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Analysis Of Beef Cattle Agribusiness In Deli Serdang Regency

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Abstract – This study aims to analyze the effect of each agribusiness subsystem on the income of beef cattle breeders in Deli Serdang Regency. The research was conducted in 3 (three) sub-districts in Deli Serdang, Hamparan Perak, Sinembah Tanjung Muda Hilir and Kutalimbaru Regencies using a simple random sample selection method. The total sample in this study were 75 breeders. Data were analyzed by scoring and path analysis. The results of the path analysis show that the agribusiness subsystem that has the most influence on the income of beef cattle breeders is the livestock farming subsystem of 0.466. The direct effect of the livestock farming subsystem on income is greater than the entire agribusiness subsystem studied. If the farmer wants to increase the income of beef cattle, then an increase is made in the livestock farming subsystem. The influence of the agribusiness subsystem on the income of beef cattle farmers through the marketing subsystem shows no effect. The influence of the agribusiness subsystem on the income of beef cattle breeders through the supporting subsystem shows that there is an influence on the income of beef cattle breeders, namely in the livestock farming subsystem of 0.821.

Keywords – Agribusiness, Upstream, On-Farm, Downstream, Marketing, Supporting.

I. INTRODUCTION

The development of livestock agribusiness offers promising market opportunities, particularly in addressing the growing domestic demand and increasing income. The integration of agribusiness systems, including the input subsystem (production facilities), cultivation subsystem (production), processing, and marketing subsystems, can effectively tackle these challenges in a comprehensive and coordinated manner (Simatupang, 2004). However, a critical issue in agribusiness lies in the weak linkage between subsystems, hindering the seamless coordination among agribusiness stakeholders (inside and outside linkages). This fragmented approach limits the potential for a holistic and cohesive agribusiness system.

In its management, the fattening of beef cattle involves incorporating production inputs that result in production outputs in the form of revenue and business income. The income received by farmers can be influenced by several factors, including the scale of the operation, business experience, education, labor costs, forage costs, additional feed costs, purchase prices, and the duration of the fattening period (Andri, 2018).

The largest livestock population in North Sumatra is located in Langkat Regency, with a total of 220,992 head of cattle, followed by Simalungun Regency with a population of 176,000 head. Asahan and Deli Serdang Regencies have populations of 147,233 and 124,638 head respectively. Deli Serdang Regency ranks as the fourth-largest producer of beef cattle in North Sumatra Province. Therefore, the development of beef cattle farming has become an urgent need to meet the demand for beef in the region.

Meanwhile, Deli Serdang Regency has become one of the major centers for beef cattle production. According to data obtained from the Central Statistics Agency of Deli Serdang Regency, the population of beef cattle in the regency has been steadily increasing over the years. In 2018, the population reached 96,881 heads, and it has further increased to 124,638 heads in 2022. The regency focuses on breeding seven different breeds of cattle, namely Brangus, Limousin, Friesian Holstein, Angus, Brahman, Ongole, and Simmental, as they fetch high prices and are relatively easy to care for. These cattle are nurtured and bred diligently until they are ready for sale.

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Beef cattle farming as an agricultural enterprise requires a good interconnection between the upstream subsystem, farming subsystem, downstream subsystem, and supporting institutions. A well-functioning subsystem will establish interdependencies among agribusiness stakeholders such as farmers, livestock traders, and consumers. A strong interconnection plays a significant role in generating income for livestock farmers. The following are common issues encountered in the development of beef cattle farming: (1) low livestock productivity, (2) limited availability of local superior breeds, (3) low productivity and knowledge levels of human resources, (4) inefficient marketing of products, (5) suboptimal farming systems, and (6) inconsistent feed availability. Therefore, by improving and further developing this livestock enterprise, not only can its substantial potential be harnessed, but it can also generate more employment opportunities, thereby stimulating the development of the Deli Serdang Regency's potential, resulting in increased economic growth within the beef cattle subsector.

The objective of this study is to analyze the agribusiness system of beef cattle farming adopted by beef cattle farmers in order to assess the income level of beef cattle farmers in Deli Serdang Regency. Additionally, the research aims to examine the impact of each agribusiness subsystem implemented by beef cattle farmers on their income in Deli Serdang Regency.

II. Literature

National beef consumption has been increasing every year, necessitating the availability of a national beef supply by collecting beef from various regions and importing it from other countries to meet the national beef consumption (Susanti, 2014). Typically, cattle breeds raised primarily for meat production, also known as beef breeds, are preferred for this purpose. Beef cattle are characterized by their large body size, high meat quality, marketability, fast growth rate, high carcass yield, and good meat quality. Fast-growing beef cattle with excellent meat quality are well-suited for intensive farming. When engaging in beef cattle farming, it is crucial to consider the practical and economic values of different cattle breeds (Salim, 2013).

Beef cattle, also known as meat or beef breeds, are primarily raised for meat production. Characteristics of beef cattle include a compact body shape, deep and wide chest, rectangular body shape when viewed from the side, well-muscled body, short and wide head at the forehead, thick neck and shoulders, broad back and loin, fast growth rate, high feed efficiency, and thick subcutaneous tissue (Purnomoadi, 2003). Beef cattle originate from the Asian continent, including local breeds and those imported from several Asian countries (Syaifullah, 2013).

Agribusiness is a system that consists of upstream to downstream subsystems, as well as additional supporting systems to facilitate agribusiness activities such as production, marketing, and other supporting systems (Hastuti, 2017; Nurif & Sukrianti, 2010). The agribusiness system can encompass various sectors, including agriculture, fisheries, forestry, and industry (Sumodiningrat, 2000). According to Hermawan (2006), agribusiness is a set of interconnected subsystems that form a totality.

Mankiw (2006) states that personal income refers to the income received by households and unincorporated businesses. Personal income includes the reduction of corporate taxes and contributions to social benefits. Additionally, personal income includes interest income received by households from government debt ownership and income received by households from government transfer programs as social benefits.

Soekartawi (2002) defines income analysis as the revenue minus all costs incurred in production, while the costs for production inputs are described by Daniel (2002). The input costs are divided into two categories: fixed costs, which do not directly affect the level of production, and variable costs, which are directly related to the level of production. In this case, variable costs include expenses for seed, preparation, and land processing. According to Nicholson (1995), there are several factors of production that influence income, including agricultural land, capital, seeds, fertilizers, pesticides, and labor.

III. Research Method

The research was conducted in Deli Serdang Regency. The selection of the research location was carried out using purposive sampling in the districts of Hamparan Perak, Sinembah Tanjung Muda Hilir, and Kutalimbaru. From the total population of beef cattle farmers, which amounted to 300 households, a sample of 75 respondents was determined, with 25 respondents from each district: Hamparan Perak, Tanjung Muda Hilir, and Kutalimbaru.

Primary data sources were obtained through direct observation at the research location, specifically from beef cattle farming businesses. The data collection methods employed were interviews, documentation, and direct observation within the beef cattle

farming areas in Deli Serdang Regency. On the other hand, secondary data sources were obtained from various relevant institutions and scientific literature that support and influence the research being conducted.

The data analysis method employed in this study is based on two approaches: descriptive analysis and quantitative analysis. The quantitative analysis focuses on examining the factors that influence income using an econometric technique known as multiple linear regression analysis. Additionally, path analysis is employed to test the causal relationships among variables. Path analysis involves the examination of independent variables, intervening variables, and dependent variables in the form of a diagram. The diagram depicts arrows indicating the direction of influence between exogenous intermediary variables and the dependent variable. Path analysis is also utilized to analyze patterns among variables, aiming to determine the direct or indirect effects of the independent (exogenous) variables on the dependent (endogenous) variables.

IV. Results And Discussion

The analysis of income from beef cattle farming is the main objective of this research. It is conducted by considering the total overall costs incurred by the respondent farmers, including fixed costs such as land purchase, construction of sheds, electricity expenses, equipment depreciation, and shed maintenance. Additionally, variable costs such as feed expenses, purchase price of calves, medication and vaccination costs, artificial insemination (AI) expenses, and labor costs are taken into account. These costs represent the expenditures made by the respondent farmers during one year of beef cattle farming activities, specifically in the breeding and fattening processes. The detailed breakdown of these costs is presented in the following

Table 1. Breakdown of Costs in Beef Cattle Farming for All Respondent Farmers in Deli Serdang District (IDR/Year)

Description		Unit	Quantity	Total Expenses	
A. Revenue					
1	Livestock Sales	head	0	Rp	9.166.000.000
2	Manure Sales	pickup	0	Rp	23.650.000
Total Revanue				**Rp**	**9.189.650.000**
B. Fixed Costs					
1	Land Purchase Cost	m^2	58.032	Rp	1.482.000.000
2	Construction of Barns	m^2	81	Rp	1.111.000.000
3	Electricity Costs watts	watt	33.750	Rp	9.450.000
4	Property text	0	0	Rp	-
5	Depreciation of Equipment and Barns				
a.	Feeding and Drinking Equipment				
	Chopper Machine unit	unit	4	Rp	1.200.000
	Mixer Machine	unit	4	Rp	1.200.000
	Buckets	pieces	169	Rp	1.690.000
b.	Cleaning Equipment and Other Tools				
	Shovel	pieces	85	Rp	340.000
	Floor Brush	pieces	85	Rp	1.700.000
	Water Hose	pieces	85	Rp	2.125.000
	Water Mahine	unit	4	Rp	160.000
	Trolly	unit	14	Rp	560.000
	Scythe	pieces	76	Rp	760.000
	Goat Rope	pieces	77	Rp	3.850.000
c.	Sheds	pieces	81	Rp	275.200.000
Total Fixed Costs				**Rp**	**2.891.235.000**
C. Variabe Costs					

1	Feed Costs				
a.	Green Fooder	Kg	0	Rp	-
b.	Concentrate Feed	Sack	970	Rp	135.080.000

Table 2. Breakdown of Beef Cattle Farming Costs Among All Respondent Farmers in Deli Serdang Regency (IDR/Year)

Description					
1	Livestock Price	heads	149	Rp	1.043.000.000
2	Medicine and Vaccine Expenses	heads	79	Rp	7.900.000
3	Artificial Insemination (AI) Expenses	heads	741	Rp	40.150.000
4	Labor Costs	persons	80	Rp	2.400.000.000
Total Variabel Costs				**Rp**	**3.626.130.000**
Total Production Costs				**Rp**	**6.517.365.000**
Total Revenue				**Rp**	**2.672.285.000**

Source: Primary Data Processed, 2023

Table 3. Breakdown of Beef Cattle Farming Costs per Respondent Farmer in Deli Serdang District (Rp/Year)

Description		**Unit**	**Quantity**		**Total Costs**
A. Revenue					
1	LiveStock Sales	heads	0	Rp	122.213.333
2	Faces Sales	pickup	0	Rp	315.333
Total Revenue				**Rp**	**122.528.667**
B. Fixed Costs					
1	Land Purchase Costs	m^2	58.032	Rp	19.760.000
2	Cage Construction Costs	m^2	81	Rp	14.813.333
3	Electricity Costs watts	watt	33.750	Rp	126.000
4	Property Tax	0	0	Rp	-
5	Depreciation of Equipment and Cage				
a.	Feeding and Drinking Equipment				
	Chopper Machine	unit	4	Rp	16.000
	Mixer Machine	unit	4	Rp	16.000
	Buckets	pieces	169	Rp	22.533
b.	Cleaning and Other Equipment				
	Shovel	pieces	85	Rp	4.533
	Floor Brush	pieces	85	Rp	22.667

	Water Hose	pieces	85	Rp	28.333
	Water Machine	unit	4	Rp	2.133
	Pushcart	unit	14	Rp	7.467
	Hoe	pieces	76	Rp	10.133
	Goat Rope	pieces	77	Rp	51.333
c.	Cage	pieces	81	Rp	3.669.333
Total Fixed Costs				**Rp**	**38.549.000**
C. Variabel Costs					
1	Feed Costs				
a.	Green fooder	kg	0	Rp	-
b.	Concentrate Feed	sack	970	Rp	1.801.067
2	Livestock Price	heads	149	Rp	13.906.667
3	Medicine and vaccine Expenses	heads	79	Rp	105.333
4	Artificial Insemination (AI) Expenses	heads	741	Rp	535.333
5	Labor Costs	persons	80	Rp	32.000.000
Total Variabel Costs				**Rp**	**48.348.400**
Total Production costs				**Rp**	**86.898.200**
Total Revenue				**Rp**	**35.630.467**

Source: Primary Data Processed,2023

The total income of beef cattle farmers in Deli Serdang Regency amounts to Rp 9,189,650,000 per year, with an average income received by beef cattle farmers per year of Rp 122,528,667, consisting of cash and non-cash income. This aligns with Ekowati's (2014) assertion that farm income encompasses all monetary values received from farming activities, both in cash and non-cash forms, within a specific period of time.

Net income is the difference between revenue and the expenses incurred in farming, including the addition of family labor wages if the farmer has external capital. This aligns with Ekowati's (2014) statement that net income is the difference between revenue and external costs, plus family labor wages. The total net income obtained by cattle farmers in Deli Serdang Regency is Rp 2,672,285,000, with an average annual net income of Rp 35,630,467 received by beef cattle farmers.

The factors influencing the income of beef cattle farming businesses, such as the number of livestock ownership (X1), farmer's age (X2), education level (X3), farming experience (X4), number of dependents (X5), productive female cattle (X6), price of young cattle (X7), feed cost (X8), cost of medication and vaccines (X9), artificial insemination cost (X10), labor cost (X11), and fattening period duration (X12), were analyzed using multiple linear regression.

Table 3. Regression Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-29901812.996	17855685.117		-1.675	.099
	Livestock Ownership (X1)	957973.238	206037.793	.544	4.650	.000
	Farmer's Age (X2)	234773.390	115149.850	.085	2.039	.046
	Education Level (X3)	5794453.145	1900482.234	.175	3.049	.003
	Farming Exprience(X4)	235096.225	110984.917	.106	2.118	.038
	Number of Depentens (X5)	4022612.307	1427745.928	.147	2.817	.006
	Productive Female Cattle	-1060069.773	520424.608	-.626	-2.037	.046
	Breedling Price (X7)	.430	.240	.207	1.795	.077
	Feed Costs (X8)	4.907	1.542	.447	3.183	.002
	Medicine and Vaccine Cost (X9)	-149.755	103.628	-.141	-1.445	.153
	Artificial insemination cost (X10)	41.037	37.256	.306	1.101	.275
	Labor cost (X11)	-.439	.243	-.111	-1.808	.076
	Fattening Period Duration (X12)	3148375.093	1265297.519	.102	2.488	.016

a. Dependent Variable: Income

Source: Processed Data from SPSS Output 29, 2023

Using the following equation:

$$\mathbf{Y = -29901813 + 957973.24\ (X_1) + 234773.39\ (X_2) + 5794453.15\ (X_3) + 235096.23\ (X_4) + 4022612.31\ (X_5) - 1060069.77\ (X_6) + 0.43\ (X_7) + 4.91\ (X_8) - 149.755\ (X_9) + 41.04\ (X_{10}) - 0.439\ (X_{11}) + 3148375.09\ (X_{12}) + e}$$

Based on the regression equation above, several conclusions can be drawn, including:

The number of livestock ownership (X1) significantly and directly influences the income of the respondents' beef cattle farmers, which is in line with Murwanto's (2008) statement that an increase in the number of cattle owned leads to an increase in the number of cattle sold and consequently, an increase in income. Similarly, the variable of farmer's age (X2) has a significant positive effect on the income of beef cattle farming. This finding aligns with Pratiwi and Sudrajad's (2012) assertion that the age of farmers is predicted to influence their behavior in managing agricultural land. The age of farmers affects their performance and energy in managing agricultural land, where older farmers have lower performance and energy levels compared to younger farmers.

The variable of the farmers' education level (X3) has a regression coefficient of 5794453.145 with a significance level of 0.003, indicating statistical significance. This finding is consistent with Ward's opinion in Ballantine (1983) that individuals with higher levels of education tend to have better income. Similarly, the variable of farming experience (X4) has a regression coefficient of 235096.225 with a significance level of 0.038, which is also below the threshold of 0.05. This aligns with Sutarto's (2008) assertion that there is a positive relationship between farming experience and production quantity. The longer a farmer's experience in agriculture, the better they are at handling various situations or aspects of farming. The variable of the number of dependents (X5) also exhibits a regression coefficient of 4022612.307 with a significance level of 0.006, which is below the threshold of 0.05. This finding is in line with Hardin's (2019) viewpoint.

The variables of productive female cattle (X6), feed costs (X8), labor costs (X11), and the duration of fattening period (X12) have shown significant and meaningful effects on the income level of cattle farmers. Consequently, individually, the variable of calf prices (X7) does not have a significant impact on the income of the surveyed beef cattle farmers in Deli Serdang Regency

(Setyo, 2017; Darmawi, 2012). Similarly, the variables of medication and vaccination costs (X9), artificial insemination costs (X10), and labor costs (X11) also do not have a significant impact.

Path analysis testing was conducted in accordance with the research objectives. The following is the path diagram for the testing:

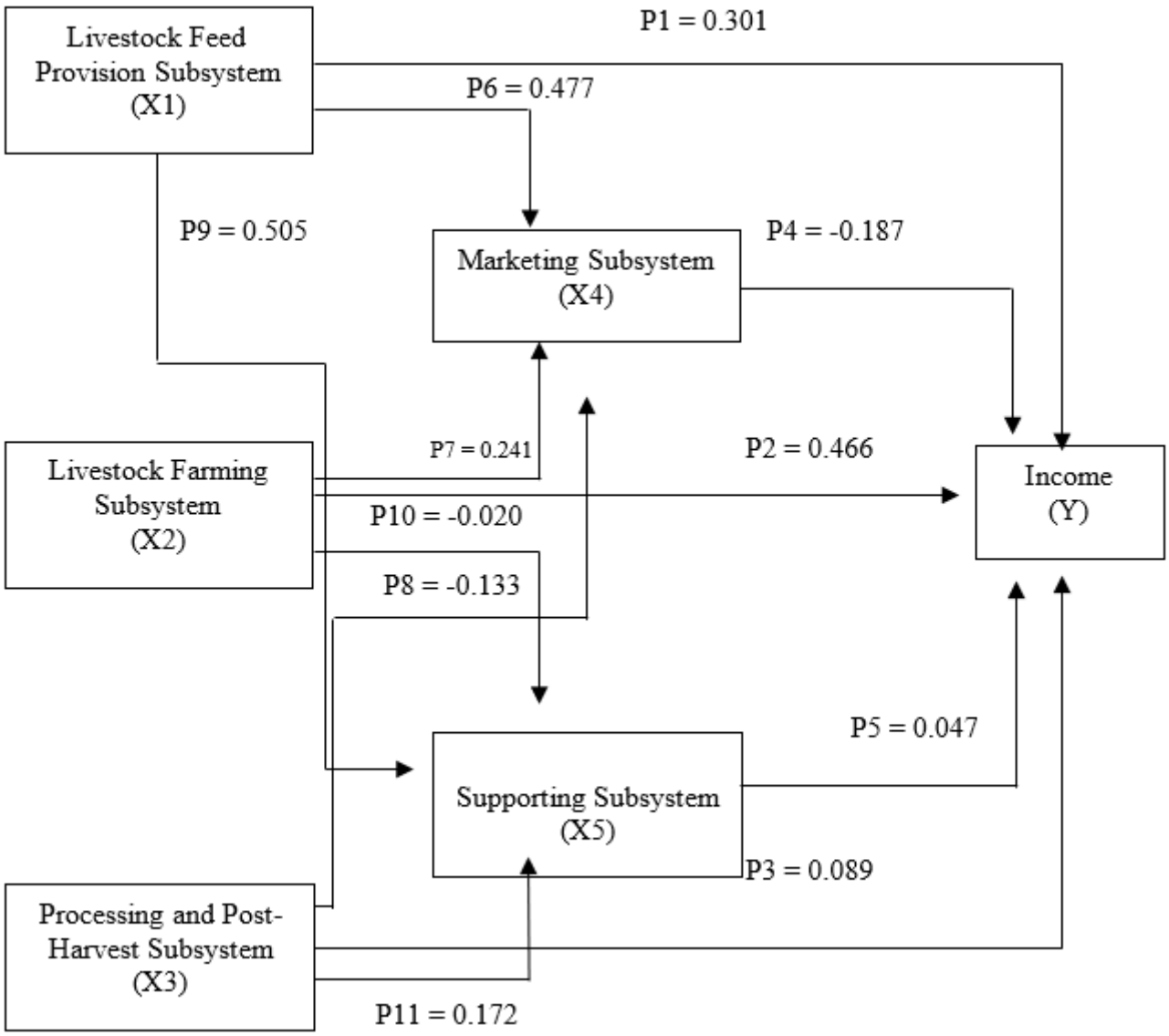

Figure 1. Path Analysis Testing Using SPSS 29
Source: Processed SPSS 29 Output, 2023.

It shows the direct influence, indirect influence, total influence, and significance.

Table 4. Hypothesis Testing Tabulation of Path Analysis.

Inter-variable Influence	Direct Influence	Indirect Influence	Total Influance	Significance
X1 – Y	0.301	-	0.301	0.000
X2 – Y	0.466	-	0.466	0.000
X3 – Y	0.089	-	0.089	0.035
X4 – Y	-0.187	-	-0.187	0.009
X5 – Y	0.047	-	0.047	0.174
X1 – X4	0.477	-	0.477	0.000
X2 – X4	0.241	-	0.241	0.211
X3 – X4	-0.133	-	-0.133	0.055
X1 – X5	0.505	-	0.505	0.033
X2 – X5	-0.020	-	-0.020	0.960
X3 – X5	0.172	-	0.172	0.377
X1 – Y – X4	0.301	-0.473	-0.172	0.030
X2 – Y – X4	0.466	-0.473	-0.007	0.029
X3 – Y – X4	0.089	-0.473	-0.384	0.103
X1 – Y – X5	0.301	0.355	0.656	0.384
X2 – Y – X5	0.466	0.355	0.821	0.383
X3 – Y – X5	0.089	0.355	0.444	0.411

Source: Processed Data from SPSS 29 Output, 2023.

The results of the analysis indicate that the livestock production facility subsystem significantly influences the income of beef cattle farmers, with a calculated t-value > t-table (4.572 > 1.673). The coefficient of direct influence between the livestock production facility subsystem and income is 0.301, showing a positive effect. Increasing the utilization of the livestock production facility subsystem will positively impact the farmers' income from beef cattle. This finding is consistent with Saragih's (2001) statement that the appropriate use of production facilities, such as superior seeds, leads to higher production capacity compared to non-superior seeds. These production facilities should meet the criteria of six appropriateness aspects (timing, quantity, quality, location, price, and type).

The research findings also indicate that the livestock cultivation subsystem has a significant influence on the income of beef cattle farmers, with a calculated t-value > t-table (4.619 > 1.673). The coefficient of direct influence between the livestock cultivation subsystem and income is 0.466, showing a positive effect. This suggests that a 1% increase in the livestock cultivation subsystem results in a 0.46% increase in the income of beef cattle farmers. Optimizing the utilization of the livestock cultivation subsystem will enhance the income of beef cattle farmers, which is consistent with the findings of previous studies by A. Rahmi and D. Retno Dwi Hastuti in 2008, as well as W. David Downey and Steven P. Erickson in 2009.

The research findings also indicate that the livestock cultivation subsystem has a significant influence on the income of beef cattle farmers, with a calculated t-value > t-table (4.619 > 1.673). The coefficient of direct influence between the livestock cultivation subsystem and income is 0.466, showing a positive effect. This suggests that a 1% increase in the livestock cultivation subsystem results in a 0.46% increase in the income of beef cattle farmers. Optimizing the utilization of the livestock cultivation subsystem will enhance the income of beef cattle farmers, which is consistent with the findings of previous studies by A. Rahmi and D. Retno Dwi Hastuti in 2008, as well as W. David Downey and Steven P. Erickson in 2009.The subsystem of processing and post-harvest shows a significant influence on the income of beef cattle farmers, with a calculated t-value > t-table (2.157 > 1.673). The direct coefficient of influence between the processing and post-harvest subsystem and income is 0.089, indicating a positive effect. This implies that a 1% increase in the processing and post-harvest subsystem results in an 0.08% increase in the income of beef cattle farmers. The increasing development of the processing and post-harvest subsystem has an impact on the farmers' income. Optimizing the utilization of the processing and post-harvest subsystem by farmers will enhance the income from beef cattle, aligning with Hanafie's (2010) statement that the downstream subsystem is part of an agricultural business system encompassing activities from post-harvest handling to advanced processing, preserving the form, composition, and taste of the agricultural

commodities. This aligns with Saragih's (2001) definition, stating that the downstream agricultural business subsystem comprises industries that process primary agricultural commodities into various products such as food/beverages, feed, natural fiber products, pharmaceuticals, bio-energy, and more.

The marketing subsystem does not have a significant value in relation to the income of beef cattle farmers, with a t-value < t-table (-2.692 < 1.673). Furthermore, the direct coefficient of influence between the marketing subsystem and income is -0.187, indicating a negative effect. On the other hand, the support subsystem does not have a significant impact on income, with a significance value of 0.174 and a t-value of 1.375 < t-table 1.673. Thus, the support subsystem does not affect the income of beef cattle farmers. These findings are consistent with the statement by Saragih (2001).

The analysis results obtained using SPSS also indicate that the livestock production facility subsystem has a significant value with the marketing subsystem, with a t-value > t-table (4.290 > 1.673). The coefficient of direct influence between the livestock production facility subsystem and the marketing subsystem is 0.477, indicating a positive effect. This means that a 1% increase in the livestock production facility subsystem leads to a 0.47% increase in the marketing subsystem. The livestock production facility subsystem for beef cattle in three districts in Deli Serdang Regency consists of capital, cattle pens, livestock feed, equipment, and medicine or vaccines. In contrast, the processing and post-harvest subsystem shows no significant value with the marketing subsystem, with a t-value < t-table (-1.952 < 1.673). The coefficient of direct influence between the processing and post-harvest subsystem and the marketing subsystem is -0.133, indicating that a 1% increase in the processing and post-harvest subsystem results in a 0.13% decrease in the marketing subsystem. (Suparta, 2005).

The analysis results also indicate that the livestock production facility subsystem has a significant value with the support subsystem, with a t-value > t-table (2.173 > 1.673). The coefficient of direct influence between the livestock production facility subsystem and the support subsystem is 0.505, showing a positive effect. This means that a 1% increase in the livestock production facility subsystem results in a 0.50% increase in the support subsystem. Additionally, the coefficient of direct influence between the livestock farming subsystem and the support subsystem is -0.020, indicating that a 1% increase in the livestock farming subsystem leads to a 0.02% decrease in the support subsystem.

The direct influence between the processing and post-harvest subsystem and the support subsystem is 0.172, indicating a positive effect. This means that a 1% increase in the processing and post-harvest subsystem results in a 0.17% increase in the support subsystem. As stated by Hermawan (2012), an improvement in the processing and post-harvest subsystem leads to an increase in the support subsystem. On the other hand, an indirect effect of the livestock production facility subsystem is observed, which decreases the income through the marketing subsystem for beef cattle by 0.47%. The total influence of the livestock production facility subsystem on income is -0.172, indicating that a 1% increase in the livestock production facility subsystem leads to a 0.17% decrease in total income. This finding aligns with the research conducted by Rahim and Astuti (2005).

The total influence of the livestock cultivation subsystem on income is -0.007, indicating that a 1% increase in the livestock cultivation subsystem results in a 0.00% decrease in total income. The livestock cultivation subsystem in this study comprises maintenance objectives, livestock location, livestock feed, and livestock maintenance patterns used. The livestock maintenance pattern employed in the research location is still semi-intensive, which combines extensive and intensive methods and requires human intervention. The inefficiency of this maintenance pattern is one of the factors contributing to the lowincome levels of beef cattle farmers in the three districts of Deli Serdang Regency. The reason why farmers still adopt a semi-intensive maintenance pattern is due to cultural and traditional practices in livestock farming in that area.

It can also be explained that the processing and post-harvest subsystem has a direct impact on the marketing subsystem with a coefficient of 0.089 and an indirect impact on income through the marketing subsystem with a coefficient of -0.473. Thus, it can be said that an increase in the processing and post-harvest subsystem will indirectly decrease income through the marketing subsystem by 0.47 percent. The total impact of the processing and post-harvest subsystem on income is -0.384, indicating that a 1 percent increase in the processing and post-harvest subsystem will decrease the total income by 0.38 percent. The processing and post-harvest subsystem consists of administrative bookkeeping, harvest selection, and utilization of livestock waste.

The data processing results reveal that an indirect improvement in the livestock production support subsystem will increase income through the support subsystem by 0.35 percent. Similarly, an indirect enhancement in the livestock breeding subsystem will also raise income through the support subsystem by 0.35 percent. As the livestock production support subsystem and the livestock breeding subsystem improve, the corresponding support subsystem experiences growth, resulting in increased income for livestock

farmers. The total impact of the livestock production support subsystem on income is 0.656, indicating that a 1 percent increase in this subsystem influences the total income by 0.65 percent. Similarly, the total impact of the livestock breeding subsystem on income is 0.821, with a 1 percent increase affecting the total income by 0.82 percent. The livestock production support subsystem includes capital, livestock housing, livestock breeding, animal feed, equipment/tools, and medication/vaccination, while the livestock breeding subsystem comprises livestock maintenance goals, livestock farming location, animal feed, and livestock maintenance patterns.

It can be explained that an indirect improvement in the processing and post-harvest subsystem will increase income through the support subsystem by 0.35 percent. As the processing and post-harvest subsystem improves, the support subsystem also experiences growth, resulting in increased income for farmers. The total impact of the processing subsystem on income is 0.444, indicating that a 1 percent increase in the processing and post-harvest subsystem influences the total income by 0.44 percent. The processing and post-harvest subsystem involves activities such as administrative bookkeeping, product selection, and utilization of livestock waste. On the other hand, post-harvest handling of agricultural products encompasses all the necessary treatments and direct processing to improve their quality, extend shelf life, and enhance their utility.

V. Conclusions And Recommandations

Livestock farming, specifically cattle farming, in Kabupaten Deli Serdang is considered profitable and viable. This is evidenced by the total revenue exceeding the total costs obtained by the cattle farmers in Kabupaten Deli Serdang. The variables that influence the income of cattle farming in Kabupaten Deli Serdang are the number of livestock ownership (X1), farmer's age (X2), level of education (X3), farming experience (X4), number of dependents (X5), productive female cattle (X6), feed costs (X8), and fattening period (X12). Overall, these variables have a positive impact on the income of the respondent cattle farmers, except for the variable of productive female cattle (X6), cost of medicine and vaccines (X9), and labor costs (X11), which have a negative influence on the income of cattle farmers. The variable with the greatest and most responsive impact on the income of cattle farmers is the number of livestock ownership (X1).

The most influential subsystem of agribusiness on income is the livestock farming subsystem (X2) with a coefficient of 0.466. The direct impact of the livestock farming subsystem (X2) on income is greater than the overall impact of the studied agribusiness subsystems. Therefore, if farmers want to increase their income, they should focus on further improving the livestock farming subsystem for beef cattle.

It is recommended for farmers in the upstream subsystem to allocate more initial capital to their livestock business. In the livestock farming subsystem, it is advisable to use intensive farming practices as they are more effective and efficient compared to semi-intensive practices. In the processing and post-harvest subsystem, farmers are encouraged to be creative in utilizing cattle manure to increase its market value and generate additional income. Additionally, in the marketing subsystem, beef cattle farmers should enhance their marketing strategies. Similarly, in the support subsystem, the government should ensure the adequacy of supporting physical facilities and infrastructure to facilitate the activities of each subsystem participant.

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