are not manage active and active members. 6). one order of 1000 liters of milk each way, or an average of 1800 liters / day. 7). information system using WAG. 8). KUD GT cash is choked up because the milk farmers produce is getting less. 8). kud gt has a debt to feed. 9). and they have debts of 120 billion or about 7.5 million euros (blacklist case). 10). they have a debt to cimory and are paid once a month. 11). An example of traditional breeders is the treatment of diarrhea using bamboo leaves. do not use drugs.	1). Cimory has a factory in Sentul, Semarang, Pasuruan. 2). 3 types of Cimory milk, namely Yogurt Drink, UHT Yogurt Drink, ESL (Extended Shelf Life) Milk, UHT Milk. 3). Quality parameters, TS 11.5 to 12. TPC <1 million. 4). KUD GT has been sent to cimory since its inception in 2007.			1). Increase human resource, productivity, family farming, and introduce farming to the school. 2). use of vacant land for agriculture

Appendix 9: Coding analysis for sub-structured interview (continue)

Sub-Questions \ Informants	Dairy Expert 1	Dairy Cooperative 1 (KUD Giri Tani)	Milk Processor	Dairy cooperative 2	Dairy Expert 1	Livestock Government
fasilities	1). KUD GT has enough facilities such as cooling unit, truck, with minimum standard	1). money credit limit to coup gt 5 million. 2). The cooperative wants to provide grass land but with capital constraints. 3). Staff consist of milk, warehouse feed, drivers, and administration. 4). Kud gt's assets are building, truck 2 panther pickup 1, land 4400m2, main cow 9 calves 4. 5). they want to have more cows to increase supply to cimory. 6). KUD GT building assets, L300 n 2 truck vehicles. panter pick up 1, land around 400m2, dairy cows 9 calves 8. 7). the maximum capacity of the tank is 5500 liters.				
others 2	1). Mandatory savings of 100k / month. There are also special savings.	1). The average price for a cow is 2 million. 2). Kud gt has a debt now of around 650 million, from about 750 million.				
Role,	1). bank help in business analysis.					
stakeholders	1). UMKM	1). Cimory sells mostly whole milk				
grade	based on bacteria must be under 1 million, fat 2,8%, protein 3,6 or 3,2, total solid 11%.	1). Giri tani has 4 acceptance standards such as alcohol test, .. 2). Grade 5 and above are rejected, grade 4 is still accepted but the price is reduced, grade 1 n 2 the price of bacteria is below 1 million.				
		1). daftar jadi anggota kud yaitu punya sapi, ada di wilayah kud dan pakai identitas.				
price	6300 to 6500 / liter to frisian flag, the average 5000 to 5500 in the cooperative based on the grade.	1). The difference in the price of 1 grade is quite significant.				
Advantages		1). If you become a member, you get cheaper feed prices, if you are lucky you can get the rest of your business, you can borrow money from Kud in the savings and loan program.				
Qualitas		1). Quality checks at KUD GT are specific gravity (120, 121, 122, 123), whether they are broken or not. 2). Tofu dregs make the quality and quantity of milk better. 3). The total solid must be 11.6. Total plate count <1m.				

Appendix 10: Data used for analysis farm management practices

No of respondents	Gender of the respondents	Age of the respondents	Educational Background	Farm size area (m2)	Cows capacity in the farm	Number of cows in the farm	Number of Productive milking cows in the farm	Milk Production per-cow per-day (litre)	Milk production per-farm per-day (litre)
1	Male	49	Senior High School	10	10	3	2	12	24
2	Male	44	Senior High School	50	14	1	2	15	25
3	Male	49	Junior High School	100	18	2	2	10	20
4	Male	41	Elementary School	100	14	4	1	15	15
5	Male	43	Elementary School	100	5	3	1	15	15
6	Male	52	Junior High School	100	15	9	3	10	30
7	Male	57	Junior High School	75	15	4	1	20	20
8	Male	55	Senior High School	250	30	16	5	10	50
9	Male	54	Elementary School	50	10	5	5	9	45
10	Male	43	Senior High School	100	24	10	6	18	100
11	Male	53	Senior High School	500	30	20	7	15	100
12	Male	38	Senior High School	100	20	11	10	8	80
13	Male	25	Senior High School	12	2	2	2	17	34
14	Male	43	Junior High School	120	12	8	2	23	44
15	Male	42	Elementary School	100	18	11	4	14	50
16	Male	40	Junior High School	70	15	12	7	10	65
17	Female	37	Junior High School	100	18	5	4	12	40
18	Male	55	No School	40	7	6	3	8	24
19	Female	48	Elementary School	200	25	4	3	11	28
20	Female	54	Elementary School	50	10	2	1	15	15
21	Female	53	Junior High School	100	10	2	0	0	20
22	Female	50	No School	50	10	8	4	16	60
23	Female	53	Elementary School	100	10	2	1	15	15
24	Male	52	Elementary School	100	20	4	2	15	30
25	Male	40	Elementary School	30	8	1	1	15	15
26	Male	52	Senior High School	100	8	3	1	14	14
27	Male	29	Senior High School	50	10	3	2	15	22
28	Male	68	No School	70	10	4	2	25	50
29	Male	70	No School	50	10	7	2	15	30
30	Male	25	Senior High School	12	3	2	2	17	34
31	Male	60	Senior High School	60	8	10	3	12	30
32	Male	55	Elementary School	24	5	5	2	16	21
33	Male	36	Senior High School	70	10	4	2	15	20
34	Male	53	Elementary School	28	6	4	1	17	17
35	Female	33	Elementary School	15	5	5	3	15	45
36	Male	26	Junior High School	600	25	15	6	15	80
37	Male	28	Senior High School	10	8	4	4	10	40
38	Male	34	Senior High School	100	12	12	6	15	80
39	Male	35	Elementary School	30	8	2	2	15	30
40	Male	35	No School	56	5	5	2	15	30

Appendix 10: Data used for analysis farm management practices (continue)

No of respondents	Providing green grass for the cows	Providing Concentrates for the cows	Providing tofu dregs for the cows	Providing straw for the cows	Providing soybean for the cows	Providing corn or corn silage	Providing wheat for the cows	Providing other fodders for the cows	The Cows can be Producing milk more than the average in Indonesia (13 litres) 1=yes, 0=No
1	Every day	Every day	Often	Never	Seldom	Never	Never	Tofu dregs	0
2	Every day	Every day	Never	Seldom	Never	Never	Never	Concentrat	1
3	Every day	Every day	Never	Seldom	Seldom	Seldom	Seldom	-	0
4	Every day	Every day	Never	Seldom	Never	Never	Never	-	1
5	Every day	Every day	Never	Seldom	Seldom	Never	Never	-	1
6	Every day	Every day	Never	Seldom	Seldom	Seldom	Never	Bran	0
7	Every day	Every day	Often	Never	Seldom	Seldom	Never	Tofu dregs	1
8	Every day	Every day	Often	Seldom	Never	Never	Seldom	Tofu dregs	0
9	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	0
10	Every day	Every day	Often	Seldom	Seldom	Seldom	Every day	Tofu dregs	1
11	Every day	Every day	Often	Never	Seldom	Seldom	Never	Tofu dregs	1
12	Every day	Every day	Often	Never	Never	Seldom	Never	Tofu dregs	0
13	Every day	Every day	Often	Seldom	Seldom	Seldom	Seldom	Tofu dregs	1
14	Every day	Every day	Often	Never	Never	Seldom	Never	Tofu dregs	1
15	Every day	Every day	Often	Seldom	Never	Never	Never	Tofu dregs	1
16	Every day	Often	Often	Never	Never	Never	Never	Tofu dregs	0
17	Every day	Every day	Often	Seldom	Never	Never	Never	Tofu dregs	0
18	Every day	Often	Never	Never	Never	Never	Never	-	0
19	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	0
20	Every day	Every day	Often	Seldom	Never	Never	Never	Tofu dregs	1
21	Every day	Often	Never	Seldom	Never	Never	Never	Tofu dregs	0
22	Every day	Every day	Never	Never	Never	Never	Never	-	1
23	Often	Every day	Often	Never	Never	Never	Never	Tofu dregs	1
24	Every day	Every day	Never	Seldom	Never	Never	Never	-	1
25	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	1
26	Every day	Every day	Often	Never	Never	Seldom	Never	Tofu dregs	1
27	Every day	Every day	Never	Seldom	Seldom	Seldom	Seldom	Tubers	1
28	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	1
29	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	1
30	Every day	Every day	Often	Never	Never	Seldom	Never	Tofu dregs	1
31	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	0
32	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	1
33	Every day	Every day	Often	Never	Seldom	Seldom	Never	Tofu dregs	1
34	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	1
35	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	1
36	Every day	Every day	Often	Seldom	Never	Never	Never	Tofu dregs	1
37	Every day	Every day	Often	Seldom	Seldom	Seldom	Seldom	Tofu dregs	0
38	Every day	Seldom	Often	Never	Never	Never	Never	Tofu dregs	1
39	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	1
40	Every day	Every day	Often	Never	Never	Never	Never	Tofu dregs	1

Appendix 11: Data used for analysis financial construction of farmer members

No of respondents	Do you sell all your milk production?	Net income per-day	Do you sell all your milk Only to KUD Giri Tani?	If not, why?	Is your milk production always accepted by KUD Giri Tani?	Usually what grade your milk is?	The average income from selling milk to KUD Giri Tani Per-day (IDR)	The average expenses for milk production per-day (IDR)	Net income per-day
1	1	15000	Yes		No	Grade 2	60000	45000	15000
2	1	82143	Yes		Yes	Grade 2	107143	25000	82143
3	1	0	Yes		Yes	Grade 2	75000	75000	0
4	1	45000	Yes		Yes	Grade 2	75000	30000	45000
5	1	45000	Yes		Yes	Grade 2	75000	30000	45000
6	1	85714	Yes		Yes	Grade 2	100000	14286	85714
7	1	75000	Yes		Yes	Grade 2	125000	50000	75000
8	1	55952	Yes		Yes	Grade 1	66667	10714	55952
9	1	75000	Yes		Yes	Grade 2	225000	150000	75000
10	1	164286	Yes		Yes	Grade 2	200000	35714	164286
11	1	130000	Yes		Yes	Grade 2	500000	370000	130000
12	1	82857	Yes		Yes	Grade 2	160000	77143	82857
13	1	71429	No	Sells directly to consumers	Yes	Grade 1	83333	11905	71429
14	1	80000	No	Sells directly to consumers	Yes	Grade 2	110000	30000	80000
15	1	71429	Yes		Yes	Grade 1	285714	214286	71429
16	1	160000	Yes		Yes	Grade 2	325000	165000	160000
17	1	71429	Yes		Yes	Grade 1	214286	142857	71429
18	1	51429	Yes		Yes	Grade 2	120000	68571	51429
19	1	68571	Yes		Yes	Grade 1	140000	71429	68571
20	1	39286	Yes		Yes	Grade 2	75000	35714	39286
21	0	72143	Yes		Yes	Grade 2	100000	27857	72143
22	1	142857	Yes		No	Grade 1	285714	142857	142857
23	1	45536	Yes		Yes	Grade 2	75000	29464	45536
24	1	114286	Yes		Yes	Grade 1	142857	28571	114286
25	1	51786	No	Processed into yogurt	Yes	Grade 2	75000	23214	51786
26	1	21429	Yes		Yes	Grade 2	42857	21429	21429
27	1	35714	Yes		Yes	Grade 2	107143	71429	35714
28	1	161607	Yes		No	Grade 2	250000	88393	161607
29	1	121429	Yes		Yes	Grade 1	178571	57143	121429
30	1	129286	No	Sells directly to consumers	Yes	Grade 2	170000	40714	129286
31	1	71429	Yes		Yes	Grade 2	214286	142857	71429
32	1	79071	Yes		Yes	Grade 2	105000	25929	79071
33	1	37143	Yes		Yes	Grade 2	71429	34286	37143
34	1	15429	Yes		Yes	Grade 2	85000	69571	15429
35	1	82143	Yes		Yes	Grade 1	225000	142857	82143
36	1	250000	Yes		No	Grade 1	400000	150000	250000
37	1	179	No	Sells directly to consumers	Yes	Grade 2	75000	74821	179
38	1	142857	Yes		Yes	Grade 2	400000	257143	142857
39	1	57143	Yes		Yes	Grade 2	142857	85714	57143
40	1	82143	Yes		Yes	Grade 2	210714	128571	82143

Appendix 11: Data used for analysis financial construction of farmer members (continue)

No of respondents	Do you satisfied with your income from the selling milk?	Where does your income come from?	If your answer is mix, please indicate where other incomes come from?	Where you get support funding for your farm?
1	Unsatisfied	Mix, from selling of milk and others	Freelance	Bank; Government
2	Unsatisfied	Mix, from selling of milk and others	Selling yogurt and internet credit	Loan from cooperative
3	Unsatisfied	Mix, from selling of milk and others	Agriculture development	Government (proposal)
4	Unsatisfied	Mix, from selling of milk and others		-
5	Unsatisfied	Mix, from selling of milk and others	Entrepreneur	-
6	Satisfied	Only from selling milk		Loan from cooperative
7	Unsatisfied	Mix, from selling of milk and others	Security villa	Bank
8	Unsatisfied	Only from selling milk		Bank
9	Unsatisfied	Mix, from selling of milk and others	selling baby cows	Bank
10	Satisfied	Only from selling milk		Bank; Loan from cooperative
11	Satisfied	Only from selling milk		Bank
12	Satisfied	Mix, from selling of milk and others	Treasurer in dairy cooperative	Bank
13	Satisfied	Only from selling milk		Bank
14	Unsatisfied	Only from selling milk		Friend
15	Unsatisfied	Only from selling milk		Never
16	Satisfied	Only from selling milk		Bank; Loan from the cooperative
17	Satisfied	Only from selling milk		Never
18	Unsatisfied	Only from selling milk		Never
19	Unsatisfied	Only from selling milk		Never
20	Satisfied	Only from selling milk		Bank; Government
21	Satisfied	Mix, from selling of milk and others	rent a car	Bank
22	Satisfied	Only from selling milk		Never
23	Satisfied	Mix, from selling of milk and others	earned money from children	Grant from the bank
24	Satisfied	Only from selling milk		Never
25	Unsatisfied	Mix, from selling of milk and others	Selling yogurt	Never
26	Unsatisfied	Only from selling milk		Never
27	Unsatisfied	Mix, from selling of milk and others	Hotel staff	Government (proposal)
28	Satisfied	Only from selling milk		Loan from cooperative
29	Unsatisfied	Only from selling milk		Never
30	Unsatisfied	Mix, from selling of milk and others	Selling milk directly to consumers	Bank
31	Satisfied	Only from selling milk		Bank; Loan from cooperative
32	Unsatisfied	Only from selling milk		Never
33	Satisfied	Only from selling milk		Never
34	Unsatisfied	Only from selling milk		Bank; Loan from cooperative
35	Unsatisfied	Mix, from selling of milk and others	Selling animal feed	Bank; Loan from cooperative
36	Unsatisfied	Mix, from selling of milk and others	Cow care services	Never
37	Unsatisfied	Mix, from selling of milk and others	Selling milk directly to consumers	Never
38	Satisfied	Only from selling milk		Never
39	Satisfied	Mix, from selling of milk and others	Driver	Never
40	Unsatisfied	Only from selling milk		Never

Appendix 12: Data used for analysis institutional barriers of the farmer members

No of respondents	Where you get knowledge about the dairy farming?	What level of knowledge do you have about dairy farming?	Does your knowledge need to be improved in terms of animal feed management?	Does your knowledge need to be improved in terms of financial management?	Does your knowledge need to be improved in terms of milk production?	Does your knowledge need to be improved in terms of farm management?	Does your knowledge need to be improved in terms of animal health?	Does your knowledge need to be improved in terms of artificial incemination?
1	Family	Middle	Very need	Very need	Need	Very need	Very need	Very need
2	Friends	Low	Need	Need	Need	Need	Need	Need
3	Family	Low	Very need	Very need	Very need	Very need	Very need	Very need
4	Friends	Middle	Very need	No need	Very need	Very need	Very need	Very need
5	Friends	Middle	Very need	Very need	Very need	Very need	Very need	Very need
6	Friends	Middle	Very need	Very need	Very need	Very need	Very need	Very need
7	Family	Expert	Very need	Very need	Very need	Very need	Very need	Very need
8	Training	Middle	Very need	Very need	Very need	Very need	Very need	Very need
9	Friends	Middle	Very need	Very need	Very need	Very need	Very need	Very need
10	Training	Middle	Need	Need	Need	Very need	Need	Need
11	Friends	Middle	Need	Need	Need	Need	Need	Need
12	Training	Middle	Very need	Very need	Very need	Very need	Very need	Very need
13	Friends	Middle	Very need	Need	Very need	Very need	Very need	Very need
14	Friends	Middle	Very need	Very need	Need	Very need	Very need	Very need
15	Family	Middle	Need	Need	Need	Very need	Very need	Very need
16	Family	Middle	Very need	Very need	Very need	Very need	Very need	Very need
17	Training	Middle	Need	Very need	Very need	Need	Need	Very need
18	Family	Middle	Very need	No need	No need	No need	Very need	Very need
19	Family	Middle	Need	Need	Very need	Very need	Need	Very need
20	Training	Middle	Very need	Very need	Need	Very need	Very need	Need
21	Family	Expert	Very need	Very need	Very need	Very need	Very need	Very need
22	Autodidact	Middle	Need	Need	Very need	Need	Need	Very need
23	Friends	Middle	Very need	Very need	Very need	Very need	Very need	Very need
24	Training	Middle	Very need	Need	Need	Need	Need	Very need
25	Family	Middle	Very need	Very need	Very need	Very need	Very need	Very need
26	Training	Middle	Need	Need	Need	Need	Very need	Very need
27	Training	Middle	Very need	Very need	Very need	Very need	Very need	Very need
28	Friends	Middle	Very need	Very need	Very need	Very need	Very need	Very need
29	Training	Middle	Very need	Need	Very need	Need	Need	Very need
30	Training	Middle	Very need	Very need	Very need	Very need	Very need	Very need
31	Training	Middle	Need	Need	Very need	Very need	Very need	Very need
32	Friends	Middle	Very need	Very need	Very need	Very need	Very need	Very need
33	Training	Middle	Very need	Very need	Very need	Need	Very need	Very need
34	Training	Middle	Very need	Very need	Very need	Very need	Very need	Very need
35	Training	Middle	Very need	Very need	Very need	Very need	Very need	Very need
36	Family	Middle	Very need	Very need	Very need	Need	Very need	Need
37	Family	Middle	Very need	Very need	Very need	Very need	Very need	Very need
38	Friends	Middle	Very need	Need	Very need	Need	Very need	Very need
39	Friends	Middle	Need	Very need	Need	Very need	Need	Need
40	Family	Middle	Very need	Very need	Very need	Very need	Very need	Very need

Appendix 12: Data used for analysis institutional barriers of the farmer members (continue)

No of respondents	Is it easy for you to get support funding?	How do you handle the need of animal feed?	How do you handle the need of financial?	How do you handle the needs of the farm?	How do you handle the need of land?	How do you handle the need of animal health?
1	Very difficult	Constrained	Constrained	Can be handled	Constrained	Can be handled
2	Difficult	Can be handled	Constrained	Can be handled	Can be handled	Easy to handle
3	Very difficult	Constrained	Very constrained	Constrained	Very constrained	Can be handled
4	Very easy	Very easy to handle	Constrained	Easy to handle	East to handle	Very easy to handle
5	Very easy	Very easy to handle	Constrained	Easy to handle	East to handle	Very easy to handle
6	Very difficult	Easy to handle	Can be handled	Easy to handle	East to handle	Easy to handle
7	Easy	Easy to handle	easy to handle	Very easy to handle	Very easy to handle	Easy to handle
8	Easy	Can be handled	Can be handled	Can be handled	Can be handled	Can be handled
9	Easy	Easy to handle	Very easy to handle	Very easy to handle	Very easy to handle	Very easy to handle
10	Easy	Easy to handle	Can be handled	Easy to handle	East to handle	Easy to handle
11	Easy	Can be handled	Can be handled	Can be handled	Can be handled	Can be handled
12	Easy	Easy to handle	easy to handle	Easy to handle	East to handle	Easy to handle
13	Difficult	Constrained	Constrained	Very easy to handle	Constrained	Can be handled
14	Very easy	Very easy to handle	Can be handled	Easy to handle	East to handle	Very easy to handle
15	Easy	Can be handled	Constrained	Constrained	Can be handled	Can be handled
16	Very easy	Can be handled	easy to handle	Easy to handle	East to handle	Very easy to handle
17	Difficult	Easy to handle	easy to handle	Easy to handle	Can be handled	Can be handled
18	Very difficult	Very easy to handle	Very constrained	Can be handled	Can be handled	Can be handled
19	Difficult	Easy to handle	Constrained	Can be handled	Constrained	Can be handled
20	Difficult	Easy to handle	Very easy to handle	Can be handled	Can be handled	Very easy to handle
21	Easy	Very easy to handle	easy to handle	Very easy to handle	Very easy to handle	Very easy to handle
22	Difficult	Can be handled	Can be handled	Easy to handle	Constrained	Easy to handle
23	Very easy	Very constrained	Constrained	Very easy to handle	Constrained	Constrained
24	Easy	Easy to handle	Can be handled	Easy to handle	East to handle	Easy to handle
25	Very easy	Easy to handle	Can be handled	Very easy to handle	Very easy to handle	Very constrained
26	Easy	Can be handled	Can be handled	Easy to handle	Can be handled	Can be handled
27	Difficult	Constrained	Constrained	Can be handled	Can be handled	Can be handled
28	Very easy	Can be handled	Very easy to handle	Very easy to handle	Very easy to handle	Very easy to handle
29	Difficult	Easy to handle	Can be handled	Can be handled	Can be handled	Easy to handle
30	Easy	Very easy to handle	Very easy to handle	Can be handled	Can be handled	Can be handled
31	Difficult	Easy to handle	easy to handle	Easy to handle	Constrained	Easy to handle
32	Very easy	Easy to handle	Can be handled	Easy to handle	East to handle	Constrained
33	Easy	Can be handled	Very constrained	Easy to handle	Very constrained	Can be handled
34	Difficult	Constrained	Constrained	Very easy to handle	Constrained	Very easy to handle
35	Easy	Easy to handle	easy to handle	Can be handled	Constrained	Easy to handle
36	Difficult	Can be handled	easy to handle	Constrained	Constrained	Easy to handle
37	Very easy	Very easy to handle	Very easy to handle	Constrained	Very easy to handle	Very easy to handle
38	Easy	Can be handled	Can be handled	Can be handled	Constrained	Can be handled
39	Easy	Constrained	Can be handled	Can be handled	Constrained	Can be handled
40	Very easy	Very easy to handle	Very constrained	Very easy to handle	Constrained	Very easy to handle