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CATTLE, CULTURE, AND CALCULATIONS: A LOGISTIC REGRESSION ANALYSIS OF LIVESTOCK SELLING DECISIONS IN DELI SERDANG, INDONESIA

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ABSTRACT

This study examines the factors influencing farmers' decisions to sell beef cattle in Deli Serdang Regency, Indonesia, using a logistic regression approach. The research was conducted in two sub-districts—Pancur Batu and Hamparan Perak—between November 2024 and January 2025. A purposive sampling method was used to define the target population, while snowball sampling recruited 40 respondents, beginning with four initial informants. Both qualitative insights and quantitative logit modeling were employed to analyze the data. Findings indicate that six independent variables collectively explain 42% of the variance in selling decisions. Partially, perceived cattle prices and religious festive moments significantly influence sales behavior. Higher price perception increases the likelihood of selling, whereas factors such as cattle quality, household needs, and herd size tend to discourage it—highlighting the role of livestock as both economic buffer and cultural asset. This study contributes novel insights by integrating cultural values with economic rationality in modeling farmers' decision-making. It underscores the importance of recognizing localized socio-economic dimensions in shaping agrarian policy, livestock trade strategies, and evidence-based rural development programs. The study recommends that future research on rural economic behavior explicitly incorporate cultural variables as critical determinants in agricultural decision-making processes.

Keywords: *Agrarian Policy, Cattle Sales, Cultural Values, Economic Behavior, Rural Development*

INTRODUCTION

In Indonesia's agrarian regions, cattle hold value far beyond their economic utility. For many farmers, cows represent living savings, symbols of social status, and integral elements of familial cultural identity (Löhde, 2025; Villalba-Eguiluz et al., 2023). This is particularly evident in Deli Serdang Regency, North Sumatra, where people do not simply sell their livestock based on high market prices. Instead, the decision to sell or retain cattle often involves complex considerations—ranging from market calculations, socio-religious timing, to perceptions of long-term household economic security. This issue becomes especially significant when connected to rural economic development initiatives centered on livestock sectors (Hornby & Hull, 2023; Murphy et al., 2022). Sibuea et al. (2023) have noted inconsistent fluctuations between cattle population numbers and sales volumes in this region. At the same time, most capacity-building

programs for farmers remain focused on physical productivity, while the behavioral economic aspects behind selling decisions remain underexplored. Yet understanding how and why these decisions are made is key to formulating more effective and contextually grounded livestock trade policies.

A number of prior studies have sought to explain the economic and social drivers behind livestock sale decisions. For example, Clarkson et al. (2022), Gongal et al. (2022), and Jobirov et al. (2022) found that market price and household needs are the primary determinants of livestock sales in Africa and South Asia. In Indonesia, research by Cook et al. (2025), Sari et al. (2024), and Williams et al. (2022) has shown that market access and production capacity have major impacts on livestock dynamics, though these studies have not delved deeply into personal decision-making processes. Studies by Sukmana et al. (2024) and Valerio et al. (2024) further examined the context of government livestock aid but did not focus on decision-making within open market systems.

Other studies have started to touch upon the relationship between culture and economic behavior, such as Iyai et al. (2024), who observed that livestock in Papua is used as a symbol of wealth, or Hilmiati et al. (2024) and Ismiaji et al. (2025), who highlighted the role of livestock as a form of family savings. However, these approaches remain largely descriptive and have yet to be integrated into quantitative statistical models capable of simultaneously measuring the contribution of each factor. Logistic regression modeling in the context of livestock sale decisions in Indonesia remains rare, and when used, tends to be limited to formal economic variables (Kurniawan et al., 2024; Li et al., 2022; Saengwong et al., 2025; Susanti et al., 2023).

Within this research landscape, there is a gap that remains largely unexplored—how farmers' seemingly rational economic logic is always embedded within a cultural framework. Even when prices are high, farmers may not sell; and even under urgent needs, sales may be withheld due to symbolic values and long-term strategies. This highlights the need to unify two approaches: precise quantitative statistics and contextual interpretation of local social values.

This study emerges at the intersection of cattle as capital and cattle as culture. It not only seeks to answer the question of "which factors most influence the decision to sell cattle," but also investigates how various economic and social considerations are interlinked. Using a logistic regression model, the study evaluates six primary predictors of cattle sales decisions: household needs, cattle prices, quality, quantity, gender of the animal, and the timing of major religious holidays. More importantly, the statistical findings are interpreted within the socio-cultural framework of local cattle farmers, allowing each coefficient to carry meaning beyond numerical value.

Through this approach, the study contributes to the social sciences and humanities by offering an interdisciplinary framework that combines statistical precision with deep social understanding. Integrating cultural values into economic models not only enriches scientific approaches but also provides a solid foundation for evidence-based, context-sensitive policies in agrarian development, livestock trade systems, and rural empowerment.

The objective of this study is to analyze the determining factors behind cattle sale decisions in Deli Serdang Regency using logistic regression, while also exploring how local cultural values influence farmers' economic behaviors. This approach is expected to strengthen cross-disciplinary understanding of Indonesia's rural economy dynamics and serve as a basis for more socially sensitive policymaking.

RESEARCH METHOD

This study is designed to understand the dynamics behind farmers' decisions to sell cattle by examining economic and cultural factors concurrently. To achieve a comprehensive and contextual understanding, an integrative quantitative and qualitative approach is employed. This methodology captures two essential sides of the phenomenon: one that is numerical and statistically measurable, and another that is cultural, contextual, and demands in-depth interpretation of farmers' social realities.

The research location was purposively selected in Deli Serdang Regency, North Sumatra, specifically in Pancur Batu and Hamparan Perak subdistricts. The choice of Deli Serdang is deliberate, as the area is a key center for beef cattle farming in the province, with a high cattle population and an economy closely tied to smallholder livestock systems. Furthermore, both subdistricts show diverse farmer characteristics in terms of market access, selling preferences, and cattle-raising practices. These factors make Deli Serdang a representative setting for exploring the complexity of livestock sales decision-making.

The study was conducted over a three-month period, from November 2024 to January 2025. This timing was strategically chosen to include the post–Eid al-Adha period—when livestock sales trends shift—and the beginning of the year, when farmers typically reassess their household economy. Livestock sale decisions are often influenced by seasonal cycles, especially those involving religious holidays, children's education expenses, and other early-year financial needs. Thus, this timeframe offers a reflective window to observe selling behavior.

The study involved 40 respondents, all active cattle farmers in the two subdistricts. Respondents were selected using a snowball sampling technique, beginning with four key informants known to possess extensive knowledge of the local livestock network. This method was chosen because information on livestock sales practices tends to be undocumented and can only be traced through social relationships among farmers. In line with Du & Costello (2025), snowball sampling is highly effective in closely-knit, informal social contexts like farming communities, where personal trust is essential for data access. From the initial informants, the network expanded until 20 respondents were reached in each subdistrict.

Data collection employed a combination of field observations, in-depth interviews, closed-ended Likert-scale questionnaires, as well as photographic documentation and field notes. Interviews were used to explore cultural background and personal motives in decision-making, while the questionnaire measured farmers' perceptions of the six main variables:

household needs, cattle prices, animal quality, ownership quantity, animal gender, and religious holiday timing. The Likert scale was chosen for its ability to represent perceptions numerically for statistical analysis (Adejare, 2025). All primary data were obtained directly from respondents, while secondary data were drawn from BPS reports, the Deli Serdang Livestock Department, and relevant academic publications.

To ensure data validity and reliability, method and source triangulation were conducted. Method triangulation was achieved through the complementary use of observation, interviews, and questionnaires, while source triangulation involved checking consistency across respondents within the same social network. Additionally, to test the reliability of the questionnaire instruments, Cronbach's Alpha was calculated using SPSS version 25. An alpha value above 0.70 was considered indicative of acceptable reliability in social research (Alkhadim, 2022; Forero, 2023).

Data were analyzed using both qualitative and quantitative methods. Qualitative data were descriptively analyzed using narratives, key quotes, and contextual interpretation of respondents' answers. Quantitative data were analyzed using logistic regression (logit), which is suitable for modeling binary decisions—in this case, whether or not to sell livestock. Logistic regression was chosen because it does not require normally distributed independent data and is effective in explaining the probability of a decision based on predictor variables (Forero, 2023). Tests included Overall Model Fit, Goodness of Fit, Nagelkerke R Square, and Classification Matrix to ensure the model's reliability in predicting farmer behavior.

The use of logistic regression in this context is not merely to satisfy statistical requirements but also serves as a methodological tool to simultaneously interpret economic rationality and cultural influence within a single analytical framework. Each predictor variable is not only examined for statistical significance but also interpreted socially, so the findings can be used not only to answer scientific questions but also to inform more contextually grounded, just, and locally rooted policy recommendations.

RESULTS AND DISCUSSION

General Profile of Respondents and the Socioeconomic Context of Cattle Farmers

The respondents in this study are beef cattle farmers residing in two sub-districts of Deli Serdang Regency, namely Pancur Batu and Hamparan Perak. A total of 40 farmers were successfully interviewed using the snowball sampling method, starting from four key informants who hold central positions within the local livestock production and distribution network. These farmers represent diverse socioeconomic backgrounds and reflect the rural dynamics that influence livestock selling practices and decisions.

In terms of age, the majority of farmers belong to the productive age group, between 16 and 56 years old, accounting for 95% of total respondents. This indicates that cattle farming is still dominated by a relatively young generation, with a high adaptive capacity toward market

price fluctuations and household needs. Only two respondents (5%) are above 56 years old, indicating that farmer regeneration is ongoing, although not yet involving the very young generation.

Table 1 Age Distribution of Beef Cattle Farmers

Age (Years)	Number (Persons)	Percentage (%)
0 – 15	0	0
16 – 56	38	95
> 56	2	5

Source: Research Findings (2024)

In terms of formal education, most respondents have completed secondary-level education. Around 77.5% have completed senior high school, while the rest completed junior high school (15%), elementary school (5%), and only 2.5% have never received formal education. None of the respondents had completed higher education. However, their ability to understand market dynamics and engage with various actors in the livestock value chain shows that practical economic literacy is fairly developed in this group.

Table 2 Education Level of Beef Cattle Farmers

Education Level	Number (Persons)	Percentage (%)
No Formal Education	1	2.5
Elementary School (SD)	2	5
Junior High School (SMP)	6	15
Senior High School (SMA)	31	77.5
Higher Education	0	0

Source: Research Findings (2024)

In terms of experience, most farmers have been raising beef cattle for 1–10 years (72.5%), while the rest have between 11 and 25 years of experience. This indicates that cattle farming is not a seasonal activity, but a long-term economic strategy. Some farmers with over two decades of experience suggest that this business is passed down not only in technical skills but also in values and social norms.

Table 3 Cattle Farming Experience

Experience (Years)	Number (Persons)	Percentage (%)
1 – 10	29	72,5
11 – 20	8	20
> 25	3	7,5

Source: Research Findings (2024)

Family dependents are another important variable influencing farmers' behavior. Half of the respondents (50%) have 1–3 dependents, while 45% support 4–6 people. Only two farmers have more than six dependents. This reflects how household economic pressure shapes financial decisions, including when to sell or hold livestock as a form of family savings.

Table 4 Number of Family Dependents

Number of Dependents	Number (Persons)	Percentage (%)
1 – 3	20	50
4 – 6	18	45
> 6	2	5

Source: Research Findings (2024)

Beyond mere statistics, these characteristics indicate that beef cattle farming in Deli Serdang is part of a broader rural socio-economic adaptation strategy. As explained by Nugraha et al. (2023) and P. Singh et al. (2022), in agrarian societies, livestock is not only a source of income but also a form of cultural capital—an asset symbolizing status, honor, and social security. Livestock is preserved not only for financial gain but also to maintain one's social position within the community, especially in local patronage and informal exchange relations.

The role of cattle as a form of livestock saving is also common. Livestock is raised not for frequent selling, but as an economic reserve to be liquidated in emergencies such as education, health expenses, or religious festivities. This practice exemplifies what Herfeld (2022) describes as contextual rationality—a form of rationality shaped by local socio-cultural conditions. In many cases, farmers refuse to sell livestock even when prices are high, due to reasons that go beyond modern economic logic.

Logistic Regression Results: Factors Influencing Livestock Sales Decisions

To examine the factors influencing farmers' decisions to sell cattle, this study employed logistic regression analysis. The model testing was conducted through four main stages: assessing the overall model fit, conducting a goodness-of-fit test, evaluating the coefficient of determination (Nagelkerke R Square), and analyzing the classification matrix. Each stage provides insight into the model's quality, accuracy, and predictive power regarding the economic decisions made by farmers.

The first stage involved assessing the Overall Model Fit. This test determines whether the inclusion of independent variables improves the regression model compared to using only the constant. The -2 Log Likelihood (-2LL) value was used to measure this improvement. The initial -2LL value (L0) was 42.653, while the final -2LL value (L1) was 29.778. The difference between the two was 12.778, which is greater than the Chi-Square value (df = 6) of 12.591. This indicates that the null hypothesis (H_o) is accepted, and the model is considered fit—the independent variables contribute to improving the predictive model of sales decisions.

Table 5 Iteration of -2LL and Regression Coefficients

Iteration		-2 Log likelihood (L1)	Coefficients						
			Constant	Family Needs (X1)	Livestock Price (X2)	Livestock Quality (X3)	Livestock Quantity (X4)	Livestock Gender (X5)	Religious Festive Moment (X6)
Step 1	1	33.367	-2.443	-.028	.243	-.110	-.030	-.069	.215
	2	30.269	-4.212	-.096	.469	-.218	-.054	-.076	.337
	3	29.795	-5.319	-.142	.601	-.281	-.065	-.068	.404
	4	29.778	-5.607	-.152	.631	-.294	-.066	-.065	.419
	5	29.778	-5.621	-.153	.632	-.295	-.066	-.065	.420
	6	29.778	-5.621	-.153	.632	-.295	-.066	-.065	.420
Initial -2 Log Likelihood L0 : 42.653									

Source: Research Findings (2025)

The next step was to assess the model's goodness-of-fit using the Hosmer and Lemeshow Test. The significance value was 0.988, which is far greater than 0.05, indicating that the model fits the empirical data. This means the combination of independent variables in the model successfully reflects real-world conditions, and the model's predictions can be considered reliable (Ehrman & Kline, 2022; Zaidi & Al Luhayb, 2023).

Table 6 Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	1.735	8	.988

Source: Research Findings (2025)

The subsequent test was the Coefficient of Determination, measured by Nagelkerke R Square in logistic regression. This value indicates how much of the dependent variable's variation (sales decision) is explained by the independent variables. The results show that Nagelkerke R^2 = 0.420, meaning that 42% of the sales decisions can be explained by variables X1 through X6, while the remaining 58% is influenced by factors outside the model (Huang, 2022; H. P. Singh & Alhulail, 2022).

Table 7 Model Summary

-2LL	Cox & Snell R^2	Nagelkerke R^2
29.778	0.275	0.420

Source: Research Findings (2025)

To evaluate the partial influence of each variable, the logistic regression output is presented in the following table. Only two variables significantly influence the sales decision: livestock price (X2) and religious festive moments (X6), with significance values of 0.041 and 0.019 respectively ($p < 0.05$). Other variables such as family needs (X1), quality (X3), quantity (X4),

and gender (X5) were not statistically significant.

Table 8 Partial Effects of Independent Variables

	Independent Variables	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Family Needs (X1)	-0.153	0.232	0.433	1	0.511	.858	.544	1.353
	Livestock Price (X2)	0.632	0.310	4.164	1	0.041	1.882	1.025	3.453
	Livestock Quality (X3)	-0.295	0.241	1.500	1	0.221	.745	.465	1.193
	Livestock Quantity (X4)	-0.066	0.262	0.065	1	0.799	.936	.560	1.563
	Livestock Gender (X5)	-0.065	0.360	0.033	1	0.856	.937	.463	1.897
	Religious Holiday Moment (X6)	0.420	0.179	5.478	1	0.019	1.522	1.071	2.163
	Constant	-5.621	5.802	0.938	1	0.333	.004		

Source: Research Findings (2025)

Table 8 above shows that, out of the six independent variables analyzed, only two were found to have a statistically significant effect on farmers' decisions to sell their cattle: perception of livestock prices (p = 0.041) and religious holiday moments (p = 0.019). The other variables—namely household needs, cattle quality, ownership quantity, and livestock gender—had p-values greater than 0.05 and did not show statistical significance. However, these results should be interpreted not only from a technical perspective but also through an approach that considers the complexity of farmers' behavior as economic actors operating within specific social and cultural contexts.

The variable of cattle price perception has a positive coefficient (0.632) and an odds ratio of 1.882, meaning that each one-unit increase in the perception of high prices increases the likelihood of selling livestock by 88.2%. This reflects the dominance of rational economic logic, where farmers actively respond to market incentives to maximize profits when prices are favorable. This finding confirms that, although farmers operate within traditional social structures, they remain sensitive to market signals in making economic decisions. Similarly, religious holiday moments such as Eid al-Adha also play a significant role, with a coefficient of 0.420 and an odds ratio of 1.522, indicating that the perception of the relevance of festive moments increases the probability of livestock sales by 52.2%. This phenomenon illustrates that farmers' economic practices are inseparable from the cultural cycles and social calendar of the local community, where seasonal demand spikes are leveraged as economic opportunities.

Conversely, several statistically insignificant variables open up interesting sociological interpretations. For instance, the variable of household needs has a negative coefficient (-0.153) and an odds ratio of 0.858, indicating that an increase in household needs actually decreases the

likelihood of selling livestock by 14.2%. This suggests that livestock, in this context, is not merely regarded as a market commodity but rather as "living savings" or a strategic economic reserve to be sold only in truly urgent situations. Within this framework, livestock serves as a form of social protection, reflecting a rationality distinct from the principle of short-term utility maximization.

Likewise, the variable of cattle quality (coefficient -0.295; odds ratio 0.745) shows that the higher the perception of livestock quality, the lower the likelihood of selling, with a decrease in probability of about 25.5%. This indicates that farmers tend to retain high-quality cattle as long-term assets, whether for breeding, reproduction, or symbolic investment purposes. The variables of livestock quantity (coefficient -0.066; odds ratio 0.936) and gender (coefficient -0.065; odds ratio 0.937) were also statistically insignificant, yet they still provide insights into the flexibility and selective considerations farmers employ when deciding the timing and type of livestock to sell.

Finally, to assess the model's accuracy in classifying farmers' decisions, a Classification Matrix was used. The model was able to predict farmers' decisions not to sell livestock with 55.6% accuracy, and to sell livestock with 93.5% accuracy. Overall, the model's accuracy rate was 85%, indicating that it is highly effective in predicting decisions based on the socio-economic factors analyzed.

Table 9 Classification Matrix of Logistic Regression Model

Actual Decision	Not Selling	Selling	Correct Percentage
Not Selling	5	4	55.6%
Selling	2	29	93.5%
Total Accuracy			85.0%

Source: Research Findings (2025)

Furthermore, the findings of this study can be analyzed through the lens of bounded rationality theory, which posits that farmers do not always act in classically rational economic ways—i.e., solely aiming to maximize profits based on market calculations—but instead make decisions based on limited information, cultural values, and local-contextual survival strategies (Khalil, 2022; Tsaoussi, 2021). For example, even though market prices indicate an increase—and in conventional economic theory this should trigger livestock sales—some farmers choose not to sell. This can be interpreted as a form of rationality that is constrained by risk perception, long-term preferences (such as keeping superior livestock for reproduction), and the symbolic meaning of livestock as a form of "living savings." In such conditions, farmers' decisions reflect more of a "satisficing" behavior than optimizing—i.e., subjectively adequate rather than objectively optimal.

Moreover, the significance of religious holidays in the regression results shows that the timing of sales is not only determined by market prices but also by social and cultural calendars. This indicates that farmers' economic rationality is both limited and shaped by social structures and cultural cycles.

These findings also strengthen the economic sociology approach, which sees the market not as a neutral arena but as embedded in social and cultural relations (Webster & Zhang, 2025). Therefore, rural development intervention models and livestock market policies must consider the real patterns of thinking and decision-making at the farmer household level, rather than relying solely on formal economic incentives.

Livestock Prices and Farmers' Economic Rationality

The positive and significant coefficient obtained for the variable of cattle price (X2 = 0.632; p = 0.041; Exp(B) = 1.882) confirms that when farmers perceive the market price as high, their probability of selling cattle significantly increases. Simply put, every one-point increase in price perception (based on the Likert scale used in the questionnaire) increases the selling probability by ±88.2%. This is consistent with classical economic logic, where economic actors will realize profits when prices reach favorable points (Fallahi et al., 2023; Weber & Wasner, 2023).

However, in the context of smallholder farmers in Deli Serdang, that number does not stand alone; it operates within a "local rationality" formed by expectations, price stability, short-term liquidity needs, and cultural norms embedded in livestock as strategic family assets.

Formally, this relationship is expressed in the logistic regression model used in this study:

$$\log\left(\frac{P}{1-P}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \mathrm{e}$$

Where Y is the decision to sell (1) or not to sell (0) cattle. Substituting the estimation results provides the following equation:

$$Y = -5{,}621 - 0{,}153X_1 + 0{,}632X_2 - 0{,}295X_3 - 0{,}066X_4 - 0{,}065X_5 + 0{,}420X_6 + \mathrm{e}$$

Among all variables, price (X2) and religious holiday moments (X6) are the two factors proven to significantly influence decisions, while household needs, quality, quantity, and livestock gender are statistically insignificant—although the direction of the coefficients carries social meaning (see previous discussion). In other words, high price acts as the main "economic trigger," but the final decision is still negotiated within a specific socio-cultural horizon: how liquid the household cash is at the time, expectations of future price increases, and the symbolic value of livestock in the family.

Nevertheless, "price" for farmers is not merely a nominal figure printed on the market board. It is a perceived price—shaped by informal information networks (chats at animal markets, brokers, middlemen, WhatsApp community groups, and past transaction experiences). This information is not always symmetric and perfect, making farmers' rationality bounded yet adaptive. They use practical heuristics: selling when "the price feels good," holding when "the price might still rise," or when high-quality livestock is seen as a "future asset" (Tsaoussi, 2021).

This finding also resonates with the large negative constant of the model (-5.621), which indicates that without price incentives or specific market momentum, the base probability of selling is very low (p ≈ 0.36%). This means that, at baseline, farmers tend to hold their livestock. When the price rises, only then do they feel a strong push to "liquidate" livestock as a source of income. This pattern aligns with the understanding of livestock as "livestock savings"—an asset not released unless it meets two conditions: peak price or urgent cash needs (Banu, 2023; Zant, 2023).

The connection between price and religious holidays (X6, B = 0.420; p = 0.019; Exp(B) = 1.522) also affirms that farmers utilize the cultural calendar as an economic calendar. During periods such as Eid al-Adha, when the demand for sacrificial animals increases, most farmers are aware that prices tend to improve and markets become more liquid, so they plan to release livestock during that window of opportunity. Thus, their economic rationality is not merely based on an "abstract market" but is bound to social-religious cycles and local market networks.

The implication is that policies relying solely on price interventions (e.g., subsidies or floor prices) are insufficient without market information transparency and the strengthening of equitable distribution networks. Programs for price information digitalization, strengthening of livestock market institutions, and contract sale mechanisms that consider seasonal demand peaks could be more targeted strategies. At the same time, since livestock are also cultural capital, policies must be sensitive to the social values that guide decision-making—not merely chasing short-term economic efficiency.

Religious Festivals as Economic Stimuli: Cultural Momentum in the Livestock Sector

In the context of beef cattle farming in Deli Serdang Regency, major religious holidays such as Eid al-Adha are not viewed merely as spiritual or social events, but are also strategically utilized by farmers as economic stimuli. The logistic regression analysis in this study reveals that the variable representing religious festivals has a significantly positive coefficient in relation to livestock sale decisions. This means that the stronger the farmer's perception of the importance of such cultural moments, the more likely they are to sell their cattle (see the Logistic Regression Equation section above). This finding aligns with Laruffa's (2025) concept of the embedded economy, which suggests that economic activities are inseparable from social structures and cultural values.

Generally, Eid al-Adha drives a drastic increase in demand for beef cattle, especially male cattle of certain weight and age, suitable for sacrificial rites. Farmers are well aware of this seasonal demand pattern and adjust their sales strategies accordingly, both in terms of timing and pricing. In an interview with one informant, Mr. R, he explained that cattle prices can increase by 10–20 percent before Eid al-Adha. Therefore, most farmers choose to hold off selling until just before the holiday to gain a higher profit margin.

This approach demonstrates that economic decisions made by farmers are not based solely on conventional market logic but are also influenced by culturally determined timing. This

phenomenon can be explained using the theory of rationalité contextuelle—a form of rationality shaped by social and cultural contexts rather than purely mathematical calculations. In practice, farmers do not rush to sell when prices rise; instead, they wait for socially significant times, such as before Eid al-Adha, when the cattle are valued not only for their weight and age but also for their symbolic worth as sacrificial animals.

Field observations support these findings. In Hamparan Perak District, the research team observed a surge in activity at local livestock markets two to three weeks before Eid al-Adha. Farmers were seen engaging more actively with traders and brokers, weighing price offers more carefully. Another farmer, Mrs. M, said that her family routinely holds back their best cattle ahead of major holidays due to increased demand and the arrival of buyers from other regions. Some even begin feeding their cattle special supplements two to three months in advance so that the animals appear healthier and more appealing to potential buyers.

This phenomenon strengthens the argument that integrating cultural cycles with economic activities is a rational practice in agrarian communities. Farmers operate not just under the profit-loss logic of a free market, but also take into account symbolic values and collective momentum rooted in local cultural life. In this context, Eid al-Adha becomes not merely a religious celebration but an economic opportunity window carefully anticipated by livestock actors. As emphasized by Laruffa (2025) in his notion of the substantive economy, economic practices in traditional societies are embedded in unique social practices and cultural institutions.

Moreover, the strategy of postponing sales until just before religious holidays reflects an adaptive capacity and risk management in farmers' decision-making processes. They intuitively understand seasonal market dynamics and align their production and distribution practices with the community's annual cultural cycle. In this regard, farmers are seen to operate within a cultural economy, where economic decisions are shaped by local values, collective memory, and long-term considerations—not merely by day-to-day price fluctuations.

In this study, the variable of religious holidays cannot be interpreted simply as a time indicator, but rather as a representation of value systems, collective expectations, and survival strategies tested within the dynamics of the local economy. Such practices should not be seen as irrational or backward; instead, they are evidence of a unique form of socio-economic intelligence within rural farming communities—an intelligence that enriches our understanding of culturally rooted economic decision-making.

Cattle as Cultural Assets: Why Farmers Do Not Immediately Sell?

In agrarian societies such as Deli Serdang, livestock—especially beef cattle—are not merely regarded as economic commodities to be sold at any time for profit. Instead, cattle hold strong cultural value and are considered a form of "living savings"—a flexible economic reserve that can be accessed in times of need. This finding is reflected in the logistic regression results, where three main variables—family needs, livestock quality, and quantity—showed negative coefficients that were not statistically significant, yet were socially meaningful.

First, family needs, often assumed to be a direct trigger for economic decisions, do not automatically lead to livestock sales. In an interview with a senior farmer, Mr. S, he explained that even when household expenses—such as children's school fees or health costs—increase, he does not immediately sell his cattle. He stated that it is better to retain the cattle as long as possible, so they can be sold under more urgent conditions or when prices are higher. This reflects a mindset that treats cattle like savings or even "family insurance," rather than regular market goods. This view is supported by McPeak et al. (2020), who argued that in pastoral and semi-agrarian societies, livestock form part of the cultural capital representing social resilience and family honor.

Second, livestock quality often becomes a reason to delay sales. High-performing cattle—in terms of weight, health, and gender—are considered to hold long-term economic potential or even symbolic status. In field observations, the research team found that some farmers gave special treatment to large, healthy male cattle. They refused to sell them even when attractive offers were made, explaining that the animals were reserved for "special" occasions like Eid al-Adha or for large-scale buyers. As Mrs. H, a female farmer in Tanjung Morawa village, said, "This cow is like my second child—it must be looked after carefully. If I sell it now, I might regret it later." This statement reveals how emotional attachment and long-term thinking shape economic decisions—factors not captured by classical economic models.

Third, the number of cattle owned plays a crucial role in decision-making flexibility. Farmers with more cattle tend to delay selling, indicating stronger risk management capabilities. They are not in a rush, as they have more "options" for monetizing their assets. During a direct visit to Mr. A's farm—who owns more than ten cattle—it was clear that he categorized his livestock by age and quality to match his annual sales targets. He remarked, "The younger ones can still be raised, the big ones—we wait for the right price." This decision reflects an understanding of value over time and the ability to read market cycles.

Meanwhile, the gender of the cattle (X5) had only a minor impact on selling decisions. This indicates that in practice, farmers do not prioritize gender as a key factor in economic evaluation. While male cattle generally fetch higher prices for sacrificial and fattening purposes, female cattle are valued as long-term reproductive assets. Thus, the economic and social functions of livestock are more complex than mere biological classification. This finding supports Susanti et al. (2023), who argued that farmers' economic decisions are not solely based on productivity but are also shaped by social symbolism and cultural preferences.

Theoretically, all of these phenomena reflect an economic decision-making system influenced by social relations, cultural values, and emotional loyalties—not merely market incentives (Khalil, 2022). This concept is highly relevant in understanding why, in communities like Deli Serdang, livestock are positioned as more than just tradable goods. They form part of a network of values, family memory, and meaningful survival strategies.

Cultural and Economic Integration within the Framework of Local Rationality

In understanding farmers' decisions to sell their livestock in Deli Serdang, it is crucial to regard the statistical results as an entry point—not the final conclusion. The logistic regression approach in this study indeed captures certain behavioral patterns, such as the significant influence of price perception and religious holidays. However, these figures do not stand alone; they are deeply embedded in social context, local values, and lived experiences that shape the unique rationality of livestock farmers. In this context, we are not merely referring to economic rationality in the sense of homo economicus, but rather to local rationality—a form of reasoning structured by cultural norms, social practices, and community-based adaptive strategies.

As stated by Mr. M, a farmer with over two decades of experience, "Not all profit needs to be quick. Sometimes we hold on, wait for the right time. It's not just about trading—it's about how we live from this livestock." This statement reflects that a farmer's calculations are not solely driven by supply and demand, but are also linked to social honor, family future, and reputation as a "good keeper" in the eyes of the community. These values are then transformed into practical principles that guide daily decisions and form part of the farmers' decision-making framework.

Field observations also reinforce this view. In Hamparan Perak Village, when the research team observed livestock transactions at the weekly market, it became clear that the negotiation process was not rigid or merely a price exchange. Many transactions began with long conversations about the animal's origin, how it was raised, and even personal stories of the farmer. One trader even said that buying a cow from a particular farmer "also means buying the trust and quality of how it's been raised." Such interactions indicate that the local economy operates within close-knit social relationships, as described by Laruffa (2025) through the concept of embeddedness—that economic action is always embedded in social networks.

This cultural and economic integration does not mean that farmers reject the logic of profit and loss. Rather, they place this logic within a broader framework—one that accounts for time, reputation, solidarity, and a sense of security. In other words, the decision to sell livestock is the result of social calculation, not merely financial. This strengthens the idea put forward by Villalba-Eguiluz et al. (2023), who emphasized that economic behavior in traditional communities often follows a "dual logic"—the logic of the market and the logic of culture—which run in parallel and balance one another.

From this perspective, the logistic model used in this study captures only one side of the complexity. Statistics may show a strong relationship between price perception and sales decisions, or that major religious holidays are key driving factors. However, without understanding the cultural context behind these variables, this data could be misinterpreted as a signal that farmers are simply opportunistic. In fact, as shown in the qualitative analysis, price perception itself is shaped by collective experience, information from social networks, and anticipation of cultural cycles such as Eid al-Adha or harvest festivals.

Furthermore, farmers do not separate the economic world from the social world. The quality and number of livestock are not just numbers on a balance sheet but also a reflection of family success, social status, and even a form of "savings" for the future. Therefore, statistical approaches cannot stand alone. They must be combined with qualitative readings and cultural understanding to provide a complete picture of how local communities make crucial life decisions.

The main strength of this research lies in its ability to unite two worlds: numbers and narratives, statistics and culture. Within the framework of local rationality, we learn that farmers' behavior is an expression of balance—between economic caution and a commitment to inherited social values. This integrative approach aligns with the spirit of contextual economics, which emphasizes that every economic behavior must be interpreted within the historical, social, and cultural context in which it occurs.

CONCLUSION

Based on the analysis and discussion, it can be concluded that livestock farmers' decisions to sell cattle in Deli Serdang Regency are not solely determined by market logic or economic pressures, but are the result of local rationality that combines cultural, social, and economic considerations. The logistic regression approach reveals that perceptions of market prices and major religious holidays significantly influence sales decisions. However, other variables—such as livestock quality, ownership quantity, and family needs—actually reinforce farmers' tendency to hold onto their livestock as a form of living savings and a symbol of social status. Therefore, this study successfully demonstrates that farmers' economic behavior cannot be understood solely through quantitative approaches, but requires integration with a deep understanding of local cultural values. The novelty of this research lies in how it combines statistical methods with cultural interpretation simultaneously, resulting in a more contextual and holistic analytical framework for explaining economic practices in agrarian communities.

ETHICAL STATEMENT AND DISCLOSURE

This study was conducted in accordance with established ethical principles, including informed consent, protection of informants' confidentiality, and respect for local cultural values. Special consideration was given to participants from vulnerable groups to ensure their safety, comfort, and equal rights to participate. No external funding was received, and the authors declare no conflict of interest. All data and information presented were collected through valid research methods and have been verified to ensure their accuracy and reliability. The use of artificial intelligence (AI) was limited to technical assistance for writing and language editing, without influencing the scientific substance of the work. The authors express their gratitude to the informants for their valuable insights, and to the anonymous reviewers for their constructive feedback on an earlier version of this manuscript. The authors take full responsibility for the

content and conclusions of this article.

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