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Article

Rural Women's Participation and their Decision Making Behavior in Livestock Management and Household Activities in Central Dry Zone Area of Myanmar

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Abstract: The study aimed to assess the factors affecting on women's participation level and decision-making behavior of rural women in livestock management and household activities in particularly 60 randomized respondents from three villages of Natmauk township, central dry zone area, Myanmar. Descriptive analysis, Chi-Square test and stepwise regression methods were applied to analyze the relationship of women's participation and decision-making behavior of respondents. Results of the KII and FGD were used to further explains in survey. Respondents are middle-aged group, small-sized farmers, busy with domestic chores and had no formal schooling. They mostly grow sesame, groundnut and other tropical crops and rear small sizes of adult cattle males in the study. Men are chief decision makers in their households because they have access to more resources. Ownership of land and access to information is highly affected on decision making of when to buy/sell livestock, what to feed and when medical treatment of livestock. Information got especially from friends, family and traders are helpful in the decision making of buying/selling livestock, spending money earned from livestock and feeding the food for the livestock. Spearman's rho correlation was used to identify and streamline women's activities that need to be focused on so that to make good decisions in livestock farming.

Keywords: women-households; livestock management; household activities; decision making description

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1. Introduction

Livestock is generally considered as a key asset for rural livelihoods (Bhanotra et al., 2015) and livestock management is a gendered activity as both men and women are involved in it (Ali, 2007). Within the agriculture sector of Myanmar, livestock plays a critical role in smallholder mixed crop-livestock systems that dominate the sector (Food and Agricultural Organizations, 2016). According to the GDP contribution data, the livestock and fishery sector grew by 4.1 percent in 2019 (Statista Research Department, 2019). Central dry zone (CDZ) is a major hub for crop and livestock production with almost 50% of Myanmar's livestock population being reared in this area. Livestock production is a major income source for farmers in the CDZ but there is an eminent lack of information on livestock husbandry practices, nutrition, animal health problems, the socio-economic impact of livestock production and the current trading system (Oo, 2010).

Rural women play an important role in both livestock and household activities. They are the good livestock caretakers and undertake various activities of livestock management like fodder cutting, watering, and feeding of animals, animal shed cleaning and milking (Arshad et al., 2013). Women's participation in livestock management is productive and saves money to be spent in hiring labor. The role of women participation and contribution of women in livestock management is appreciated and women spend on an average about 5 to 6 hours a day on various livestock activities which include cleaning of sheds, washing of animals, feeding, and milking (Taj et al., 2012).

Despite the women's incredible role in livestock sector, their involvement in decision-making regarding livestock management is still seeming questionable (Bhanotra et al., 2015). Male dominance in decision making of the household and economy has continued even in areas where women are the key providers of labor because the influence of women has not been recognized and they are kept out of all important decision making processes, while the responsibilities ultimately impinge on them (Bhanotra et al., 2015). They have no or very little power to take decisions due to

many reasons like lack of education, lack of mobility, lack of control over resources, low level of awareness of their civic/ human rights, lack of credit facilities from the Government (Food and Agricultural Organizations, 2003).

The importance women's participation in family decision-making among third world countries is limited to some extent (Sultana, 2010). The discriminatory social norms across societies, imbalanced gendered power within households and communities, unequal access to resources and opportunities impact on women's participation at all levels of decision making (Paudel, 2019). The participation of women in decision making of major household purchases has a strong significant association with socio-background characteristics in outcome (Acharya et al., 2010). There is a lack of confidence to contribute to public decision making of women prevents many women from trying to take on leadership roles in Myanmar (Minoletti, 2014). Women in Myanmar have a high burden of work, which includes both productive and reproductive work. Thus, the participation of Myanmar women in the development, implementation, monitoring, and evaluation of policies and programs can develop their qualities and leadership roles (Asian Development Bank, 2016a).

Nowadays, it is often argued that women's contributions are undermined and their involvement in decision making is minimal. Information about women's extent of participation and decision-making power in livestock and household management is still lacking in Myanmar. There is no study and research about women's participation and activities in livestock management related to their decision-making behavior. Thus, the study was conducted to assess the factors affecting on rural women's participation level and decision-making behavior of rural women in livestock management and household activities. Specifically, the study aimed to:

1.1. Objectives

(1) Analyze the livelihood status, social norms and beliefs related to livestock production of rural women in study area.
(2) Assess rural women's participation level and decision-making behavior of rural women in livestock management and household activities.
(3) Explore the factors affecting on rural women's participation level and decision-making behavior of rural women in livestock management and household activities.

2. Materials and Methods

Livestock development is the driving force for rural development in Myanmar. According to Census in 2019, there are 112,891 populations of cattle, 70 populations of dairy cattle, 15,849 populations of sheep, and 29,455 populations of goats. Livestock is playing a crucial role in the fulfillment of basic subsistence requirements of the country's poor. The livestock farmers embark on various activities of livestock management like watering and feeding of animals, cleaning activities and milking (Bhanotra et al., 2015). Women are the household managers, but their work is considered as non-productive, unorganized, undocumented and their contribution in agricultural labor force in developed countries is 36.7% while, it is about 43.6% in developing countries (Lemlem et al., 2010). As compared to men, contribution of women in livestock care and management is higher and they contribute 60 to 80% of labor in the animal husbandry (Younas et al., 2007). Women carry out their livestock production to their household commitments or duties, which include food preparation, child-care, water collection, gathering firewood, milling grains, cleaning, sewing and embroidery. The success of livestock enterprise relies heavily on effective involvement of women because they are closely involved in animal husbandry sort of activities (Ahmad, 2013).

On the other side, male dominance in the decision-making of the household has continued in the gender biases of some areas even if women are the key providers of the labor perform the most of all (Tulachan & Karki, 2000). Male dominance and traditional belief system are the main factors which had affected the involvement of rural women in decision making process (Bhanotra et al., 2015). Men are taking the lead role in the decision-making of their households (Lemlem et al., 2010). The reasons women are kept out of all important decision-making processes are due to lack of education, lack of mobility, lack of control over resources, low level of awareness of their human rights, and lack of credit facilities from the Government (Bhanotra et al., 2015).

3. Results

3.1. Data Collection and Analysis

The Number of households, about 60, were selected from three villages in Natmauk township, central dry zone area, Myanmar. A survey was collected quantitative, numbered data using questionnaires or interviews and statistically analyze the data to describe trends about responses to questions and to test research questions or hypotheses. Interview using a structured questionnaire; key informant interviews; focus group discussions and desk review of relevant secondary documents

were used in the study. Descriptive analysis and inferential statistics were used through the aid of the SPSS software for Chi-Square test with the use of Goodman and Kruskal's Lambda Coefficient correlation and stepwise regression methods to determine the relationship between the dependent and independent variables.

4. Results and Discussion

4.1. Demographic Factors

Data of livelihood status, social norms and beliefs related to livestock production of the respondents were included in these factors.

4.1.1. Age

The mean age of the respondents was 51 years within the range of 17–73 years (see in Table 1). Besides, the age of the respondents was categorized into three groups such as young, middle, and old. Most of the respondents are middle age group (70%) and they are between 38–64 years old. This was followed by the young group under 38 years, the old group64 years and above in the same percent (15%), respectively. This finding is similar with the finding of Australian Center for International Agricultural Research (2011), which described that the average age of the farmers in CDZ of Myanmar is 48.8 years.

4.1.2. Educational Attainment

Nearly about half (46%) of the respondents had no formal schooling, however, about 26% of them had primary level education and 20% had middle level education (Table 1). More than 6% of the respondents had the monastic education. This finding agrees with the statement of Food and Agricultural Organizations and Yezin Agricultural University (2021) that most Myanmar people had in the primary education. On this regard, Myanmar Education Consortium (2015) reported that monastic education was the first education system of both men and women in Myanmar despite its chequered and politically sensitive history, it is still in demand today and currently provides education for 3% of school-aged children.

4.1.3. Occupation

All respondents are involved in livestock farming (Table 1). However, respondents are cooperate-working in other jobs such as agricultural works (35%), construction sites, standing as the hired labor, and selling in grocery. Respondents (55%) spent all their working time in the livestock activities of their houses including fodder cutting, watering, and feeding of animals, animal shed cleaning and milking as their main occupation. A few respondents (3.3%) said that they are grazing in pasture because they have enough food for their livestock. The National Consultative Committee (2001) also pointed that about 86% of the Myanmar people live in rural areas and are engaged in livestock farming.

Table 1. Demographic factors of the respondents.

Variables Age Group	Frequency	Percentage
Young	9	15
Middle	42	70
Old	9	15
Total	60	100
Mean	51	
Std Dev	13	
Total		
Education Attainment		
Illiterate	7	46.7
Primary	4	26.7
Middle	3	20.0
Monastery	1	6.7
Total	15	100
Occupation		
Agriculture	21	35.0
Construction worker	1	1.7
Laborer	2	3.3
Livestock activities	33	55
Livestock grazing	2	3.3
Selling	1	1.7
Total	60	100
Household Size		
Small (below mean)	28	46.8
Large (above mean)	32	53.2
Mean	4.6	
Std Dev	1.7 (Range 1–8)	

Age (young = ≤38; Middle = 38–64; Old = ≥64)

4.1.4. Household Size

More than 53% of the respondents fall within 5–8 household size followed by 46.8% is within the size of 1–4 members. As per Table 1, the average household size in this study is 4.6. According to the 2014 Myanmar Population and Housing Census Thematic Report on Housing Conditions and Household Amenities, the average Myanmar national household size is 4.4 (United Nation Development Programme, 2016). Study area is similar to Myanmar's national household size.

4.2. Land Holding of the Respondents

There are three kinds of crop growing seasons in the study area: pre-monsoon, monsoon and post-monsoon. Thus, the respondents have different farm sizes in the three seasons (see in Table 2). According to the data gathered, more than 56% of the respondents have 1–5 acres, while nearly 12%have 6–10 acres, and 1.7% have 16–20 acres in pre-monsoon, respectively. When it comes to monsoon season, 60% of the respondents have 1–5 acres followed by 3.4% of the respondents and 1.7% of the respondents have 6–10 acres and 16–30 acres, respectively.

Table 2. Land holding of the respondents.

Pre-Monsoon (Acres)	Frequency	Percentage	Monsoon (Acres)	Frequency	Percentage	Post-Monsoon (Acres)	Frequency	Percentage
1–5	34	56.8	1–5	36	60	1–5	10	16.6
6–10	7	11.7	6–10	2	3.4	6–10	2	3.4
11–15	-	-	11–15	-	-	11–15	-	-
16–20	1	1.7	16–20	1	1.7	16–20	-	-
Total	42	70.2	Total	39	65.1	Total	12	20

As to post-monsoon season, the respondents have 1–5 acres and 6–10 acres for 16.6% and 3.4%. When compared with the country's average rainfall level, CDZ receives limited rains and the farmers in this region are mostly grown in pre-monsoon and monsoon crops. In contrast, their farm sizes of pre-monsoon and monsoon are also higher than post-monsoon farm size and post-monsoon crops are lack of rainfall. According to the results of FGD, the respondents mostly cultivated their crops during pre-monsoon and monsoon because they got low profits for post-monsoon crops during lack of rainfall in the study area. Hein et al. (2017) pointed out that the main two farmland categories: lowland (paddy land; le), and "upland" (ya) for pre-monsoon, monsoon, and monsoon crops in the central dry zone, and he also described that the landholding of the intermediate farm households is within 1–5 acres.

Majority of the respondents cultivated sesame (86.7%) and groundnut (73.3%) while some cultivated sorghum (33.3%) and Cotton (33.3%) in the pre-monsoon season as per in Table 3. A few respondents (5%) has pigeon peas during this season. Asian Development Bank (2016b) approved that sesame and groundnuts are the two principal oilseeds produced commercially in the CDZ, Myanmar.

Table 3. Pre-monsoon, monsoon, and post-monsoon crops.

Pre- Monsoon Crop	Frequency	Percentage	Monsoon Crop	Frequency	Percent	Post-Monsoon Crop	Frequency	Percent
Sesame	52	86.7	Sorghum	33	55.2	Cotton	20	33.3
Groundnut	44	73.3	Cotton	25	41.7	Chickpea	20	33.3
Sorghum	20	33.3	Groundnut	21	35	Sorghum	18	30.0
Cotton	20	33.3	Rice	20	33.3	Sunflower	16	26.7
Pigeon pea	3	5.0	Sesame	20	33.3			
			Chilli	17	28.3			
			Pigeonpea	7	11.7			
			Greengram	4	6.7			

When it comes to monsoon season, more than 55% of the respondent's cultivated sorghum and nearly 42% of them cultivated cotton. Besides, the rest of them are cultivated groundnut (35%), rice (33.3%), sesame (33.3%), Chilli (28.3%), pigeon pea (11.7%) and greengram (6.7%). Naing (2017) approved that rice, sesame and groundnut are the most widely cultivated crops in central dry zone area during monsoon season. Results also show that most of the respondents cultivated cotton and chickpea at the same percent (33.3%) while others cultivated for sorghum (30%) and sunflower (26.7%) in post-monsoon areas. In this regard, Oxfarm (2014) also reported that the farmers in the dry zone are mostly grown cotton, pulses including chickpea and other oilseed crops including sunflower. According to JICA report of the central dry zone in 2010, the farmers in the dry zone area cultivated sorghum for the marginal cost effectiveness.

4.3. Demographic Factors

The ownership of livestock depends on a herd or flock size in the study area. According to the categorization of livestock guide in ACIAR research project in 2019, the livestock were categorized based on the lifespan and tercile analysis. In fact, the livestock were classified into two groups of young and adult for male and female in this study. Two years of male cattle were counted in adult and less than 2 years are in young male cattle. Likewise, one and half years of female cattle were counted in adult and less than one and half years are in young female cattle. Based on the terciles analysis, the 33rd, 66th and 100th percentiles were used to describe the herd/flock sizes (Table 4).

Table 4. Cattle group of the respondents.

Cattle Male Young Group	**Respondents (n = 60)**	
	Frequency	**Percent**
Small (1–3)	11	18.3
Medium (4–6)	2	3.3
Large (6≤)	1	1.7
Nil	46	76.7
Total	60	100
Cattle Male Adult Group	Frequency	Percent
Small (1–3)	33	55
Medium (4–6)	11	18.3
Large (6≤)	1	1.7
Nil	15	25
Total	60	100
Cattle Female Young Group	Frequency	Percent
Small (1–3)	16	26.6
Medium (4–6)	1	1.7
Nil	43	71.7
Total	60	100
Cattle Female Adult Group	Frequency	Percent
Small (1–3)	19	31.5
Medium (4–6)	11	18.3
Large (6≤)	5	8.5
Nil	25	41.7
Total	60	100

According to the data, the herds/flocks were classified into three sizes (small, medium, large), corresponding to these terciles for each livestock species: cattle herds-small (1–3), medium (4–6) and large (> 6); small ruminants' flocks-small (1–20), medium (21–40) and large (> 40). The respondents mostly had the small size of adult cattle male (55%) and female (35.5%) while the small size of young male group (18.3%) and female group is (26.6%). Likewise, the medium size of adult cattle male and female is the same percent (18.3%) followed by the medium size of young male group (3.3%) and female group is (1.7%). When it comes to the large size, the adult cattle male group (1.7%) and female group (8.5%), however, the respondents have only young male group (1.7%).

This categorization results of cattle herd are agreed with the finding of Win et al. (2019), that the number of animals kept per herd or flock was examined by terciles analysis, and the adult and young groups were categorized based on the life span in the central dry zone area. The small ruminants were also categorized based on their lifespan and ten months of male are added in adult group and less than ten months are in young male group. Likewise, eight months of the female small ruminants are added in adult group and less than eight months are in young female group.

In the flock size of goat, the respondents have only the small young size of male (16.7%) and female (18.3%) (see in Table 5).

Table 5. Goat group of the respondents.

Goat Male Young Group	**Respondents (n = 60)**	
	Frequency	**Percent**
Small (1–20)	10	16.7
Nil	50	83.3
Total	60	100
Goat Male Adult Group	Frequency	Percent
Small (1–20)	13	21.6
Medium (21–40)	1	1.7
Nil	46	76.7
Total	60	100
Goat Female Young Group	Frequency	Percent
Small (1–20)	11	18.3
Nil	40	81.7
Total	60	100
Goat Female Adult Group	Frequency	Percent
Small (1–20)	9	15
Medium (21–40)	1	1.7
Large (40≤)	2	3.3
Nil	48	80
Total	60	100

In terms of adult groups, the small size of male (21.6%) and female (15%) while the medium size of male and female groups has the same percent (1.7%). There has only adult large size of female (3.3%) in the study.

When it comes to the flock young sizes of sheep, the respondents have only the small size of male (20%) and female (18.3%) (Table 6).

Table 6. Sheep group of the respondents.

Sheep Male Young Group	**Respondents (n = 60)**	
	Frequency	**Percent**
Small (1–20)	12	20
Nil	48	80
Total	60	100
Sheep Male Adult Group	Frequency	Percent
Small (1–20)	11	18.4
Medium (21–40)	2	3.3
Large (40≤)	2	3.3
Nil	45	75
Total	60	100
Sheep Female Young Group	Frequency	Percent
Small (1–20)	11	18.3
Nil	49	81.7
Total	60	100

In case of sheep flock adult sizes, they have the small size of male (18.4%) and female (8.4%); the medium size of male (3.3%) and female (8.4%); and the large size of male (3.3%) and female (5%) in this study. This is similar with the categorization of Win et al. (2019) in the small ruminants' flocks' size and life-span analysis. Key informant interviews revealed that the respondents used lifespan and tercile analysis to categorize their herd or flock sizes of livestock.

4.4. Women's Participation in Decision-Making Behavior of Livestock Management and Household Activities

As per Table 7, it was found that the breakdown of the gendered division of labor in terms of livestock chores. The respondents' participation in the livestock rearing activities was found in this table. Results show that women are responsible for performing livestock chores, especially around the house. A greater percentage of women feed livestock (31.7%), provide water (38.3%), care for young animals (46.7%), clean shelters (83.3%), care for sick animals (53.3%) and purchase forage (45%), than men. This finding is agreed with the reports of Awan et al. (2021), the participation of women in livestock management activities is higher than men's contribution in various livestock activities including clean livestock shelters, care for sick livestock, care for young animals etc.

Table 7. Livestock rearing activities.

Activities	Activity is performed by (hrs/day)				
	Neither	**Men**	**Both**	**Women**	**Other**
Take the livestock grazing	25.0(15)	36.7(22)	8.3(5)	30.0(18)	
Feed livestock	6.7(4)	28.3(17)	33.3(20)	31.7(19)	
Provide livestock with water		28.3(17)	33.3(20)	38.3(23)	
Care for young animals	10.0(6)	20.0(12)	23.3(14)	46.7(28)	
Buy livestock	48.3(29)	36.7(22)	6.7(4)	8.3(5)	
Sell livestock	11.7(7)	58.3(35)	11.7(7)	18.3(11)	
Clean livestock shelters		6.7(4)	10.0(6)	83.3(50)	
Care for sick livestock	3.3(2)	20.0(12)	23.3(14)	53.3(32)	
Buy forage for livestock	23.3(14)	26.7(16)	5.0(3)	45.0(27)	
Chop and carry forage for livestock	8.3(5)	26.7(16)	43.3(26)	21.7(13)	
Agricultural work for forage crops	15.0(9)	51.7(31)	30.0(18)	3.3(2)	
Collect milk from livestock	98.3(59)	1.7(1)			
Sell milk collected from livestock	98.3(59)			1.7(1)	
Sheep Shearing	75.0(45)	5.0(3)	3.3(2)	15.0(9)	1.7(1)
Take manure to fields for fertilizer	8.3(5)	50.0(30)	35.0(21)	6.7(4)	

Cutting and carrying forage (43.3%) is a chore that is shared equally between men and women and for those households that own sheep. This finding agrees with Fischer et al. (2018) finding, that the forage chopping is the highest done with both husbands and wives in domestic groupings and male households are mostly found in chopping machine while female households are chopping with manual. Men are more influenced in decision making of sale of livestock (58.3%), agricultural work for forage crops (51.7%) and take manure to fields for fertilizer (50%) than women. This finding is agreed with the results of Arshad et al. (2010) that about 74% of the male dominance has in decision making of livestock activities including sale of animals, fodder cultivation, sale of animals' produce to get useful. If shearing (1.7%) is performed by someone in the households, it is more likely to be a chore for women. The result was assumed that respondents are seldom to shear their sheep in this region. In the reports of WorkSafe New Zealand (2014) and National Centre for Farmer Health (2023), which pointed that shearing and crutching are high-risk jobs that need a lot of manual effort workers, who shear or crutch thousands of sheep each year, can be at high risk of being injured.

Data shows that both men and women seldom to collect the milk from their livestock (98%) and seldom to sell their livestock milk (98%) in this study because they used milk for their home consumption. van der Lee et al. (2014) approved that dairy milk is the source of livestock milk production and only 6% of dairy cattle milk production has in the central dry zone. This finding agrees with van der Lee's finding that the livestock farmers in the dry zone area seldom to collect their livestock milk and seldom to sell out them in the market.

The domestic chores who actively performed in the household see in Table 8. Apart from agricultural work, where duties are predominantly performed by men or shared by men and women, women disproportionately bear the responsibility for performing all other domestic chores. Women are mostly involved in the four of five household chores such as clean house (100%), wash clothes (98.3%), cook for family (96.7%) and prepare donations for monks (96.7%). This is agreed with the report of Alliance for Gender Inclusion in the Peace Process (2016), which described that men are seen as responsible for hard-, productive- and outside work while women are seen as responsible for work taking place inside and domestic works.

Table 8. Domestic chores time constraints.

Activities	Activity is performed by (hrs/day)			
	Neither	**Men**	**Both**	**Women**
Do agricultural work	8.3% (5)	43.3% (26)	41.7% (25)	6.7% (4)
Prepare donations for monks		1.7% (1)	1.7% (1)	96.7% (58)
Cook for family			3.3% (2)	96.7% (58)
Wash clothes			1.7% (1)	98.3% (59)
Clean house				100% (60)
Care for seniors	40% (24)	1.7% (1)	1.7% (1)	56.7% (34)
Care for children	26.7% (16)		5% (3)	68.3% (41)
Make clothes	45% (27)			55% (33)
Rest or enjoy time with friends and family			100% (60)	

Although agricultural work is done jointly by men and women (41.7%), men (43.3%) are also involved in this domestic chore. Result is similar to the findings of FAO (2012) and Singh and Srivastava (2016), they stated that most agricultural activities are done jointly by men and women, in which, men are more involved in agricultural activities. Besides, they all spend their leisure time together with their friends and family (100%). This finding is approved by the report of the United Nations Office for Project Services (2022) in Myanmar, in which, Myanmar farmers can spend their free time with their families todays because they get more free time due to changing mechanized farming.

The gendered patterns of access to the resources required to care and manage livestock are seen in Table 9. Results indicate that women appear to have more access to the financial resources, that required to manage livestock than men based on access to household income to spend on expenses (68.3%) and access to credit either from formal institutions or friends and family (53.3%). Razzaq et al. (2018) also approved that male and female respondents can manage their households' finances.

But the animals and equipment are more likely to be owned by men (31.7%) or co-owned by both parties (50%). The report of United Nations Women Watch Information and Resources on Gender Equality and Empowerment of Women (2012) explained that, in fact, women's lack of ownership over assets that can be used as collateral to leverage loans also constrains them more than men.

Table 9. Access to resources.

Activities	Indicate access or ownership				
	Other	**Men**	**Both**	**Women**	**Neither**
Access to household income to spend on expenses?		18.3% (11)	13.3% (8)	68.3% (41)	
Access to credit either from formal institutions or friends and family?	16.7% (10)	20% (12)	6.7% (4)	53.3% (32)	3.3% (2)
Who in the household owns the livestock?		31.7% (19)	50% (30)	18.3% (11)	
Who in the household owns livestock shelters or equipment?		31.7% (19)	50% (30)	18.3% (11)	
Ask friends or family for help managing or caring for livestock?	43.3% (26)	16.7% (10)	10% (6)	30% (18)	
Access to a local trader when they want to buy or sell livestock?	10%(6)	50% (30)	13.3% (8)	25% (15)	1.7% (1)
Had information in agricultural or livestock rearing practices? (animal help worker/friend/community)	28.3% (17)	31.7% (19)	10% (6)	28.3% (17)	1.7% (1)
Access information about markets when they want to buy or sell livestock?	11.7% (7)	51.7% (31)	11.7% (7)	25% (15)	
Owns the land that crops are grown on?	11.7% (7)	41.7% (25)	30% (18)	16.7% (10)	
Access to communal grazing land when they need?			100% (60)		

Men have more access to traders (50%) and information about markets (51.7%) while women have access to traders (25%) and they got information about market when they want to buy or sell their livestock (25%). In contrast, women have no opportunity to get traders and information to know about market in this study. This agrees with the findings of García (2013) that rural women in developing countries face difficulties to get information and difficulties in the process of negotiating prices with buyers and lack of mobility due to access to markets. The assessment results of FAO and WFP (2021) report also pointed that, farmers did not access traders, their crops will get low price with lower demand than usual. Men predominantly own cropping land (41.7%) but women have 16.7% of land as their own. This finding is agreed with the report of SasaKawa Global (2000), that women have less access to land than men for a variety of legal and cultural reasons. Legislation has affirmed women's basic right to land but other customary practices and laws limit women's land rights in some cases. Some legislations restrict rural women in developing countries. Both men and women have access to communal grazing land (100%). This means everyone has the right to graze livestock on a common pasture. The result is agreed with the report of Gilles and Jamtgaard (1981), that most of the world's grazing lands is the publicly owned.

4.5. Factors Affecting on Rural Women's Participation on Decision-Making Behavior in Livestock Management and Household Activities

As per Table 10, the participation in decision making is a commonly used indicator of women's agency in the gender literature. It was found that women's decision-making behavior affected their domestic chores and livestock management activities in this table. Results from our study concur with evidence from other Asian countries, in which, women are often in control of the family finances (65%). Half said that they make decisions on when to borrow money (50%) and many are either unilaterally or jointly involved in decisions on how to spend the money earned from selling livestock (45%). While the tasks of feeding and caring for sick animals are the responsibility of women, men are more dominant in decision making on these matters including when to get medical treatment (50%), when to sell/buy livestock (50%) and what to feed the livestock (46.7%). However, a third of women (33.3%) stated that they unilaterally make decision on providing treatment to animals. Arshad et al. (2013) approved that caring for diseased and sick animals, was one of the main activities performed by rural women.

Table 10. Decision making discretion.

Activities	Decision made by				
	Neither	**Men**	**Both**	**Women**	**Others**
When to buy/sell livestock?	10.0% (6)	50.0% (30)	16.7% (10)	23.3% (14)	
How to spend the money earned from livestock?	10.0% (6)	16.7% (10)	28.3% (17)	45.0% (27)	
What to feed/graze the livestock?		46.7% (28)	38.3% (23)	15.0% (9)	
When to get medical treatment for livestock?		50.0% (30)	16.7% (10)	33.3% (20)	
When to seek medical treatment for family?	1.7% (1)	25.0% (15)	21.7% (13)	50.0% (30)	1.7% (1)
How to educate children?	3.3% (2)	15.0% (9)	43.3% (26)	38.3% (23)	
How to manage household finances?		16.7% (10)	18.3% (11)	65.0% (39)	
When to borrow money?	18.3% (11)	20.0% (12)	11.7% (7)	50.0% (30)	
How to organize the marriage of children?	53.3% (32)	15.0% (9)	10.0% (6)	21.7% (13)	

Table 11 shows the important values and meanings for understanding women's motivations and purpose of their activities to encompass a range of different factors such as social and cultural beliefs and norms that guide behavior and to gauge religious and social values and norms for women's mobility that guide livestock rearing.

Table 11. Values and meanings.

Value Statement	Response				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I don't like selling animals to traders because they will be killed	13.3% (8)	46.7% (28)	21.7% (13)	16.7% (10)	1.7% (1)
I give livestock or the earnings from livestock as a donation to the Monastery	1.7% (1)		13.3% (8)	48.3% (29)	36.7% (22)
I don't sell livestock because I am not allowed to go to the market	35.0% (21)	21.7% (13)	38.3% (23)	3.3% (2)	1.7% (1)
There are places in or outside the village where I am not allowed to go	21.7% (13)	23.3% (14)	13.3% (8)	11.7% (7)	30.0% (18)
I like to take the livestock grazing because I meet friends to chat	3.3% (2)	3.3% (2)	45.0% (27)	20.0% (12)	28.3% (17)
I love our livestock because they provide us with power and income	1.7% (1)	6.7% (4)	15.0% (9)	30.0% (18)	46.7% (28)

While there is little evidence suggesting that women follow Buddhist norms of abstaining from killing animals and eating meat, livestock are commonly used to pay for donations to the Monastery for rituals (48.3%). Mowe (2011) explained about Buddhist teachings on killing animals and abstaining from meat in Buddhist review of tricycle and Mon (2014) recommended that Myanmar farmers hold their donation festivals after harvesting their crops and selling livestock based on their rituals.

In terms of mobility many women can go to the market but there is a spread in terms of limitations in mobility in and outside the village (30%). It is also recommended that women frequently have poorer access to markets than men and play a limited role in the commercialization of livestock to sell out in market by themselves and livestock products in the management of livestock assets (FAO, 2013). Nearly half said they enjoy the social benefit of meeting friends to chat while taking animals grazing. This is agreed with the finding of Undeland (2008) that women graze animals jointly with the relatives and have no problems with access to good pastureland and water sources. Analysis of local values and meanings allows extension services to provide benefits to participants beyond income.

4.6. Relationship of Variables

To determine the relationship between the independent variables (decision making discretion) and the dependent variables (access to resources) of the women-headed households on the livestock rearing in the study area. Specifically, the non-parametric Chi-Square test with the Goodman and Kruskal's Lambda correlation coefficient was used to analyze the variations.

Table 12 shows the significant and highly significant correlations between access to resources and decision-making descriptions of the women-headed households on the livestock rearing in this study. The ownership of land, information about markets, access to traders, and the information about livestock are highly significant correlated with time to buying or selling livestock, what to feed for livestock and when medical treatment. According to the results, the ownership of land is highly correlated with the decision making description of when to buy/sell livestock (.001**), what to feed (.050*) and when medical treatment (.050*). It is approved in the report of Hernández-Jover et al. (2019) that ownership of livestock can take health records of animals and engage with the surveillance system for animals. The United Nations Development Programme (2013) recommended that if the farmers have their own land, they can be considerable capability in managing small scale livestock enterprises covering the whole livestock program and they also pointed that even some landless households have demonstrated considerable capability in managing small scale livestock enterprises. When it comes to access to information about market, it is highly correlated with when to buy sell and livestock (.003**) and what to feed (.024*). This finding is similar with the finding of García (2013), that access to market information can provide the information of suitable food and process of negotiating prices with buyers to know the exact time of selling and buying due to lack of mobility.

Table 12. Relationship between decision making discretion and access to resources.

Decision making discretion	When to buy/sell livestock?		What to feed?		When to get medical treatment for live-stock?		How to spend money earned from live-stock	
	λ	P	λ	P	λ	P	λ	P
- Ownership of animal	.209	.155	.302	.064	.062	.637	.129	.183
- Access to income-	.143	.188	.038	.478	.148	.038*	.085	.408
- Ownership of land	.181	.001**	.265	.050*	.265	.050*	.093	.231
- Information about markets	.415	.003**	.230	.024*	.079	.408	.118	.262
-Access to trader	.424	.000**	.242	.026*	.109	.231	.246	.034*
-Information about livestock rearing practices	.338	.000**	.329	.007**	.187	.133	.138	.159
-Information from friends and family	.319	.008**	.188	.313	.143	.183	.280	.013*

Chi-Square test with the use of Goodman and Kruskal's Lambda Coefficient for discriminate analysis of variation.

Access to traders is highly correlated with when to buy and sell livestock (.000**), what to feed (.026*) and how to spend money earned from livestock (.034*). In fact, the report of ACIAR, FAO and WFP (2021) and Win et al. (2019) explained that access to traders can support to access feed, to get veterinary services and inputs including when to buy and sell livestock and manage of their livestock income. Access to Information about livestock rearing practices is also highly correlated with when to buy sell and livestock (.000**) and what to feed (.007**).

UNDP (2016) pointed that access to information on livestock can be the extent of official livestock rearing processing and practicing and exports livestock and livestock products. Access to information from friends and family is highly correlated with when to buy/sell livestock (.008**) and how to spend money earned from livestock (.013*). This finding is agreed with the report of Animal Welfare Institute (2022), the livestock information sources and services such as the activities performed to facilitate any stage of the livestock life cycle information, that were available to farmers from their friends, family, neighbors, and co-workers and social media. García (2013) also approved that rural women in developing countries face the most challenges in financial resources due to a lack of information.

4.7. Multiple Regression Analysis

Multiple Regression Analysis the statistical findings of Spearman's rho correlation not only established the relationship between women households' livestock activities, access to resources, and decision-making discretion in the study area but also identified the possible predictors for the multiple regression analysis. Multiple regression analysis was used to further streamline the predictors (women households' activities and livestock management) of decision-making discretion to guide the researcher in formulating the recommended appropriate livestock management practices to access the better resources.

The prediction formula of multiple regression analysis is:

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \text{----} + \beta kXk$

X = Independent variables (livestock activities, domestic chores, and access to resources)

Y = Dependent variables (decision making description)

a = Y-axis intercept

β = regression coefficient

k = number of predictor variables

Stepwise regression method was used to ensure the significant predictors remain after iterative model building using the set of predictors as variables. The predictors are the women households' livestock activities and their accessing resources that have strong significance with their decision-making discretions. Those predictors that have p-values less than the significance level of 0.05 and less than highly significant level 0.01 have statistically significant impacts.

The multiple regression analysis results in Table 13 reflect that care for young animals (p = 0.030*), livestock feeding (p = 0.039*), livestock buying (p = 0.028*), livestock selling (p=0.000**), caring for sick livestock (p = 0.032*), sheep shearing (p = 0.001**), cutting and carrying forage for livestock (p = 0.005**) of women households' livestock farming practices, and access to income (p = 0.003**), access to credit either from institutions/friends/family (p = 0.004**), livestock ownership (p = 0.002**), livestock shelters or equipment ownership (0.002**), access to a local trader (0.003**), access information from friends and family (0.000**), access

information about market (0.002**) of the resources, will have the highest impact on decision making discretion of livestock farming.

Table 13. Regression analysis of women households' decision-making discretion, their activities and access to resources.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
-Care for young animals	.267	.120	.271	2.226	0.030*
- Livestock Feeding	.298	.141	.272	2.117	0.039*
- Livestock buying	.282	.125	.252	2.252	0.028*
- Livestock Selling	.535	.122	.499	4.377	0.000**
-Caring for sick livestock	.319	.144	.279	2.204	0.032*
-Sheep Shearing	.316	.090	.418	3.501	0.001**
-Cutting and carrying forage for livestock	.360	.125	.353	2.891	0.005**
-Access to income	.486	.159	.376	3.057	0.003**
-Access to credit either from institutions/friends/family	.529	.176	.362	3.005	0.004**
-livestock ownership	.305	.094	.385	3.248	0.002**
- livestock shelters or equipment ownership	.305	.094	.385	3.248	0.002**
-Access to a local trader	.242	.078	.372	3.114	0.003**
-Access information from friends and family	.721	.102	.693	7.078	0.000**
-Access information about market	.396	.121	.394	3.282	0.002**

Dependent Variable- Decision Making *Significant**

Not taking these predictors altogether will not have the expected high impact on improving the women's participation and their decision-making behavior in the study area. In essence, it points out that the participation of women in livestock farming practices and their access to resources in livestock management will have the highest impact on their decision-making discretions in this area.

The results imply that women's participation in livestock farming and their decision-making discretion could clearly improve the activities in caring young and sick animals, livestock feeding, livestock buying and selling, sheep shearing, cutting, and carrying forage for livestock. Ahmad (2013), Arshad et al. (2013) and Fischer et al. (2018) approved that women are actively involved in animal husbandry sort of activities including livestock feeding and caring, watering, fodder cutting, milking and animal shed cleaning etc. Result also shows that some products of livestock are commercialized when the benefits can be switched to women. Furthermore, FAO (2013) also mentioned that women-headed households are responsible to large and small animals marketing including by-products in practical, but they need the decision-making power over sale of livestock. The result shows women can be more actively participate and they can make the good decisions to access income if they access resources of credit, trader, market information and information from friends and families. FAO (2013) agreed that access to good market, access to credit, the high status and education, the high levels of customary practices can support women in the decision-making power over rural assets. Additionally, Win et al. (2019), and FAO and WFP (2021) highlighted that access to traders can be benefit in getting animal feed, veterinary services, time to sale of livestock, and manage of their livestock income.

On the other side, shearing is performed by one of the household members and it is more likely to be a chore for women. Result shows that the respondents seldom to shear their sheep in this region. WorkSafe New Zealand (2014) and National Centre for Farmer Health (2023) pointed out that shearing and crutching are high-risk jobs that need a lot of manual effort contractors who shear or crutch thousands of sheep each year can be at high risk of being injured. According to the results, the respondents need to be the owners in their livestock farming to manage their livestock and livestock equipment. UNDP (2016) pointed out that the farmers with their own lands can manage small scale livestock enterprises covering the whole livestock program.

5. Conclusions

The role of women's participation becomes important not only in livestock management but also households' activities. Even the respondents are in the middle-aged, but they did not get the lead role in decision making due to lack of access to resources and poor education of no formal

schooling. Almost 60% of the respondents are small-sized farmers with the average household size is 4.6 and they mostly grow sesame, groundnut, and other tropical crops. The respondents mostly rear small sizes of adult cattle male and they categorized their livestock based on the tercile analysis and lifespan of livestock. Besides, the respondents serve as the good housewives with domestic chores. In case, men households are chief of the decision makers in the households because they access to resources more than women's households, however, access to financial resources and household income to spend on expenses are stronger on the women.

Access to resources contributed substantially to the decision-making descriptions of the households. The respondents also need to be the owners in their livestock farming to manage their livestock and livestock equipment. The information got especially from friends, family and traders are helpful in buying/selling livestock, spending money earned from livestock, taking medical treatment of the livestock, and feeding the food for the livestock. In fact, women can be more actively participate and they can make the good decisions to access income if they access resources of credit, trader, market information and information from friends and families. This implies that the higher access to resources, the decision making will be more prominent. Thus, women can improve their decision-making in livestock activities for the household by empowering women in livestock farming.

Since the correlation and multiple regression analyses were able to identify and streamline women activities that need to be focused on so that to make good decisions in livestock farming, this should be taken as a concrete guide for the involved villages, their officials, the Government of Myanmar, and all project implementers to follow. For longer-term outlook, participation of women and access to resources are important to achieving decision making behavior in livestock farming. In addition, providing the necessary resources to women in livestock farming, they can easily facilitate their livestock activities and their performance will be improved. Policy makers have to consider these constraints identified in this study to provide the necessary resources to women in livestock farming, to train women as the female leaders in their households and to develop guidelines for sustainable livestock production not only in the central dry zone but also the whole country. The gender-based equal opportunity can be initiative through a policy to enhance the participation of women and achieve development of women decision-making behaviors at the national scale.

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Appendix A

Individual Survey Questionnaire
Levels of Participation and Constraints that women face while developing their livestock production in the Central Dry Zone

Section A: (1) Demographic factors and Livelihood typology in study area.

Township		Village Tract	
Interviewer		Village	
Date		Contact No.	
Interview Duration			

No.	Name	Relation with HHH	Age	Education Level	Primary occupation	Secondary occupation	Remark
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

(2) Cropping patterns.

Pre-monsoon		**Monsoon**		**Post-Monsoon**		**Remark**
Crop	acre	Crop	acre	Crop	acre	

(3) Farming experiences.

1. Crop production ----------yrs

2. Livestock production ----------yrs

(4) Livestock access

	Livestock size		**Quantity**	**Remarks**
Cattle	Male	Young **(<2 yrs)**		
		Old **(>2 yrs)**		
	Female	Young **(<1.5 yrs)**		
		Old **(>1.5 yrs)**		
Goat	Male	Young **(<10 months)**		
		Old **(>10 months)**		
	Female	Young **(<8 months)**		
		Old **(>8 months)**		
Sheep	Male	Young **(<10 months)**		
		Old **(>10 months)**		
	Female	Young **(<8 months)**		
		Old **(>8 months)**		

Section B: Levels of participation.

Activities	**Activity is performed by**			**Family member**
	Men	**Women**	**Both**	
Take the livestock grazing				
Feed livestock				
Provide livestock with water				
Care for young animals				
Buy livestock				
Sell livestock				
Clean livestock shelters				
Care for sick livestock				
Buy forage for livestock				
Cut and carry forage for livestock				
Agricultural work for forage crops				
Collect milk from livestock				
Sell milk collected from livestock				
Sheep Shearing				
Take manure to fields for fertilizer				

Section C: (1) Constraints – time.

Activities	Activity is performed by			Family member
	Men	Women	Both	
Do agricultural work				
Prepare donations for monks				
Cook for family				
Washing clothes				
Clean house				
Care for seniors				
Care for children				
Make clothes				
Rest or enjoy time with friends and family				

(2) Constraints – access to resources.

Activities	Indicate access or ownership				Family member
	Men	Women	Both	Neither	
Access to household income to spend on expenses?					
Access to credit either from formal institutions or friends and family?					
Who in the household owns the livestock?					
Who in the household owns livestock shelters or equipment?					
Ask friends or family for help managing or caring for livestock?					
Access to a local trader when they want to buy or sell livestock?					
Had information in agricultural or livestock rearing practices? (Animal help worker/friend/community)					
Access information about markets when they want to buy or sell livestock?					
Owns the land that crops are grown on?					
Access to communal grazing land when they need?					

(3) Constraints – decision making.

Activities	Decision made by			Family member
	Men	Women	Both	
When to buy/sell livestock?				
How to spend the money earned from livestock?				
What to feed/graze the livestock?				
When to get medical treatment for livestock?				
When to seek medical treatment for family?				
How to educate children?				
How to manage household finances?				
When to borrow money?				
How to organize the marriage of children?				

(4) Constraining or enabling factors – values and meanings.

Value Statement	Response	Remark
I don't like selling animals to traders because they will be killed	Strongly disagree disagree Neutral agree strongly agree	
I give livestock or the earnings from livestock as a donation to the Monastery	Strongly disagree disagree Neutral agree strongly agree	
I don't sell livestock because I am not allowed to go to the market	Strongly disagree disagree Neutral agree strongly agree	
There are places in or outside the village where I am not allowed to go	Strongly disagree disagree Neutral agree strongly agree	
I like to take the livestock grazing because I meet friends to chat	Strongly disagree disagree Neutral agree strongly agree	
I love our livestock because they provide us with power and income	Strongly disagree disagree Neutral agree strongly agree	

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