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ON THE EVALUATION OF FORAGE MANAGEMENT PRACTICES APPLIED BY RUMINANT RAISERSUSING REGRESSION MODEL

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Abstract

The main aim of this research article is to evaluate the forage management practices of ruminant raisers in the Municipality of Jaro, Leyte, Philippines. The study also predicted the statistically significant factors of forage management practices and described their implications. A validated developed questionnaire was used to gather primary data for selected ruminant raisers in the Municipality of Jaro. Descriptive measures were calculated to provide the necessary information to describe the collected data and summarize it in statistical tables. Additionally, regression models were constructed to determine the significant predictors of forage management practices. The results depicted that, on average, ruminant raisers are not implementing forage management practices regarding planting, care and management, harvesting, and feeding procedures. This means that ruminant raisers are not implementing agricultural technologies that might improve their productivity and profitability. The regression analysis revealed that male ruminant raisers are implementing forage management as opposed to female raisers. In addition, the regression model showed that ruminant raisers are observing forage management if they have more number of ruminant animals. Moreover, it is depicted that ruminant raisers are more likely to practice forage management to increase their income. Hence, to encourage the ruminant farmers to implement forage management, the local government must conduct a seminar and educational training to introduce to them the new existing technologies and their advantages in the production process.

Key words**:** *forage management, ruminant raisers, predictors, regression modeling*

INTRODUCTION

Ruminant farming is considered one of the sources of income as well as a source of food for many Filipinos [12], [14]. In fact, ruminant farming in the country Philippines is one of the production business that earns significant profits that contributes to the national income [3]. In [7], it is stated that forage serves as a main source of food for ruminant animals which comprises various plant species that supply their dietary needs. In that case, forage management practices are crucial in ruminant raising to optimize the production process and provide enough food for the animals. It is worth noting that ruminant animals extract essential substances from forages that are essential to their growth with the help of their unique digestive system. In other words, the dependency of ruminant animals on forages is significant for them in regard to their health and development [16]. Apparently, the selection of the right forages for ruminant production results in nutritional and wellness implications.

In the country Philippines, raisers feed their ruminant animals with forages from their own grazing lands, however, farmers often lack an of understanding the impact of forages on their livestock's wellness. In [21], it is mentioned that innovation in processing new feed forages is important to help ruminant animals adjust to the changes in global temperatures and climate change which is a vital part of their growth. Hence, enhancing forage management practices among ruminant raisers is necessary as it promotes awareness and the effective optimization and utilization of livestock resources [3]. In fact, over the years, there are changes have taken place in ruminant raising production which is driven by advancements in modern technology, management strategies, growth enhancers, and financial incentives [17], [22].The positive results of this initiative are more marked in developed regions, where the animal production of food has increased and involves larger farms [7], [12], [14]. With that, it is important to acknowledge and resolve the hunger and poverty that exist worldwide. Perhaps, there remains a widespread deficiency of knowledge regarding the forage management and sustainable production of meat and poultry worldwide [4].

On the face of it, the investigation of forage management practices will lead to sustainable ruminant production and may increase the farmer's income. Although there are studies that deal with forage management, the evaluation of the factors is scarcely mentioned. With that research gap, this study exists. In general, the study aims to assess the awareness of forage management practices among ruminant raisers in Jaro, Leyte as the basis for designing a sustainable forage production and investigate the factors affecting its implementation. This study is significant because it aims to improve forage management practices among ruminant raisers, enhancing animal health and wellness, as well as the production process. By promoting sustainable forage production, the study seeks to boost resource efficiency, reduce environmental impact, and ensure long-term agricultural viability. The findings hope to provide a foundation for designing effective, eco-friendly forage systems, benefiting both ruminant raisers, animal consumers, the economy, and the ecosystem.

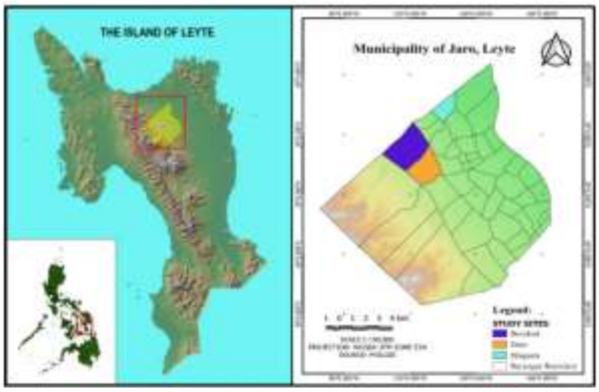
MATERIALS AND METHODS

Research Design

The goal of this investigation study is to elucidate the level of forage management practices and their determinants, hence, the research design employed in this article is descriptive-correlational which uses statistical measures and inferences. The study engaged a one-time survey for the data collection and involved primary information needed for the research design. The target of the design is to determine the cause and effect of the dependent and independent variables in the study. Moreover, the design made use of statistical inference to extract conclusions that may be used for future information about forage management practices to improve its current condition.

Research Locale, Respondents, Sampling, and Ethics

This survey study is restricted only to ruminant raisers in the three chosen barangays of Jaro, Leyte, Philippines such as(1) Burabod, (2) Hiagsam, and (3) Daro. These three barangays were selected since they have the highest number of ruminant raisers in the municipality of Jaro, Leyte. In addition, the said barangays have substantial grazing lands and water resources which makes them suitable for ruminant farming. Map 1 shows the picture of the three barangays in the municipality of Jaro, Leyte, Philippines that are involved in the study.



Map 1. Municipality of Jaro, Leyte, Philippines.
Source: [15].

As the first step of the research survey, an ethical process was done by sending a formal consent letter to the Municipal Agriculture Office (MAO) of Jaro, Leyte indicating the purpose and its significance to ruminant farming. After approval to conduct the study, the list of all registered ruminant raisers was asked through their MAO secretary. In that case, there are 103 ruminant raisers on the list and the researchers decided to employ complete enumeration to collect accurate results considering that the population is manageable. Table 1 presents the distribution of respondents per barangay.

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Table 1. Distribution of respondents

1. Barangay	2. No. of Ruminant Raisers
3. Burabod	4. 39
5. Hiagsam	6. 35
7. Daro	8. 29
9. Total	10. 103

Source: Authors' guide (2024).

Additionally, a second formal consent was constructed for the chairmen of the said three Barangays involved in the survey informing them to inquire for permission to conduct the survey research and interview. Fortunately, the three chairmen per barangay were all positive and supportive of the research study. Hence, the survey took place from February to March 2024 focusing on evaluating the existing forage management practices by ruminant raisers. Furthermore, the ruminant raisers who participated in the study were informed that their cooperation was voluntary and the data collected from them were treated confidential.

Survey Instrument and Data Collection

In regard to the survey instrument, the study used a researcher-made questionnaire constructed in English language and translated into the local dialect (Leyte-Samaron) for the sake of ruminant raisers who are not fluent in English language. The research questionnaire has two parts namely (1) socio-demographic profile and (2) current forage management practices among ruminant raisers. For socio-demographic profile, the ruminant farmers were asked on their (i) age (in years), (ii) sex (male or female), (iii) civil status, (iv) educational attainment, (v) household size (count), (vi) monthly income (Philippine peso (PHP)) in ruminant raising, (vii) number of years in ruminant raising, (viii) number of current ruminant animal/s raise, and (ix) tenurial status. As for the forage management practices, respondents were asked a structured questionnaire involving a 3-point scaling on the following: (a) planting practices (3 questions), (b) care and management (9 questions), (c) harvesting (4 questions), and (d) feeding (5 questions). Table 2 depicts the possible forage management practices perception score, and corresponding response and interpretation.

Table 2. Forage management practice perception score

Perception score	Response	Interpretation[a]
1.00-1.67	Disagree	Not practice
1.68-2.34	Neutral	Moderately practice
2.35-3.00	Agree	Practice often

Source: Authors' guide (2024).

The research instrument has undergone a validity test by some experts in social science holding at least a master's degree and found that it is valid to use for the survey. Additionally, using a Cronbach alpha [23] as a reliability test, it is found that the set questions for forage management practices are reliable as shown in Table 3.

Table 3. Reliability test forage management practices research instrument

Questions	Items	Alpha	Interpretation [23]
Planting practices	3	0.55	Poor but acceptable
Care and management	9	0.76	Fair
Harvesting	4	0.55	Poor but acceptable
Feeding	5	0.51	Poor but acceptable

Source: Authors' guide (2024).

Data Analysis and Statistical Model

To get robust and clear results, the data gathered has undergone quality control by clearing the missing responses and outliers. Qualitative responses were then coded to quantitative responses for statistical calculation using Microsoft Excel and formatted to fit into the statistical software called STATA. To provide a meaningful description of the data gathered, descriptive statistical metrics were computed such as Mean, standard deviation (SD), minimum (Min) value, and maximum value (Max). Descriptive results were then presented in a statistical table and interpreted accordingly. Moreover, forage management practices perception scores for each category question were summed up and considered as a continuous variable so that parametric statistics could be applied [8]. In predicting the determinants of forage management practices as the dependent variable, ordinary least square regression was used. In that case, the study has the empirical statistical model as follows:

$$FMPractice_i = c_0 + c_1 Age_i + c_2 Male_i + c_3 Married_i + c_4 Educ_i + c_5 HHsize_i + c_6 log(income_i + 1) + c_7 Nyears_i + c_8 Nruminant_i + c_9 Owner_i + \varepsilon_j \quad (1)$$

This study has four statistical models since forage management practices have four categories namely: planting practices (Model 1), care and management (Model 2), harvesting (Model 3), and feeding (Model 4). Hence, $FMPractice_i$ refers to the perception score for each category mentioned above. Moreover, $i$refers to the i^{th}ruminant raisers ($i \in \{1, 2, \ldots, 103\}$), $c_k (k \in \{1, 2, \ldots, 9\})$ refers to the models' parameters to be calculated by approximation, Age_i refers the age of ruminant farmers in years, $Male_i$ refers to a dummy variable that indicates a male ruminant raisers (0-female, 1-male), $Married_j$ refers to a dummy variable that captures a ruminant raisers who is officially married (0-non married, 1-married), $Educ_j$ refers to the ruminant raisers' educational attainment in the form of scoring (1-elementary level, 2-elementary graduate, 3-high school level, 4-high school graduate, 5-college level, 6-college graduate), $HHsize_i$ refers to the number of family members in the household, $log(income_i + 1)$ refers to the normalized (taking logarithm based 10) monthly income of ruminant raisers, $Nyears_i$ refers to the number of years in raising ruminant animals, $Nruminant_i$ refers to the current number of ruminant animals being raise during the survey, $Owner_i$ refers to a dummy variable that indicates a ruminant raisers who own farm land, andε_i refers to the remaining random errors in OLS regression model (1).To obtain statistically sound results, diagnostic tests for regression analysis were performed [2, 9, 20]. In this case, the null hypothesis (H_o) is that the forage management practices have no significant influence on the socio-demographic profile of ruminant raisers, and the alternative hypothesis (H_a) is the otherwise scenario. Furthermore, statistical computations in the regression analysis were subjected to the likelihood of rejecting H_o with the standard level of significance (1%, 5%, or 10%), and all calculations were aided with STATA software.

RESULTS AND DISCUSSIONS

Socio-demographic Profile

It is revealed in Table 4 that the age of the ruminant raisers in Jaro, Leyte, Philippines is close to 52.26 (SD=12.58) years old. The youngest of them is 23 years old and the oldest is 79 years old. This average age is consistent with the findings in [11] which found that farmers are relatively old. About 57% of the ruminant raisers are male and 43% of them are female. Most (75%) of them are married and about 25% of them are non-married (single, widower, etc). In regard to their mean educational attainment score, it is close to 2.79 (SD=1.65) which can be interpreted as high school level. Additionally, Table 3 shows that there is a ruminant raiser who is elementary level and the highest educational attainment is college graduate. Approximately, their household size is close to 2 (SD=0.77).

The monthly income of ruminant raisers is close to PHP 7,121.36 (SD=5,391.29) where the lowest is PHP 3,000 and the highest is 40,000.

Table 4. Ruminant raisers' profile (n=103)

Profile variable	**Mean**	**SD**	**Min**	**Max**
Age	52.26	12.58	23	79
Male[a]	0.57	0.49	0	1
Married[a]	0.75	0.44	0	1
Educational attainment	2.79	1.65	1	6
Household size	2.02	0.77	1	5
Income in ruminant raising[b]	7,121.36	5,391.29	3,000	40,000
Number of years in ruminant raising	23.19	18.12	1	63
Number of ruminant animals	2.83	1.49	1	8
Owner[a]	0.65	0.48	0	1

Note: a - dummy (indicator) variable; b - Philippine peso (PHP).
Source: Original computation (2024).

On average, the number of years in ruminant raising is close to 23.19 (SD=18.12) where the minimum is 1 year and the maximum is 63 years.

The number of ruminant animals raised is close to 3 (SD=1.49) where the minimum number is 1 and the maximum number is 8. About 65% of the ruminant raisers own their farmland for raising the animals and 35% of them do not own a land for ruminant raising. In [19], it is stated that owning land is very crucial due to competition for resources particularly in grazing.

Forage Management Practices

Table 5 depicted that ruminant raisers are not exercising *"Planting Practices"* (Mean=1.02, SD=0.11) such as testing soil fertility, seedbed preparation, proper seeding rates, and appropriate planting depth, and even rotating forage crops with other crops for ruminant raising. In [5], it is depicted that planting practices are one of the activities that increase production and yield. Secondly, ruminant raisers are not practicing any *"Care and Management"*(Mean=1.53, SD=0.19) in their forage fields such as monitoring signs of pests, diseases, nutrient deficiencies, and maturity to optimize harvest timing and Implementing appropriate weed control. In addition, they are not practicing a regular assessment of forage quality, utilizing rotational grazing, implementing strategies to prevent soil compaction, and soil fertility management.After planting, care and management must be observed to produce a good quality of forage and the desired amount must be obtained [13].Thirdly, ruminant raisers are not also practicing *"Harvesting"* (Mean=1.18, SD=0.07) management for their forage such as appropriate harvesting schedule, equipment and techniques, storing harvested forages properly, utilization of additives, weather monitoring, and regrowth management for right recovery. It is mentioned in [18] that high-quality of forage can positively influence the profitability of ruminant animals, hence, optimizing forage harvest is highly suggested. Lastly, ruminant raisers are not exercising any *"Feeding"*(Mean=1.50, SD=0.15) management such as incorporating harvested forages into the ruminants' diets, prioritizing rotational grazing, balancing forage-based diets, regular assessment of ruminants' body condition, seasonal adjustments in feeding strategies, and assessment of forage quality. It is mentioned in [6] that the right amount and feeding values must be observed to optimize the growth of the ruminant animals.

Overall, the ruminant raisers are not practicing (Mean=1.31, SD=0.22)forage management and new technology that might improve their productivity and profitability. This shows that these ruminant raisers need to be introduced to the new agricultural activities suitable to their production process through educational training and seminars. With the new agricultural technologies, farmers can progress their production activities and will have a resilient attitude towards the environment and climate change [1].

Table 5. Ruminant raisers' forage management practices

Practices	Mean	SD	Interpretation
Planting practices	1.02	0.11	Not practice
Care and management	1.53	0.19	Not practice
Harvesting	1.18	0.07	Not practice
Feeding	1.50	0.15	Not practice
Total	**1.31**	**0.22**	**Not practice**

Note: a-Scale 1 to 3.
Source: Original computation (2024).

Regression model

Table 6 presents the diagnostic tests for the four (4) regression models to measure the consistency and validity of the results [9, 20]. These four models have the same possible independent variables and they showed no multicollinearity (mean VIF=1.36) problem [2]. The dependent variable for Model 1 is the ruminant raisers' perception score on *"Planting Practices"*. The diagnostic tests showed that Model 1 is Heteroscedastic (X^2=108.31; p-value<0.001), no omitted variable bias (F=1.37; p-value=0.256), and residuals are not normally distributed (Z=108.31; p-value<0.001). Model 2 dependent variable is the "C*are and Management"* perception score; diagnostic tests showed that it is not Heteroscedastic (X^2=0.55; p-value=0.459), no omitted variable bias (F=2.52; p-value=0.063), and residuals are not normally distributed (Z=2.261; p-value=0.011). Additionally, Model 3 dependent variable is *the "Harvesting"*perception score and the diagnostic tests depicted that the model is Heteroscedastic (X^2=65.89; p-value<0.001), has omitted variable bias (F=4.40; p-value=0.006), and residuals are not normally distributed (Z=3.563; p-value=0.034). Furthermore, Model 4 dependent variable is *the "Feeding"*perception score and it is found that the model is Heteroscedastic (X^2=10.32; p-value=0.001), has no omitted variable bias (F=2.59; p-value=0.058), and residuals are not normally distributed (Z=5.26; p-value<0.001). In that case, models are adjusted by robust options in the STATA program to get statistically sound results [9].

Table 6. Diagnostic tests for regression models

Test Statistic		p-value	Interpretation
Model 1: The dependent variable is the Planting practices score			
Breusch-Pagan test	χ^2=108.31	<0.001	Heteroscedastic
Ramsey RESET test	F=1.37	0.256	No omitted variable bias
Variance inflation factor (VIF)	Mean VIF=1.36	-	No Multicollinearity
Shapiro-Wilk test	Z=9.059	<0.001	Residuals are not normal
Model 2: The dependent variable is the Care and management score			
Breusch-Pagan test	χ^2=0.55	0.459	Not heteroscedastic
Ramsey RESET test	F=2.52	0.063	No omitted variable bias
Variance inflation factor (VIF)	Mean VIF=1.36	-	No Multicollinearity
Shapiro-Wilk test	Z=2.261	0.011	Residuals are not normal
Model 3: The dependent variable is the Harvesting score			
Breusch-Pagan test	χ^2=65.89	<0.001	Heteroscedasticity
Ramsey RESET test	F=4.40	0.006	Has omitted variable/s bias
Variance inflation factor (VIF)	Mean VIF=1.36	-	No Multicollinearity
Shapiro-Wilk test	Z=3.563	0.034	Residuals are not normal
Model 4: The dependent variable is the Feeding score			
Breusch-Pagan test	χ^2=10.32	0.001	Heteroscedastic
Ramsey RESET test	F=2.59	0.058	No omitted variable bias
Variance inflation factor (VIF)	Mean VIF=1.36	-	No Multicollinearity
Shapiro-Wilk test	Z=5.260	<0.001	Residuals are not normal

Source: Own calculation based on data gathered (2024).

Fig. 1, 2, 3, and 4 presented the Kernel density estimate and normal density for the residuals of Models 1, 2, 3, and 4, respectively, which indicates that the residuals are far from normality. This implies that the response variables of the four models are skewed.

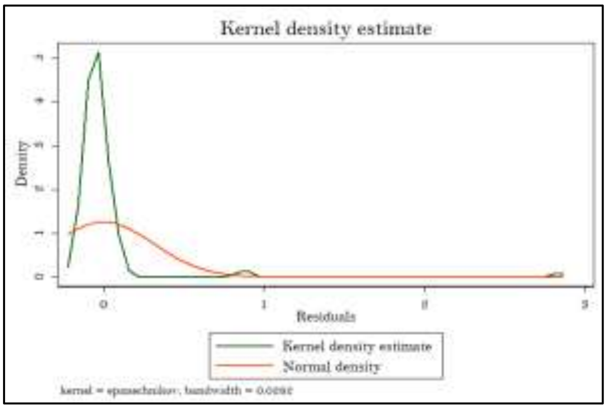

Fig. 1. Kernel density estimate and normal density for residuals of regression model 1.
Source: Original construction (2024).

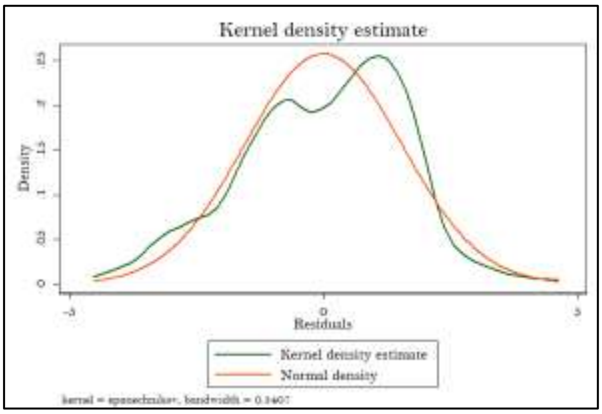

Fig. 2. Kernel density estimate and normal density for residuals of regression model 2.
Source: Original construction (2024).

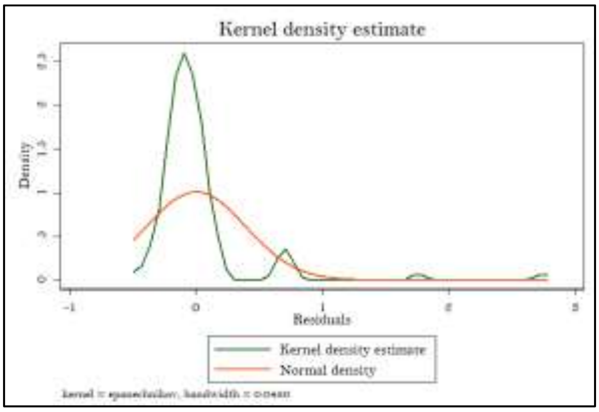

Fig. 3. Kernel density estimate and normal density for residuals of regression model 3.
Source: Original construction (2024).

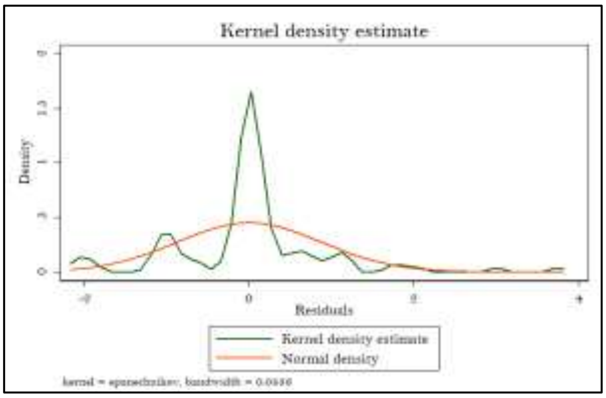

Fig. 4. Kernel density estimate and normal density for residuals of regression model 4.
Source: Original construction (2024).

Table 7 presented the regression models 1 and 2 with the *"Planting practices"* and *"Care and management"* perception scores as dependent variables, respectively. The two models are both not significant (Model 1: F=0.35, *p*-value=0.95; Model 2: F=0.48, *p*-value=0.88) and revealed a very little coefficient of determination (Model 1: R^2=0.05; Model 2: R^2=0.04). However, the individual T-test for independent variables showed some significant predictors. In Model 1, it is shown that age (*p*-value=0.407), civil status (*p*-value=0.738), educational attainment (*p*-value=0.985), household size (*p*-value=0.340), income (*p*-value=0.959), number of years in ruminant raising (*p*-value=0.291), number of ruminant animals (*p*-value=0.286), and tenurial status (*p*-value=0.811) are not significant predictors of *"Planting practices"*. The only significant independent variable in Model 1 is sex (*p*-value=0.099) at a 10% level and the positive coefficient indicates that male ruminant raisers are the ones who observed *"Planting practices"*. In [10] and [11], males are more capable in farming activities and they are more efficient because most of the tasks are masculine in nature. Meanwhile, Table 5 showed that the variables such as age (*p*-value=0.942), civil status (*p*-value=0.634), educational attainment (*p*-value=0.598), household size (*p*-value=0.915), number of years in ruminant raising (*p*-value=0.693), number of ruminant animals (*p*-value=0.923), and tenurial status (*p*-value=0.452) are not significant predictors of *"Care and management"* in Model 2. The significant independent variables in Model 2 are sex (*p*-value=0.091) and income (*p*-value=0.092) both at a 10% level. These results imply that male (positive coefficient) ruminant raisers are observing *"Care and management"* than females which is consistent with the results in [11]. Moreover, findings indicated that ruminant raisers with lower income (negative coefficient) are more observing *"Care and management"* as opposed to raisers with higher income.

Table 7. Regression (OLS) models 1 and 2.

Independent variables	Model 1		Model 2	
	Coeff.	Std. Error	Coeff.	Std. Error
Age	0.003^{ns} (0.407)	0.004	-0.001^{ns} (0.942)	0.016
Sex[a]	0.081* (0.099)	0.054	0.450* (0.091)	0.338
Civil status[a]	0.013^{ns} (0.738)	0.039	0.186^{ns} (0.634)	0.389
Educational attainment	0.001^{ns} (0.985)	0.030	0.065^{ns} (0.598)	0.124
Household size	0.027^{ns} (0.340)	0.028	0.024^{ns} (0.915)	0.229
log (income[b]+1)	0.007^{ns} (0.959)	0.142	-1.559* (0.092)	1.041
Number of years in ruminant raising	-0.003^{ns} (0.291)	0.003	-0.004^{ns} (0.693)	0.011
Number of ruminant animals	0.026^{ns} (0.286)	0.024	-0.011^{ns} (0.923)	0.123
Tenurial status[a]	0.018^{ns} (0.811)	0.076	0.278^{ns} (0.452)	0.368
No. of observation	103		103	
F-test computed	0.35		0.48	
p-value	0.95		0.88	
R²	0.05		0.04	

Note: a - dummy (indicator) variable; b - Philippine peso (PHP); *p*-values are enclosed with parenthesis.
Source: Original computation(2024).

It is worth noting that making the right and optimal decisions in organizing and operating a farm leads to maximizing production and profitability [10], [14].

Table 8 shows the regression models 3 and 4 with the *"Harvesting"* and *"Feeding"* perception scores as dependent variables, respectively. Again, the models are not significant (Model 3: F=1.07, *p*-value=0.39; Model 4: F=0.47, *p*-value=0.88) and revealed a very little goodness of fit (Model 3: R^2=0.11; Model 4: R^2=0.04). The same with models 1 and 2, the individual T-test for independent variables showed some significant predictors for models 3 and 4.

Model 3 revealed that age (*p*-value=0.538), civil status (*p*-value=0.748), educational attainment (*p*-value=0.921), household size (*p*-value=0.172), income (*p*-value=0.460), number of years in ruminant raising (*p*-value=0.739), and tenurial status (*p*-value=0.285) are not significant predictors of *"Harvesting"*.

Table 8. Regression (OLS) models 3 and 4

Independent variables	Model 3		Model 4	
	Coeff.	Std. Error	Coeff.	Std. Error
Age	0.003[ns] (0.538)	0.004	0.002[ns] (0.822)	0.008
Sex[a]	0.157** (0.032)	0.072	-0.059[ns] (0.750)	0.187
Civil status[a]	0.023[ns] (0.748)	0.073	0.194[ns] (0.350)	0.207
Educational attainment	-0.004[ns] (0.921)	0.038	-0.003[ns] (0.953)	0.060
Household size	0.074[ns] (0.172)	0.054	0.059[ns] (0.610)	0.116
log (income[b]+1)	-0.145[ns] (0.460)	0.196	-0.668[ns] (0.274)	0.607
Number of years in ruminant raising	-0.001[ns] (0.739)	0.003	0.003[ns] (0.612)	0.006
Number of ruminant animals	0.045* (0.096)	0.029	-0.047[ns] (0.378)	0.053
Tenurial status[a]	0.086[ns] (0.285)	0.080	0.027[ns] (0.901)	0.219
No. of observation	103		103	
F-test computed	1.07		0.47	
p-value	0.39		0.88	
R^2	0.11		0.04	

Note: a - dummy (indicator) variable; b - Philippine peso (PHP); p-values are enclosed with parenthesis; *-significant at 10% level; **-significant at 5% level.
Source: Original computation (2024).

The significant independent variable for Model 3 is sex (*p*-value=0.032) at a 5% level and number of ruminant animals (*p*-value=0.096) at a 10% level. The results showed that male (positive coefficient) ruminant raisers are practicing forage management in terms of harvesting compared to females. Again, this result is parallel to the discoveries in [10] and [11]. Additionally, a raiser with a higher number of ruminant animals (positive coefficient) is more likely to observe forage management in *"Harvesting"* as opposed to raisers with a lower number of ruminant animals. In [18], it is portrayed that management in harvesting forage is crucial in maximizing limited resources and optimizing the production activities in raising ruminant animals. However, Model 4 revealed that variables such as age (*p*-value=0.822), sex (*p*-value=0.750), civil status (*p*-value=0.350), educational attainment (*p*-value=0.953), household size (*p*-value=0.610), number of years in ruminant raising (*p*-value=0.612), number of ruminant animals (*p*-value=0.378), and tenurial status (*p*-value=0.901) are not significantly affecting the *"Feeding"* management of ruminant raisers. This implies that ruminant farmers do not have enough understanding in regard to the importance of managing the feeding activities and strategies of ruminant animals which can influence the health and wellness as well as the growth process [22].

CONCLUSIONS

The study concluded that ruminant raisers do not implement forage management practices in terms of right planting practices, care, and management for forage, harvesting, and as well as feeding procedures. This implies that ruminant raisers face challenges in practicing forage management, particularly in understanding and implementing suitable practices that involve new technology. Results have found that male ruminant raisers are more likely to practice forage management compared to female raisers indicating that farming is more suitable for male workers. It is also found that ruminant raisers practice forage management if they have more ruminant animals to optimize their resources. Moreover, ruminant raisers are encouraged to practice forage management to increase their productivity and profitability. Hence, the study suggests that to enhance forage management practices among ruminant raisers, education and outreach efforts should be intensified to raise awareness and promote the adoption of modern technologies alongside traditional knowledge, thus improving overall productivity and sustainability. Moreover, ruminant raisers require support to enhance planting and care practices, while ensuring a strong emphasis on forage quality and sustainable grazing methods. The study's limitation is that it only deals with socio-demographic profiles as predictors of forage management practices, hence, the study strongly recommends incorporating the variables such as access to credit and economic behavior like resilience in the regression model as future research.

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