



# Awareness, Acceptability and Perceptions of Meranao Livestock Raiser on Silage as Alternative Feedstuff

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## ABSTRACT

This paper is a short-term research aimed to investigate the awareness, acceptability and perceptions of selected farmers in Guimba, Marawi City and Roqero, Raman, Lanao del Sur Province about silage. Selected demographic profile of the farmers were also obtained. The study used mixed method (quantitative and qualitative) design involving 36 purposively selected farmers through snowball technique. Data collection tools were video presentation, focus group discussion and Likert scale survey questionnaire. Descriptive and correlational statistics were used in the analysis of data. Findings revealed that the farmers have varying ages, both men and women are engaged in farming with cow as the main livestock they rear, but in a very few numbers of heads, and they mostly have elementary education only. However, despite their limited education and zero knowledge and awareness about silage, they are willing to learn and adapt the silage technology. Age, sex, and education positively influence on their type of livestock and number of livestock raised, while awareness, acceptability and perceptions on silage has varying influence to farmers demographic profile per location. These findings implied that regardless of age, sex and educational attainment, farmers are willing to learn new things, new skills, and new technology for the augmentation of their knowledge and skills, livelihood and economic status in life. As such, this study recommends that farmer field school (FFS) program must be established in the area to educate the farmer not only on silage making but to include various farm practices, management strategies, and technological up-gradation.

## 1. INTRODUCTION

This short-term research assessed the awareness, acceptability and perceptions of Meranao livestock growers and farmers about silage as feeds for their livestock. Silage is a feedstuff produced from controlled fermentation under anaerobic conditions of chopped crops or forages. Silage can be easily made

using various crop or forages and facilities from simple to complicated set-up. The naturally occurring bacteria present in the crops or forages are responsible for converting some of the plant sugars into organic acids that preserve nutritional qualities. Silage making is one of the different methods of forage conservations that is very important to ensure that there is no feed gap of the livestock during

extreme weather conditions. According to Klopfenstein et al. (2013), Wilkinson and Toivonen (2003), silage is an important method for preservation of forages for livestock feeding in the US and around the world respectively.

Silage making and production is not only intended for personal consumptions of the livestock owner but it is also a profitable agricultural business all over the world. Various studies have been conducted on the importance of silage in agriculture and many of them claimed the importance of silage industry and forage conservation due to the unpredictable and worsening climate change on the planet earth. Livestock productivity is mainly affected due to limited nutritious forages during extreme weather condition brought by climate change. Balehegn, Ayantunde, Amole, and Njarui, et. al (2021), mentioned that livestock productivity is currently constrained by complex systemic challenges due to limited supply of quality feed. Yet the demand for animal-source food is predicted to improve the livelihoods and food and nutrition security particularly among low and middle economic countries (Ritchie & Roser, 2017). Balehegn, et. al (2021), concluded in their study that forage conservation in any form, be it silage or hay, is the greatest opportunity to bridge the feed gap due to seasonal variability in feed quality and availability.

In the Philippines, several farms are already engaging corn silage making and production and build their cord silage business such as the MW farm in Zambales, Lupao, Nueva Ecija. Furthermore, the Department of Agriculture fully support silage production in the Philippines, and they will provide financial assistance or funding on silage production as it is mentioned during 14<sup>th</sup> Agricultural Fisheries Technology Forum and Product Exhibition (Aug. 30 – Sept 2, 2018). Likewise, the Philippine Carabao Center (2017), emphasize that the provision of sufficient and nutritious feedstuff is one of the most important issues faced by dairy buffalo management and also a challenge for farmers especially because the source of nutritious forage or grasses is very limited during summer season. As such, they encourage silage making here in the Philippines to provide a steady source of feedstuff for dairy buffalo. Research study conducted by Cañete, and Alvarez (2021), Commercialization of Green Corn-Based Silage Production for Dairy in Cagayan Valley: 4) Profitability and Viability Assessment concluded that green corn silage was very effective to the dairy animals both cattle and buffalo to increase milk production. Silage making also provided options to the farmers to engage business selling green corn silage to other dairy producers or sell green corn to silage makers. They also emphasized that green corn silage has huge demand waiting in the meat and dairy production in various provinces in the Philippines. Based on their findings, silage making and production is profitable and has greater income with greater return on investment with only few years to recover the investment.

Based on some literature and studies cited above on the great potential of silage not only for

forage conservation but also for business enterprise, still, only very few are engaging and using silage as agribusiness and feedstuff respectively, not only in the Philippines but also in other countries. Singh (2022) conducted a survey on the *Possible Reasons for Non-adoption of Silage Making in India – a Practitioner's View*, that the level of silage making adoption by smallholder dairy farmers is poor and highly dependent on farmer's education, farming experiences, financial status and extension services. Adoption of technologies greatly influences the socioeconomic circumstances and skills of the end users. Developing strategies to enhance adoption of forage conservation technologies is necessary to resource poor farmers, enabling them to increase animal production and enter expanding markets for livestock products. Likewise, Balehegn, Ayantunde, Amole, and Njarui, et. al (2021), research studies also concluded that capacity should be built in forage production and conservation, as well as pertinent aspects of ruminant production to ensure they understand and can promote their products properly to farmers. Farmer cooperatives and dairy farmers, should be linked and tied up for capacity building particularly on forage conservation techniques (Kilelu et al., 2021). There are various reasons for the non-adoption of silage in many low and middle-income countries. These reasons include a) lack of financial and other resources, b) limited supply of conservable forage, c) systemic limitations with the production system, land tenure, and market access, and gender-related constraints (Balehegn, Ayantunde, Amole, and Njarui, et. al, 2021).

Fueled by the limitations on the adoption of forage conservation more specifically on silage, due to various reasons or factors, this study is aimed to assess the awareness, acceptability and perceptions of selected Meranao livestock growers and farmers in the Philippines about silage as feeds for their livestock, and as a forage conservation technique. Specifically, it deals on the following questions:

- 1) What is the awareness level of the Meranao livestock growers/farmers on silage?
- 2) What is the willingness of the Meranao livestock growers/farmers to accept silage technology?
- 3) What is the perception of the Meranao livestock growers/farmers on silage production technology?
- 4) Is there a significant relationship between the awareness, acceptability and perceptions of the farmers to their profile such as age, sex, educational attainment, livestock raised and the number of heads of their livestock?

## 2. METHODOLOGY

### 2.1. Research Design

This short-term research made used a cross-sectional descriptive survey employing a mixed-method design of a qualitative-quantitative methodological triangulation to determine the socio-demographic information, and perceptions of farmers

about silage utilization and production. The design employed a pragmatic approach through the complementarity of the findings from a video presentation about silage, survey, questionnaire and focus group discussions to permit the breadth and depth of understanding about the subject matter and enable data collection within a short period (Palinkas, et. al, 2015; Warfa, 2016).

## 2.2. Participants

The participants of the study were purposively selected and with the use of snow ball technique with the following inclusion criteria:

- They should be a residence of Lanao del Sur Province
- The municipality is accessible and with stable peace condition
- A ruminant animal's raiser (cattle, buffalo, and goat), and
- Willing to participate in the survey and focus group discussion (FGD)

Based on the inclusion criteria, a total of 30 farmers who are livestock raisers successfully participated in the study, comprising 15 from Guimba and 15 from Roguero Bubong Lanao del Sur.

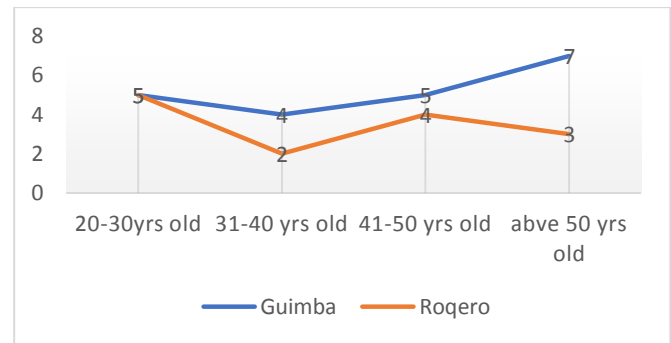
## 2.3. Data Collection and Analysis

Questionnaire was used as data collection tool. The said questionnaire is divided into 3 parts. Part A is for the demographic profile of the participants, Part B is an open-ended question for FGD, and Part C is a survey questions on a Likert scale which will disclose the awareness, acceptability and perceptions on silage. Prior to data collection, a video presentation about silage making and its economic importance was played among them. There were 2 sets of videos presented. After the video presentation, we supplemented with a brief discussion about silage, followed by the open forum. After the open forum we proceeded to our FGD and interview using the survey questionnaire.

Quantitative data obtain from the participants was analyzed using the statistical software SPSS 16 version specifically descriptive statistics (measures of central tendency and variability) and correlation analysis. Qualitative data from interview/ FGDs was transcribed, summarized, and categorized, and used as illustrative quotes to support the findings of the study.

## 3. RESULTS AND DISCUSSION

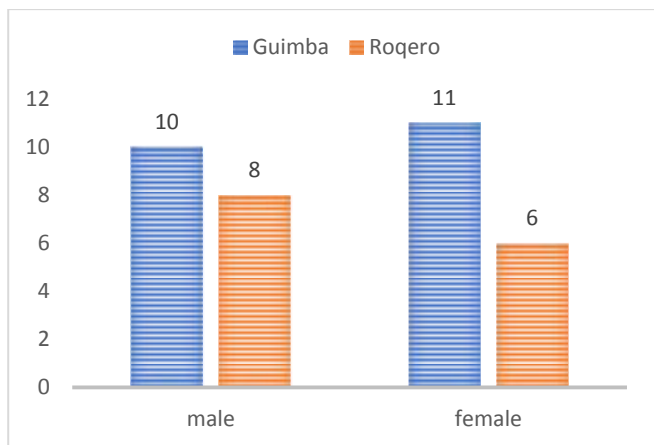
The profile distribution of the farmer's participants in terms of their age, gender, educational attainment, livestock reared and the number of heads of their livestock are shown in Figure 1-5 respectively.



**Figure 1. Age Profile of the Farmer's Participants**

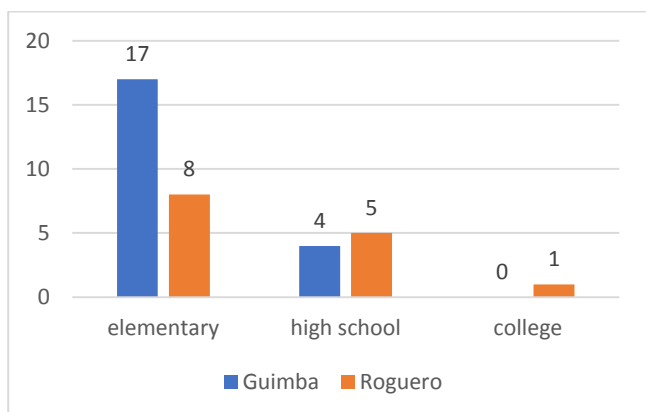
Figure 1 shows the age profile of the farmers' participants from Barangay Guimba, Marawi City and Barangay Roguero, Raman. These Barangays are located in the Lanao del Sur Province. As shown in the figure, majority of the farmer's participants in Guimba are aged 51 and above, while in Roguero, majority are very young farmers who are between 20-30 years old. Generally, the farmers who participated in the FGD and assessment are of various ages. This implies that despite their age range, they are willing to gain more knowledge to improve their farming way of life. Research study conducted by Guo, Wen, and Zhu (2015) pointed out that elderly farmers who do not intend to abandon farming had higher agricultural output compared to other farmers. Farmers of different ages operate with different technologies and use various inputs at different efficiency.

Figure 2 also show the sex distribution of the farmers. As can be gleaned in the figure, both male and female are interested in gaining knowledge about farming particularly on silage making, considering there is only a very small number difference with regards to male and female who participated in the FGD and assessment. Globally, reports of the United Nations' Food and Agriculture Organization (FAO), mentioned that the majority of economically active women in the least-developed countries work in agriculture. And, according to the 2012 Census of Agriculture (the latest data available), 30 percent of farmers in the U.S. are women (Duckett, Nd). Male and female farmers can have different farming objectives. According to the study conducted by **Vercillo (2020)**, the primary farming objectives of smallholder male farmers is to produce enough food to feed their family, while women smallholders tended to describe their farming largely in terms of cash generation. Despite their different primary objectives, still they engage in farming regardless of their gender.



**Figure 2. Gender distribution of the farmer's participants**

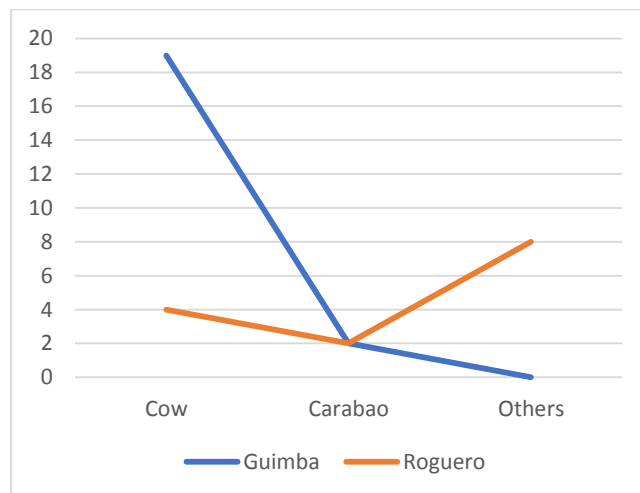
In terms of educational attainment among the farmers who participated in this survey, almost all of them only have elementary level of education as shown in Figure 3. However, their limited educational attainment did not hinder their eagerness to learn more on farming technologies that could help alleviate their economic status and enhance their livelihood. Oduro-ofori and Anokye (2015) concluded in their study that education play vital role in enhancing agricultural practices of the farmers.



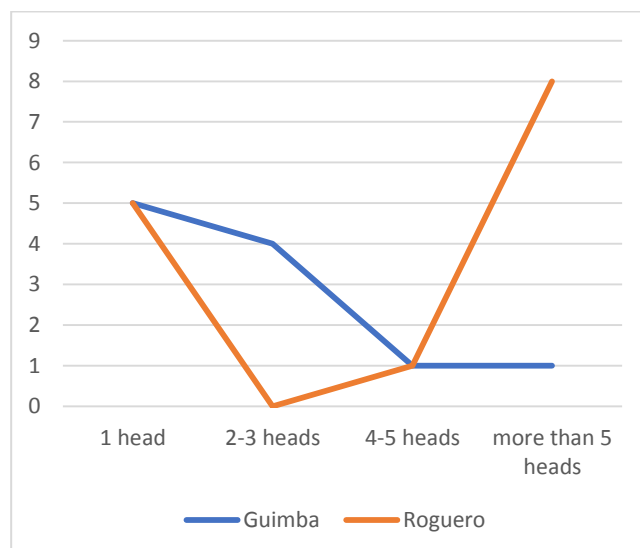
**Figure 3. Educational attainment of the farmer's participants**

Figure 4 and 5 shows that the most common livestock raised by the farmers who participated in the survey are cows. However, they only have very

limited number of heads being raised. In barangay Roguero, they have other animals raised but mostly chicken, which was not given much attention in this survey since the primary objective of this survey is about silage feedstuff for large ruminants.



**Figure 4. Livestock raise by the farmer's**



**Figure 5. Number of livestock raise by the farmers**

### 3.1. Awareness, Acceptability and Perceptions of Farmers on Silage as Feedstuff

**Table 1.** Awareness on silage among the farmers in Guimba, Marawi City (n=21) and Rogero, Raman (n=14)

AWARENESS Statement	Area	1 SDA		2 DA		3 U		4 A		5 SA	
		f	%	F	%	f	%	f	%	f	%
I am not aware about silage as feedstuff for animal	Guimba							3	14.3	18	85.7
	Roguero							4	28.6	10	71.4
This is my first time to hear about silage	Guimba							8	38.1	13	61.9
	Roguero							4	28.6	10	71.4
I am afraid to use silage because I am not familiar with it	Guimba			3	14.3	4	19.0	6	28.6	8	38.1
	Roguero					3	21.4	5	35.7	6	42.9
I heard about corn silage but I don't have experience in using it.	Guimba					3	14.3	11	52.4	7	33.3
	Roguero							5	35.7	9	64.3
There is no such silage in Lanao del Sur, so I don't know about it	Guimba							11	52.4	10	47.8
	Roguero							5	35.7	9	64.3
OVERALL MEAN	Guimba	4.41 - Agree									
	Roguero	4.57 - Strongly Agree									

Table 1 shows the awareness of the farmer's participants about silage as feedstuff. Based on the figure shown in the table, both farmers in Guimba and Roguero are not aware and have no knowledge about silage. This means that their level of awareness on silage is zero considering they all agreed on the statement given. During the film showing on silage making, the farmers were very interested and they were all excited about the technology. However, they felt discouraged because they did not know anything about silage. Excerpt below are some of their opinions during the focus group discussion (FGD).

Farmers in Guimba and Roguero all said;

*Oh, we don't know about silage. This is the first time we heard and saw the video. It is very interesting?*

On the other hand, in terms of acceptability on silage, the farmers in both barangays are willing to adopt the technology, majority of them said that they are very much willing to accept the technology as long as they will be trained. Table 2 shows their responses in terms of the acceptability of silage.

**Table 2.** Acceptability on silage among the farmers in Guimba, Marawi City (n=21) and Rogero, Raman (n=14)

ACCEPTABILITY Statement	Area	1 SDA		2 DA		3 U		4 A		5 SA	
		f	%	F	%	f	%	f	%	f	%
I am very interested to learn more about silage	Guimba							10	47.6	11	52.4
	Roguero							1	7.1	13	92.9
I am willing to try something new to feed my cattle	Guimba					1	4.8	9	42.9	11	52.4
	Roguero							3	21.4	11	78.6
I think it is nice since it has more nutrients and easy to handle than pasturing	Guimba			1	4.8	7	33.3	7	33.3	6	28.6
	Roguero					1	7.1	4	28.6	9	64.3
It is good to know that we can process those kinds of feedstuff and I think it is very important particularly in raising more cattle due to limited pasture area that we have.	Guimba					2	9.5	10	47.6	9	42.9
	Roguero					1	7.1	3	21.4	10	71.4
If other grass/forage/plant can be used as silage like water hyacinth it is better since water hyacinth has no use for us as of this moment and it is easily grown in our locality.	Guimba					4	19.0	11	52.4	6	28.6
	Roguero					2	14.3	5	35.7	7	50.0
OVERALL MEAN	Guimba	4.26 - Agree									
	Roguero	4.66 - Strongly agree									

As shown in Table 2, farmers in Guimba agreed to all the statement given with an overall mean of 4.257, while farmers in Roguero strongly agreed to all the statements given on acceptability with an overall mean of 4.7 = 5. During FGD, farmers in Guimba and Roguero has similar stand saying that *Yes, if we know the technology in silage making, we are willing to use silage as feedstuff for our animals.*

Others said that *Yes, if we can earn money from silage making, then we are willing to learn the technology, but how about the young corn that we can sell if it is being used for silage, we have spent a lot for the fertilizer.*

Based on the FGD discussions, we explained to them that other crops and forages can be used for silage making, and the young corn could not be included for silage making if they wanted to sell if outright to earn money. We also emphasize to them that if they will use the corn for silage making their income will become doubled since instead of one cropping for the whole development of corn, they can split it into 2 cropping since the corn will be harvested young or 70-80 days after planting. Upon learning more information about silage technology, they gain insights and became more interested to learn the technology in silage making.

Table 3, shows the perceptions of farmers on silage production. As shown in the table, farmers in

Roguero are more persistent and have agreed to the potential of silage as feedstuff and business compared to the farmers in Guimba with an overall mean of 3.97 or 4 and 4.43 respectively. Looking into the 5 statements in Table 3, farmers in Roguero are more motivated, of which most of them strongly agree (85.7%) on the statement number 5 stating that *"I am motivated to use silage as feeds for my cattle/livestock and at the same time I am looking forward to have business on silage making as well.* While more than 50% of the farmers in Guimba only agree (61.9%) on that statement. Likewise, farmers in Guimba and Roguero has also different perception levels on the aspect of forage conservation stated in the statement number 3. Fifty percent (50%) of the farmers in Roguero strongly agree and 42.9% agree on the needs for forage conservation while 57.1% of the farmers in Guimba only agree on the statement, and only 23.8% strongly agree. This implies that farmers in Roguero are more open minded on the possible effects of climate change and much willing to do innovative actions compare to the farmers in Guimba. From the remaining statements presented regarding how they perceived silage making, both farmers in Guimba and Roguero perceived almost the same, in which they agree to the potential benefits on silage technology.

**Table 3. Perception of farmers in Guimba, Marawi City (n=21) and Roguero, Raman (n=14) on silage as feedstuff**

PERCEPTION	Area	1 SDA		2 DA		3 U		4 A		5 SA	
		f	%	F	%	f	%	f	%	f	%
Silage is a good promising feedstuff for cattle and other livestock.	Guimba	2	9.5	2	9.5	2	9.5	10	47.6	5	23.8
	Roguero					1	7.1	7	50.0	6	42.9
Making water hyacinth into silage is very interesting and promising as our source of feeds and source of income as well.	Guimba					12	57.1	6	28.6	3	14.3
	Roguero					1	7.1	8	57.1	5	35.7
After knowing about silage, we learned that we need to conserve forage and make silage for our cattle/livestock	Guimba			1	4.8	3	14.3	12	57.1	5	23.8
	Roguero					1	7.1	6	42.9	7	50.0
I think silage making is good business particularly if we can make use of our water hyacinth here in the lake	Guimba					1	4.8	12	57.1	8	38.1
	Roguero					2	14.3	7	50.0	5	35.7
I am motivated to use silage as feeds for my cattle/livestock and at the same time I am looking forward to have a business on silage making as well.	Guimba					1	4.8	13	61.9	7	33.3
	Roguero							2	14.3	12	85.7
OVERALL MEAN	Guimba	3.97 or 4 – agree									
	Roguero	4.43 - agree									

Excerpt below are some of their statements during FGD.

Farmers in Guimba said the following:

*Me, I am willing to try so that I can earn more*

*Me, I am hesitant because I expense a lot in my corn farming)*

*For me, we really need to conserve forage because sometimes I find it difficult to find feedstuff for my animals specially during summer)*

Farmers in Roguero said;

*Yap, that is a very good program we hope we can learn how to make silage)*

*Can we use other crops because it is a waste if we will use our corn*

*Yes we need to conserve feedstuff specially during hot season we find it difficult to look for feeds to our animals since the grasses are died.*

*When can we have training on silage making?*

Several studies showed the advantages of silage technology. Silage production provide additional income and improve financial and economic status of the family engaged in silage technology (Bosma, Roothaert, Asis, Saguinhon, Binh, and Yen, 2003). Silage making like corn silage is also a promising business not only in the Philippines but to the foreign markets as well with greater return of investments (Cañete and Alvarez,

(2021). According to Singh (2022) silage technology is not only good for agricultural business but it also helps mitigate the dry season green fodder scarcity problems. However, research studies also showed that silage technology is very limited due to farmers' lack of information, skills and technology. Farmers rarely make silage, despite its potential to bridge the dry season feed gap, due to the limited resources, knowledge, and skills of the farmers, Balehegn et al. (2021). Singh (2022) pointed out some reasons for non-adoption of silage making among farmers. These are (1) the perceived need of the technology; (2) financial capability for initial capital requirement; (3) risk aversion attitude; (4) perception of double handling of forage; (5) green fodder is more nutritious than silage; (6) lack of choppers/chaff cutters; (7) scarcity of surplus and quality fodder; (8) return on investment; (9) poor extension services; (10) level of expertise of extension workers; (11) education level; (12) gender; (13) lack of proper communication channel; and (14) lack of information.

### **3.2. Relationship between awareness, acceptability and perceptions of farmers on silage to their demographic profile**

To determine the relationship between type of livestock raised, the number of heads of the livestock raised, the awareness, acceptability and perceptions of the farmers with their demographic profile, Pearson correlation was established. The statistical results of the correlation of these variables are shown in Table 4 and Table 5 for Guimba and Roguero respectively.

**Table 4. Relationship between awareness, acceptability and perceptions of farmers in Guimba, Marawi City on silage to their demographic profile (n=21)**

		LIVESTOCK	NO. OF HEAD	AWARENESS	ACCEPTABILITY	PERCEPTION
AGE	Pearson Correlation	.417	.697**	.831**	.861**	.624**
	Sig. (2-tailed)	.060	.000	.000	.000	.003
GENDER	Pearson Correlation	.281	.469*	.642**	.539*	.609**
	Sig. (2-tailed)	.217	.032	.002	.012	.003
EDUC	Pearson Correlation	.795**	.811**	.320	.364	.167
	Sig. (2-tailed)	.000	.000	.157	.105	.470

Legend: \*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows that the age and gender of the farmers are significantly and positively correlated to the type of livestock raised, farmers' awareness, acceptability and perceptions on silage. This means that the number of heads of the livestock to be raised will depend on the age and sex of the farmers. In the same manner, the awareness, acceptability and perception of the farmers on silage technology is

directly associated with the age and gender of the farmers. Likewise, farmers education is positively correlated to the type of livestock raised and the number of livestock, but not correlated to their awareness, acceptability and perceptions about silage. The relationship is significant at 0.01 level of significance. This means that the higher the education is, the more livestock they wanted to raise.

**Table 5. Relationship between awareness, acceptability and perceptions of farmers in Roguero, Romain on silage to their demographic profile (n=14)**

		LIVESTOCK	NO. OF HEAD	AWARENESS	ACCEPTABILITY	PERCEPTION
AGE	Pearson Correlation	.183	.192	.149	-.192	.345
	Sig. (2-tailed)	.550	.530	.626	.530	.248
GENDER	Pearson Correlation	.659*	.693**	.539	.433	.234
	Sig. (2-tailed)	.014	.009	.057	.139	.443
EDUC	Pearson Correlation	.513	.539	.420	.337	.182
	Sig. (2-tailed)	.073	.057	.153	.260	.552

Legend: \*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 5 shows that only gender is significantly related to the type of livestock and the number of heads of the livestock raised. This means that these variables are associated with each other positively, and the gender will influence the type of livestock and the number of heads of livestock raised among farmers participants. However, gender does not influence their awareness, acceptability and perceptions about silage technology. Similarly, age, and education do not influence the type of livestock, the number of heads of the livestock raised, as well as their awareness, acceptability and perceptions towards silage technology. This means that age and education has no influence and irrespective of the type of livestock raised, its number of heads, and the farmers' awareness, acceptability and perceptions towards silage. This means that the farmers' age, sex and education, does not hinder their eagerness to learn new technology and new livelihood or opportunity.

Research studies show that farmers' age affects the preferences and agricultural output of the farmers (Guo, Wen, and Zhu, 2015), middle-aged farmers tend to be more productive (Tauer, 1993). Similarly, gender also impacted farmers' farming practices. Men's farming is primarily oriented for subsistence, and the gender division of labor is an important aspect of social inequality and food insecurity (Vercillo, 2020), and closing the global gender gap in agriculture would grow food production and build sustainable futures for women (Duckett, Nd). In the Philippines, the involvement of women and children in tasks like herding and cutting diminished, and men were responsible for more livestock tasks (Bosma, Roothaert, Saguinhon, Binh, and Yen, 2003).

Paltasingh & Goyari (2018), analyzed the effects of education on farm productivity. Their findings showed that education enhances farm productivity in the case of adopters of modern technology. Educating farmers about the application of various modern technologies needs to be emphasized. As such, they suggested that farmers' field school program must be implemented along with a strong extension network for a wider dissemination of modern technology. As educational level increases, output increases with secondary school education having the highest returns on agricultural productivity. Extension service has a greater impact on agricultural

productivity than formal education (Oduro-ofori and Anokye, 2015).

#### 4. CONCLUSION, IMPLICATION AND RECOMMENDATION

This paper is a short-term research aimed to investigate the awareness, acceptability and perceptions of selected farmers in Guimba, Marawi City and Roguero, Romain in the Lanao del Sur Province about silage. Aside from the awareness, acceptability and perceptions of the farmers participants about silage, selected demographic profile of the farmers were also obtained such as their age, gender, education, type of livestock, and the number of their livestock raised. From the findings, the study concluded that the farmers have varying ages, both men and women are engaged in farming with cow as their main livestock raised but in a very few numbers of heads. Most of them are also having elementary education only. However, despite of their limited education with zero knowledge and awareness about silage, they are willing to learn and adapt the silage technology. It is also concluded that farmers age, sex, and education have a different influence on the type of livestock raised, number of heads of livestock raise, awareness, acceptability, and perceptions. The influence of their demographic profile varies from farmer to farmer.

Findings of this study implied that regardless of age, sex and educational attainment, farmers are willing to learn new things, new skills, and new technology for the augmentation of their knowledge and skills, livelihood and economic status in life. Since they have no knowledge about silage technology and they have low level of education, more extension programs from educational institutions and the department of agriculture must be established. There should be a farmer field school (FFS) program along with strong extension service to guide the farmers. To educate the farmer about silage and various farm practices, crop management strategies, and technological up-gradation, the FFS approach should be innovative, participatory, and interactive. The farmer hands-on training keeps the farmer abreast with changing innovations and ideas and allows them to share experience gained. Likewise, the government

must improve the quality of extension services to the farmers to improve farmers productivity.

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