

RESEARCH ARTICLE

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Succession Process for Sustainability of Family Dairy Farming

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ABSTRACT

Succession is crucial in the small-scale dairy cattle business, predominantly managed by family members. The process of preparing a successor in a dairy farming family is a challenging endeavor. This study aims to explore the succession process through family business participation, the factors influencing a successor's participation, and succession patterns in family dairy farming. This study employed a quantitative method for multiple regression model and a qualitative method to compile the opinion of the succession patterns. The results revealed the low successor participation index for family business due to restricted time. Six variables significantly influenced successors' participation in family dairy farms: family size, gender, employment status, number of dairy cattle, age, and farm size. The study's findings generated two succession patterns: farm transfer and farm handover. The succession patterns preserved the existence of family dairy farms in Pangalengan District, West Java, Indonesia. Therefore, this study suggests to encourage the participation of potential successors to ensure the sustainability of family dairy farming.

Keywords: Children; Family dairy farming; Succession patterns; Successor participation

INTRODUCTION

Smallholder farmers have dominated the dairy cattle business and become the main livelihood for most dairy farmers in Indonesia (Asmara, Purnamadewi, & Lubis, 2017; Moran & Morey, 2015). This business supplies approximately 21% of national milk demand (Daryanto et al., 2021; Sekretariat Jenderal-Kementerian Pertanian, 2022) and has been passed down from generation to generation (Asmara et al., 2017; Firman, Budimulati, Paturochman, & Munandar, 2018). This condition is similar to that of Bangladesh, where smallholder producers dominate the dairy cattle business (Yasmin & Ikemoto, 2015). Smallholder dairy farmers are characterized by having one to five cattle, limited land and access to banking, semi-permanent cages, family management and labor, poverty and food insecurity, various economic activities, and insufficient money and assets to maintain dairy cattle (Al Sidawi, Urushadze, & Ploeger, 2021; Amin & Palash, 2020; Asmara et al., 2017; Daud, Putro, & Basri, 2015; Elizabeth & Emmanuel, 2018; Firman et al., 2018; Rapsomanikis, 2015).

In contrast, farmers in developed countries possess large numbers of dairy cattle, strong finances, large capital and assets, and large land area (Firman et al., 2019). However, small-scale farmers could maintain the family's dairy cattle business from generation to generation (Firman et al., 2019; Food and Agriculture Organization [FAO], 2018).

Smallholder farmers raise livestock with simple maintenance, involving the entire family, including their children, as an inseparable part of their lives (Rapsomanikis, 2015). Each family member's involvement is essential in reducing production costs. Each family member, including children, has their respective business duties (Muatip & Sugiarto, 2016). Children could be considered successors in farming families (Rodriguez-Lizano, Montero-Vega, & Sibelet, 2020). As a farming family member, children play a role as labor—an essential input factor (Ofuoku, Ovharhe, & Agbamu, 2020; Sumberg & Sabates-Wheeler, 2020). Therefore, children or the younger generation are crucial in sustaining farming families.

The dairy farming business has persisted since the 18th century (Firman et al., 2018) and continues to be a source of income for farmers, especially in Pangalengan District. It indicates that the dairy cattle business has been passed down through generations (Asmara et al., 2017; Sulistyati, Hermawan, & Firman, 2019), proving that farmers could manage family members, dairy cattle, and the environment supporting their business (Mekonen, 2017; Salman, S Aisyah, Siregar, & Baba, 2020). In this region, small-scale businesses run by families often control the dairy cattle market (Firman et al., 2019). It is clear that dairy farming is a family livelihood when it can be passed down from one generation to another (Mekonen, 2017).

Succession planning is a crucial factor in ensuring the sustainability of a family dairy cattle operation. Succession transfers business management to the next generation to keep and manage the family business (Melinda & Putra, 2019). However, transitioning a family farm into the next generation is lengthy and intricate (Bertolozzi-Caredio, Bardaji, Coopmans, Soriano, & Garrido, 2020; Borec, Bohak, Turk, & Prišenk, 2013). Many rural agribusiness owners worry about the future of their family farms because of the importance of the succession process (Lange, Piorr, Siebert, & Zasada, 2013). Blood and emotional ties affect the family business succession (Kristanti & Nuradhi, 2021). The succession process is reflected in the successor's involvement or youth participation in the family business (Kristanti & Nuradhi, 2021; Saan, Enu-Kwesi, & Nyewie, 2018). Youth participation refers to active engagement representing their presence in the business, competence in the work, and decisions that affect their lives (Geza et al., 2021). Daily working hours serve as a proper indicator of how involved a successor is in agriculture, especially children (Food and Agriculture Organization [FAO], 2021).

The succession process highly depends on the decision of the younger generation whether or not to continue the family dairy farming business (Firman et al., 2019). Planafarran and Gallizo (2021) and Shahzad, Abubakr, and Fischer (2021) discovered that in Pakistan, characteristics of farmers (e.g., age, gender, and education), characteristics of the farm (e.g., size and specialization in horticulture) and agricultural income were the factors influencing the successors' decision to continue family farms. Meanwhile, Hennessy (2002) asserted that income and dairy productivity are critical factors in attracting successors to work

and maintain a family dairy farming business. Stiglbauer and Weiss (2000) determined that the probability of farm succession is significantly influenced by factors such as farm size, previous farm growth, and on-farm diversification. Corsi (2004) examined the succession decision in Piedmont, Italy, and revealed that children's preferences in farming—including professional pride, habit, and social tradition—might be a determining factor. Other reasons are emotional bonds to parents, family, and the farm atmosphere, which play an essential role in their lives and influence successors on the farm (Blanc & Perrier-Cornet, 1993).

Family farmers become the most significant source of employment worldwide, contributing to rural development and food security (Food and Agriculture Organization [FAO], 2018; Mbah, Ezeano, & Odiaka, 2016). Family members could run family farms, a particular enterprise category (Garner & Campos, 2014). Therefore, a farming family transfers the farmhouse or the occupation of the necessary capital to establish a family business from parents to a successor or multiple successors (Lobley, Baker, & Whitehead, 2010). In developed countries, the inheritance of agricultural business from parents to a successor or multiple successors is known as farm takeover and farm transfer or handover (Kerbler, 2012).

The succession process could be complex and emotionally charged; hence, it is essential to approach it with sensitivity and understanding. Successor candidates must pass the process to continue family dairy farming. The process differs between regions, including in the study location. Research on succession in developed countries, where large-scale farmers predominate, will provide different results than this study since small-scale dairy farmers dominate, influencing succession participation and patterns in family dairy farming. It also has implications for farm continuity, family relationships, and the overall sustainability of the family farming operation. Therefore, this study aims to explore the successors' participation, the factors influencing the successors' participation, and succession patterns in family dairy farming. The study results could be a benchmark for future research because this topic has not been widely studied in Indonesia.

RESEARCH METHOD

Study Area, Sampling, and Data Collection

This study was conducted in Pangalengan District, West Java, Indonesia. In the 1880s, the colonial government introduced dairy cattle to this area for the first time (Firman et al., 2018). It indicates the sustainability of dairy farming through a succession process from generation to generation, and the study area has become a reference for the development of dairy cattle in West Java, Indonesia. This research was carried out from May 1st to September 30th, 2021, using both quantitative and qualitative methods. The quantitative method analyzed data and information from respondents with a statistical approach, especially on factors influencing successors' participation. Conversely, the qualitative method was applied through in-depth interviews with informants using a voice recorder to obtain detailed information to map succession patterns at the research location.

This study employed two research approaches: observation and survey. An observation was made to gather information regarding the sustainability of family dairy farming through their children as potential successors to the family business. Several informants were interviewed through deeper discussions, encompassing the head of farmer groups (eight people from eight groups) and community leaders (two cooperative administrators and one extension officer). Using a questionnaire, the survey was intended to collect information from farmers and their children who would be the successors (sons and daughters aged 15 to 25 years and still living in the same house with their parents) (Mann, 2007). Initially, the questionnaire's validity and reliability were tested using Cronbach, with a significance value greater than 0.7 (Surucu & Maslakci, 2020). Based on the BPS-Statistics Indonesia (2021), non-productive age is less than 15 years and more than 64 years. Hence, individuals between the ages of 15 and 25 were considered to be in the productive age. Having the ability to think critically and express opinions demonstrates that children's age belongs to the youth category. Studies have revealed that in-depth interviews could yield deeper information (Riley, 2014). In addition, it enhances the internal validity of the method (Gehrels, 2013).

Pangalengan District possessed five Milk Collecting Points (MCPs): Citere, Los Cimaung, Mekar Mulya, Warnasari, and Cipanas, with 808 dairy farmers. However, out of the population, only 133 met the criteria ($n = \text{population}$). Following Krejcie and Morgan's table, 100 out of 133 farmers were selected as the respondents, distributed in five MCPs according to proportional sampling, representing farmers with children as successors. Hence, the research involved farmers and their children, resulting in 200 respondents being interviewed: 100 farmers and 100 farmers' children. The questionnaire was arranged in a structured manner to gather information related to the study.

Analysis Method

The data were analyzed quantitatively using descriptive statistics, describing data without making a general decision (Jahroh, Atmakusuma, Harmini, & Fadillah, 2020). Three components were analyzed using multiple regression: participation of successors in family dairy farming, percentage of successor participation index, and factors influencing successors' participation.

Participation of Successors in Family Dairy Farming

The participation of successors in family dairy farming was studied under the categories of cleaning stalls and cattle, feeding, milking, distributing fresh milk to MCPs, and foraging (Yasmin & Ikemoto, 2015). All of these activities were performed in the morning and afternoon. Successors' participation was calculated in working hours with the following formula (Yasmin & Ikemoto, 2015).

$$AP = H_m + H_a \quad (1)$$

$$aAP = AP/2 \quad (2)$$

AP denotes actual participation (hour/day), aAP signifies the average of actual participation (hours/day), H_m indicates morning activities (hours/day), and H_a refers to afternoon activities (hours/day).

Percentage of Successor Participation Index

The percentage of successor participation index (PSPI) in family dairy farming was examined with the following formula (Yasmin & Ikemoto, 2015).

$$\text{Percentage of Successor Participation Index (PSPI)} = aAP/H_t \times 100 \quad (3)$$

H_t implies the total activity in family dairy farming (hours/day). Generally, the total activity in family dairy farming is eight hours daily (Dimov, Marinov, & Penev, 2020; Jahroh et al., 2020). The participation index was categorized into three levels: low (0-50%), moderate (50-70%), and high (70-100%) (Yasmin & Ikemoto, 2015).

Factors Influencing Successors' Participation in Family Dairy Farming

A multiple linear regression model was employed to determine the factors influencing successors' participation in family dairy farming (Shahzad et al., 2021; Yasmin & Ikemoto, 2015). The formula was specified as follows.

$$AP = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + e_1 \quad (4)$$

Hypothesis:

$$\beta_1, \beta_4, \beta_6, \beta_7, \beta_8, \beta_{10} > 0;$$

$$\beta_2, \beta_3, \beta_5, \beta_9 < 0$$

AP indicates actual participation (hours/day), X_1 denotes the number of dairy cattle, X_2 represents the order of children in the family (first, second, and so on), X_3 implies the family size (person), X_4 refers to the age of the successor (year), X_5 is the successor's education level (year), X_6 signifies farm size (m^2), X_7 depicts cattle productivity (liter/head/day), X_8 illustrates gender (male = 1; female = 0), X_9 demonstrates employment status (farmer = 1; non-farmer), X_{10} exhibits early age obtaining knowledge transfer (year), e_1 is an error term, and $\beta_0, \beta_1, \beta_2, \dots, \beta_{10}$ portray the coefficients. Adjusted R-squared, p-value, heteroscedasticity, normality error, and multicollinearity tests were run to test the model's goodness of fit. The results unveiled no heteroscedasticity events because the data spread out without a pattern, indicating no multicollinearity. After all, the VIF value was less than 5, and the formula had a significant level greater than 0.05 ($P = 0.000$).

RESULTS AND DISCUSSION

Identify of Respondents

Dairy farmers and their children served as the respondents of this study. Table 1 reveals the characteristics of farmer respondents based on the survey results in the five MCPs. The data was categorized by age, formal education, family size, and farming experience. Most farmers were the productive age (those between the ages of 15 and 64), a demographic

belonging to the productive age and depicting early adopters (Ong, Rahim, Lim, & Nizat, 2022). Elementary school graduates dominated the level of formal education of respondents. Most families had one to five members with more than ten years of working experience, demonstrating how the dairy cattle business has integrated into farmers' daily lives. However, longevity in raising dairy cattle does not always indicate the innovation adoption ability level. Moreover, farmers' patterns of raising dairy cattle could be shaped by the habits developed over the years (Sulistiyati et al., 2019; Widodo, Kamardiani, & Utami, 2022).

TABLE 1. IDENTITY OF FARMERS

Category	Frequency	%
Age (year)		
15 - 64	94	73
> 64	6	27
Formal education (year)		
Elementary (6 years)	71	71
Junior high school (9 years)	21	21
Senior high school (12 years)	8	8
Family member (person)		
1 – 5	97	97
6 – 10	3	3
Farming experience (year)		
< 10	5	5
10 - 35	86	86
> 35	9	9

Note: n = 100 respondents

TABLE 2. IDENTITY OF SUCCESSORS

Category	Frequency	%	Category	Frequency	%
Gender (person)			Employment status		
Male	61	61	Student	40	40
Female	39	39	Dairy farmer	24	24
Order of children in the family			Employee	8	8
First	79	79	Unemployment	28	28
Second	16	16	Getting involved in knowledge of dairy raising on the family farm		
Third	5	5	Age 6 years old	6	6
Formal education (year)			Age 7 years old	11	11
Elementary (6 years)	0	0	Age 8 years old	24	24
Junior high school (9 years)	46	46	Age 9 years old	19	19
Senior high school (12 years)	52	52	Age 10 years old	15	15
University (16 years)	2	2	Age 11 years old	1	1
Marital status			Age 12 years old	6	6
Not married yet	83	83	Age 13 years old	5	5
Married	17	17	Age 14 years old	6	6
			Age 15 years old	6	6
			Age 16 years old	1	1

Note: n = 100 respondents

Male and female children aged 15 to 25 years living in the same house with their parents made up the respondents for this study. Young people were defined as those aged 15 to 30 according to the Law of the Republic of Indonesia No. 40 of 2009. At those ages, they have the potential, responsibility, rights, character, capacity, self-actualization, and aspirations of youth. Table 2 exhibits that male children dominated successors as the firstborn in the family. Furthermore, compared to their parents, children's formal education was superior. Most successors (83%) had not married yet, dominated by females. Some successors (24%) had been farmers, whereas most (40%) were students.

The View of Successors on the Dairy Farming Business in the Future

Capturing how successors view the sustainability of the dairy cattle business has become necessary. Table 3 portrays that 70% of dairy farmers' successors considered the dairy cattle business no longer relevant. Meanwhile, 6% hesitated in determining, and 24% believed the business would still be prospective. Various reasons have been put forward to maintain the sustainability of the dairy cattle business into the future, such as the business being the main livelihood, continuing the family business, and helping parents. Future generations would continue to face stiff competition in the dairy cattle business—their main livelihood (Boettcher, 2001; Sulistyati et al., 2019).

TABLE 3. VIEW OF SUCCESSORS IN THE DAIRY CATTLE BUSINESS

Category	Frequency	%
Becoming a dairy farmer is the main choice of livelihood in the future		
Yes	24	24
Hesitate	6	6
No	70	70
Total	100	100
Reason (Yes)		
Being the main livelihood	4	4
Continuing family business	5	5
Helping parents	16	16
Total	24	24
Reason (Hesitate)		
Have not decided yet	6	6
Total	6	6
Reason (No)		
Not a woman's job	4	4
Having work	8	8
Focusing on school or continuing study	39	39
Housewife	5	5
Taking courses	2	2
Willing to work in the factory, modern market, or government	10	10
Time-consuming	1	1
Wanting for a marriage proposal	1	1
Total	70	70

Nevertheless, the prospects for the dairy cattle industry appeared unfavorable due to the population's inclination towards pursuing higher education, seeking employment in industries, such as factories or modern markets, or government offices, and various other motivations. These findings align with the neo-classical economic theory that youth prefer seeking maximum profits, attempting to find the most lucrative activities (Hennessy, 2002), and not necessarily taking the same path as their parents (Firman et al., 2019). Several factors could trigger a lack of interest in young generation workers in the agricultural sector, including less prestige, high risk, less assurance, unstable earnings, preferring to work in industry, and lack of incentives for young farmers (Widiyanti, Setyowati, & Ardianto, 2018).

Participation of Successors and Successor Participation Index in Family Dairy Farming

The significance of succession in family dairy farming could not be overstated (Firman et al., 2019). The successors of the dairy farmers helped their parents with the day-to-day activities of the dairy cattle business. Figure 1 displays the activities in the dairy cattle business from morning to afternoon. Due to their other responsibilities, such as attending school, becoming housewives, being unemployed, and working outside the farm, the successors did not devote enough time to dairy cattle activities. All of these tasks were performed by the successors who had taken up dairy farming.

TABLE 4. PARTICIPATION OF SUCCESSORS IN DAIRY FARMING PER CHILDREN'S STATUS

Daily Activity	Mean				
	Dairy Farmer	Student	Housewife	Unemployment	Average time
A. Morning activities (04.00 - 12.00)					
Boiling water	3	3	10	6	4.4
Cleaning cattle and stalls	25	15	0	15	11.0
Milking	24	15	0	0	7.8
Feeding	21	15	13	14	12.6
Milk distribution	8	6	0	5	3.8
Foraging	234	115	0	130	95.8
Subtotal a	315	169	23	170	135.4
B. Afternoon activities (14.00 - 16.00)					
Boiling water	6	6	10	10	6.4
Cleaning cattle and stalls	25	16	0	15	11.2
Milking	23	14	0	0	7.4
Feeding	21	15	13	14	12.6
Milk distribution	8	6	0	6	4
Subtotal b	82	57	23	46	41.6
Total minutes	397	226	46	216	177
Total hours	6.62	3.77	0.77	3.60	2.95
Percentage of successor participation index (%)*	82.71	47.08	9.58	45.00	36.87

Note: *) Index participation is the average of actual participation (hours/day) divided by total activities in family dairy farming (hours/day), which is the same as 8 hours/day.

Table 4 illustrates that foraging was time-consuming compared to other activities. Successors who have become dairy farmers required 234 minutes or 3.9 hours to complete

the task, while those who were still students spent 115 minutes or 1.92 hours. Generally, foraging was carried out at 8 to 12 o'clock. Due to the pandemic causing many schools to conduct online learning, students could divide their time to help their parents find forage. Before the pandemic, students could not help foraging because they had to go to school. Female successors or married women (housewives) participated in only two activities: boiling water and providing food. Indeed, working children did not have time to help their parents on the farm. As for the unemployed successors, they helped their parents in certain activities.

Table 4 exhibits the low successor participation index in dairy farming. The table depicts each successor position who helped parents in family dairy farming in hours per day. Student and unemployed successors influenced the overall average participation time of successors. However, successors who have become dairy farmers demonstrated a high participation index because their time was up for raising dairy cattle.

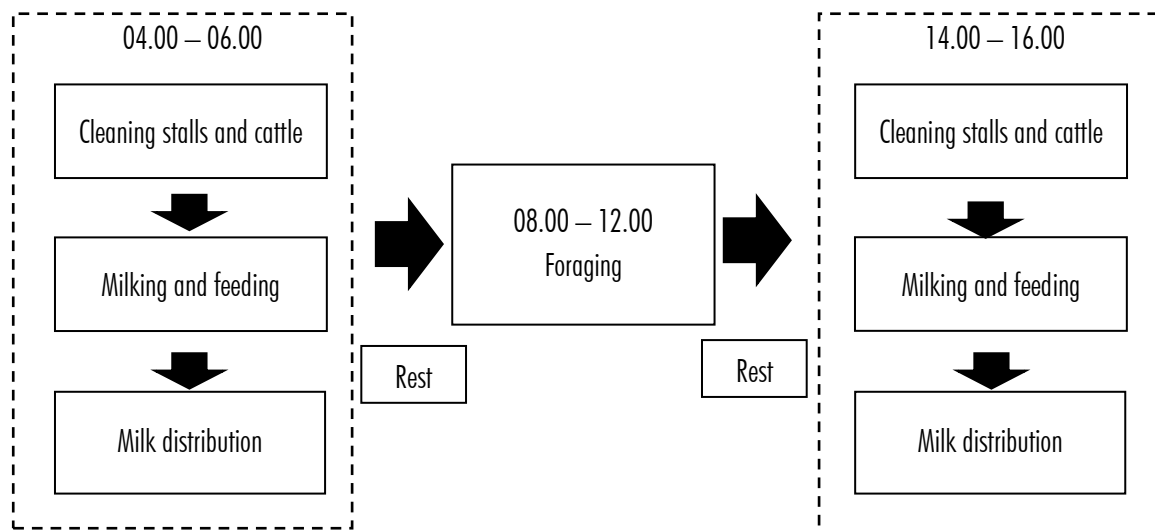


FIGURE 1. DAILY ACTIVITIES OF THE FAMILY DAIRY FARMING IN THE STUDY AREA

Factors Influencing Successors' Participation in Family Dairy Farming

The multiple regression analysis was run to determine factors influencing the successors' participation in family dairy farming. The multiple regression formulation is as follows (see also Table 5).

$$AP = -4.52 + 0.1176 X_1 + 0.142 X_2 + 0.465 X_3 + 0.1025 X_4 + 0.1138 X_5 - 0.00944 X_6 - 0.0031 X_7 + 1.747 X_8 + 3.337 X_9 - 0.0288 X_{10}$$

The model's goodness of fit was examined using various statistical measures and tests, comprising adjusted R-squared, p-value, heteroscedasticity, normal probability, and multicollinearity tests. Table 5 displays an adjusted R-squared of 64.60%, with a p-value of less than 0.01. There was no heteroscedasticity test because the data were scattered. The average probability acquired a p-value greater than 0.15 and a VIF of less than 5 (no multicollinearity) (Shrestha, 2020). In short, the model had a goodness of fit.

As Kristanti and Nuradhi (2021) and Saan et al. (2018) asserted, the successors' involvement in the family business, measured by working hours, reflects the succession

process. Table 5 lists six variables that significantly influencing the successors' participation, encompassing the the number of dairy cattle (X_1), family size (X_3), age (X_4), farm size (X_6), gender (X_8), and employment status (X_9). The average amount of successor's farm working time was directly proportional to the family size, as more people in the family signified more people who were likely to take over the family business and help it thrive. Due to the high expectations of males to carry on the family dairy farm, they were more frequently entrusted with agricultural tasks than their female counterparts (Firman et al., 2019). Male successors who graduated, dropped out of school, or were unemployed preferred to work on the family farms. The number of dairy cattle and farm size were proportional to the amount of family labor working time, especially for potential successors. The age of successors was positively correlated with work participation on the farm because their parents were getting older and had limited energy. This study's findings that gender and farm size influenced successors' participation are nearly identical to those of Shahzad et al. (2021) and Stiglbauer and Weiss (2000).

TABLE 5. FACTORS UNDERLYING SUCCESSORS' PARTICIPATION IN FAMILY DAIRY FARMING

Variable		Standardized coefficient (Beta)	Stand Dev.	t	Sig.	VIF
Constant			1.40	-3.23	0.002	
X_1	Number of dairy cattle (head)	0.147	0.0627	1.88	0.064*	2.05
X_2	Order of children in the family (first, second, and so on)	0.047	0.279	0.51	0.613	1.11
X_3	Family size (person)	0.217	0.142	3.28	0.001**	1.11
X_4	Age of successors (year)	0.148	0.0575	1.78	0.078*	1.34
X_5	Education level of successors (year)	0.077	0.0698	1.63	0.106	1.13
X_6	Farm size (m ²)	-0.158	0.00513	-1.84	0.069*	2.00
X_7	Cattle productivity (liter/head/day)	-0.003	0.0367	-0.09	0.932	1.15
X_8	Gender (male = 1; female = 0)	0.361	0.317	5.50	0.000**	1.17
X_9	Employment status (farmer = 1; non-farmer)	0.572	0.400	8.34	0.000**	1.32
X_{10}	Early age obtaining knowledge transfer (year)	-0.018	0.0602	-0.48	0.634	1.14
R Squared = 68.17%						
Adjusted R Squared = 64.60%						
F = 19.06						
P = 0.000						
Multicollinearity VIF < 5						
Normal probability P > 0.150						
Heteroscedasticity data scattered						

Note: ** significant at $\alpha < 0.05$; * significant at $\alpha < 0.1$

Succession Patterns in the Study Area

Family dairy farming and smallholder producers have dominated the dairy cattle farming business in the study area (Asmara et al., 2017; Sulistyati et al., 2019). It has persisted since the reform of the dairy cattle industry in the 1980s (Amin & Palash, 2020; Firman et al., 2018). This business has remained strong despite structural and industrial changes (Amin

& Palash, 2020; Firman et al., 2018). Because succession is crucial to the longevity of family dairy farms, it is one of the factors contributing to the sustainability of family dairy farming, as highlighted by some research (Borec et al., 2013). Succession is a way to. Parents intentionally or unintentionally invite their children (school-age) to participate on the farm. The survey results displayed in Table 3 pointed out that the involvement of children on the farm began from the age of six, known as a socialization process (García-Álvarez, López-Sintas, & Saldaña Gonzalvo, 2002). This process drives the successors to develop respect for all of the farms, especially for the parents' livelihood because they live from raising dairy cattle (García-Álvarez et al., 2002). When children are involved in helping their parents, there is a process of knowledge transfer, acquisition of life values, and learning the rules of behavior, norms, and beliefs in the stage of primary socialization (Crisogen, 2015; Lozano-Posso & Urbano, 2017). Due to its successional nature, the socialization process could be regarded as indigenous or traditional ecological knowledge. Indigenous knowledge is the body of information unique to a particular culture and is obtained by local people through the accumulation of various experiences, informal experiments, and a deep understanding of the environment in a particular culture (Chikaire et al., 2012; Harris, Mishra, & Williams, 2012).

In-depth interviews with eight farmer representatives, two community leaders, and one extension officer generated two succession patterns: farm transfer and farm takeover or handover, as illustrated in Figure 2. The interview results defined farm transfer as when the parents had six lactating cattle and gave their children one or two to care for until they could manage them independently. In other words, farm transfer is giving part of the dairy business assets, from lactating cattle, stalls, and land, to their children to manage themselves. The informants asserted that farm takeover or handover was when parents could no longer work on the family dairy farm because they were old or had a long-term illness. Farm transfers could be business and inheritance transfers (Altig & Davis, 1992). Business or farm transfer refers to the process where all assets representing in their totality an enterprise as a going concern are transmitted to a new holder (Calogirou, Fragozidis, Houdard-Duval, & Perrin-Boulonne, 2010). Business transfer could be physical and human capital (Harris et al., 2012).

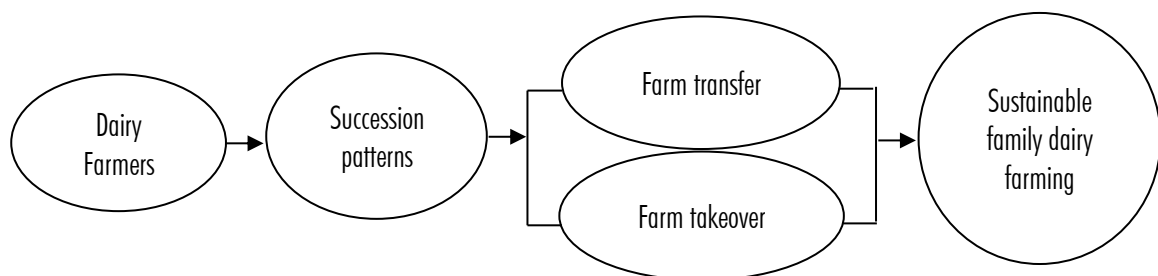


FIGURE 2. THE SUCCESSION PATTERN IN THE FRAMEWORK OF THE FAMILY DAIRY FARMING SUSTAINABILITY IN THE STUDY AREA

Furthermore, physical capital transfers could be liquid and illiquid assets. Human capital transfer (intrafamily) could be income transfer, capital, and management. This study disclosed that parents' transfer of family dairy farming to children began from the socialization process. When the children became dairy farmers, their parents handed over the assets of one or two dairy cattle to be managed. The successors kept dairy cattle, such as feeding, breeding,

and production (fresh milk production). They could run the farm independently after receiving the bequest from their parents, which included some cattle and stalls. Therefore, the pattern of succession in the study area was more likely to be farm transfers, such as knowledge and management, dairy cattle assets, and stalls (Calogirou et al., 2010). The pattern resulted from in-depth discussions with informants, such as the heads of farmer groups, community leaders, cooperative administrators, and an extension officer.

Family farm takeover or handover occurred when the parents were unable to manage the business due to illness and getting older, the family business was in a deteriorating condition, or when the parents passed away during the succession (Borec et al., 2013; Firman et al., 2018; Kerbler, 2012). The business takeover by its successors was a way for the family to perpetuate the business by saving and managing assets, capital, income, and family welfare. Errors in retirement planning and business transfer to children could be a potential problem in the family due to financial instability, low levels of personal and family satisfaction, and potential capital loss (Kerbler, 2012; Mishra, El-Osta, & Johnson, 2004) asserted, the main agricultural problem in developed countries is the reduced number of successors willing to take over the farm or farm transfer. The European Union has taken steps to alleviate these conditions by involving the agricultural successors in the process and providing non-refundable one-time financial assistance to facilitate farm takeover and a structural adaptation of the farm after the takeover (Lobley et al., 2010; Schuh, Munch, Badouix, Hat, & Brkanovic, 2022). Furthermore, the farmers' support for retiring is pivotal because their successors must guarantee their lives through annual annuities (Lobley et al., 2010).

The study area was highly different from the description of previous studies on farm handover. The in-depth interviews uncovered that the succession with a farm takeover pattern was more emphasized on the inability of the parents to manage the family dairy farm. This parental inability was caused by several factors, such as farmers' aging, serious illness, or death, giving their children the responsibility of maintaining the family business. The firstborn, particularly sons, typically carried on the family business (Melinda & Putra, 2019). Thus, the successor bore the responsibility to provide for his parents. Parents sometimes passed the family farm on to their children by entrusting them with the care of one or two cattle to be raised until they reached a point of maturity when they could go off on their own (Firman et al., 2019).

CONCLUSION

The main objective of the successors was to introduce the next generation into the family's dairy farming business. Several successors had other activities, such as attending school, being housewives, being unemployed, and working off-farm, contributing to a low average participation index for the family business. Six variables significantly influenced successors' participation in family dairy farms: the family size, gender, employment status, number of dairy cattle, age, and farm size. These factors had become the key to the sustainability of the family dairy farm, which would be passed on to the next generation. This research generated two succession patterns: farm transfer and farm handover. These patterns

were essential for the sustainability of family dairy farming in Pangalengan District, West Java, Indonesia.

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