Women's Roles in Beef Cattle Farming Households in Nagari Lakitan Utara, Pesisir Selatan Regency, Sumatra Barat Province

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Abstract. Gender equality is one of the main aspects in the sustainable development goals. This study aimed to analyze the roles of women in the households of beef cattle raising farmers in Nagari Lakitan Utara, Pesisir Regency, Sumatra Barat Province. This research involved 100 farmer households and collaborating partners from related institutions, employing the Harvard gender model of analysis and using the approach of Level of Effort (LoE) values. Results showed that women had significantly important roles in the management of beef cattle raising, starting from providing the logistical needs to managing the finances from cattle sales. In particular, women showed greater roles in herding as well as contacting inseminators and veterinarians in the case of ill animals.

1 INTRODUCTION

One of the main goals in sustainable developments is gender equality. The Indonesian government showed the commitment to support that goal in the presidential decree *Perpres No. 59 tahun 2017* on the Implementations to Achieve the Goals of Sustainable Development. These implementations include preparing the National Action Plans for Family Farming consisting of sustainable family farming, gender equality, capacity advancement of farmer organizations, and farmers' welfare improvement, which is stated in the strategic planning of the Ministry of Agriculture for 2020 - 2024. This action is a manifestation of Indonesia in support of the United Nations' declaration of 2019 - 2028 as the decade for family farming. Additionally, *Rencana Pembangunan Jangka Menengah Nasional* (RPJMN – Medium-term National Development Plan) 2020-2024 states that the national development strategy must include gender perspective to achieve the advancement that is more just and equally distributed for all Indonesians, both men and women. This strategy's goal is to have an increased equality in all fields by the year 2025.

The score of 0.70 in the Gender Gap index for Indonesia places the country at the 85th place among the evaluated 153 countries [1]. In the Southeast Asian region, Singapore, Laos, and the Phillipines show better score and are ranked at 54th, 43th, and 16th, respectively. The Gender Gap score for Indonesia indicates that there is still a large gap between men and women in the country. The government issued a presidential instruction in response to the report to put gender in the mainstream of national development. This instruction defines that gender equality is a condition in which women and men have the same opportunity as well as equal human rights in order to be able to have the same roles in all fields, such as politics, social, culture, and so on. Since the subsector of animal husbandry has important roles in the national development, therefore, it needs the implementations of sustainable development.

The understanding of gender mainstreaming and equality between men and women is required to achieve a sustainable development in animal husbandry [2]. But in reality, women have not fully had the control of the operation [3]. Men are still the dominant force in accessing and controlling the resources and profit utilization. Women's roles in the various daily activities, whether planned or unplanned, essentially carry economic values, especially in relation to household income. The roles of women in improving the household income are aimed at increasing the family welfare. Therefore, public support must be increased for widening the vocational opportunity for women especially in the rural areas [4].

Pesisir Selatan is one of the regencies in Indonesia known for beef cattle raising and is located in the *agropolitant* of Sumatra Barat province [5]. Pesisir Selatan regency had the highest concentration (20.47%) of beef cattle in the province with a total number of 85,361 head in 2021. Women in this area are involved in the family economy, including in caring for the livestock. However, their participation is significantly small in improving the farmers' capacity in support of animal husbandry practices, such as being involved in guidance sessions. This leaves women with less knowledge and skill in caring for their animals. Studies on women's roles in these beef cattle raising families must be conducted to measure gender equality in an economic sector in order to achieve sustainable developments, especially in Pesisir Selatan regency.

2 Research Objectives

This research aimed to analyze the roles of women in the households of beef cattle raising farmers in Nagari

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Lakitan Utara, Pesisir Selatan Regency, Sumatra Barat province.

3 Methodology

This study involved 100 households of beef cattle raising farmers as well as collaborating partners from related institutions, including the Livestock and Animal Health Bureau of Pesisir Selatan regency Sumatra Barat Province, civil servants of Nagari Lakitan Utara, and Veterinary Center of Sutera and Lengayang areas. Collaborating partners played a role in providing information regarding the general description of beef cattle farming in Nagari Lakitan Utara, Lengayang District, Pesisir Selatan Regency, Sumatra Barat Province.

There were several criteria in determining the sample for this research, including female breeders who are married, livestock businesses that have been running for more than 1 year, patterns of raising beef cattle using semi-intensive and intensive system. Then interviews with selected respondents and data analyses were carried out based on the completed questionnaires.

The variables measured consisted of feeding and watering management, shelter management, livestock reproductive management, the livestock health management, the livestock procurement management, livestock sales and monetary management. The Harvard gender model of analysis was employed to analyze the data because it is a simple analytical technique for a set data in a micro scale that can be used to determine the different roles in a household. In this study, the household data observed were data on women's productive role in implementing the management of beef-cattle farming business.

The analyses of women's roles in the livestock subsector were conducted with the approach of Level of Effort (LoE) between husband (man) and wife (woman) in a household. In this study, women referred to wives and LoE was defined as degree of efforts shown by husband or wife or both in relation to the management of livestock. The parameters for LoE were presented as indices with the range of 0 – 4 [6]. An index value of 0 meant no effort and an index value of 4 meant a full effort.

4 Results and Discussion

4.1 Characteristics of respondents (women)

Out of 100 participants, 99% of the women in the beef-cattle raising families were in the productive age category, with only one older participant. Age determines the firmness in carrying out business [7]. At a productive age, farmers are able to coordinate and take effective steps in advancing their business [8]. The largest number of participants came with high school education at 42%, with only two women had higher education experience. Education level in farmers influences their learning process, in which the higher the education, the easier they understand the information [9].

In terms of vocation, the majority participants (80%) declared beef cattle raising as their main occupation. The amount of time allocated in a work can impact performance [10]. Meanwhile, more than half of the participants (54%) had more than 15 years of experience in raising beef cattle. [11]. Longer experience could lead to a better management of cow-calf operations. Many of these households (64%) had 1-3 family dependents.

4.2 Value of Level of Effort (LoE)

4.2.1 Values of LoE on the feeding and watering management

The values of LoE on the feeding and watering management are described in detail in Table 1.

Table 1. Values of LoE on the feeding and watering management.

No	Activity		LoE	
		Husband	Wife	Both
1	Gathering forage	3.00	0.25	0.75
2	Feeding forage	0.00	0.64	3.36
3	Procuring concentrate	1.74	0.47	1.79
4	Feeding concentrate	0.05	0.58	3.37
5	Supplying water	0.00	1.08	2.92
6	Herding	0.14	2.14	1.72
	Average	0.82	0.86	2.32

Source : primary data analysis (2022)

Husbands dominated forage gathering with the LoE value of 3.00. Meanwhile, herding is mostly conducted by wives (LoE = 2.14). Both spouses carried out the activities at about equal efforts on feeding forage, feeding concentrate, and supplying water with LoE values of 3.36, 3.37, and 2.92, respectively.

The time required to gather forage is about two hours, depending on the location, forage quantity, and precipitation amount. Feed is provided two to three times a day. The concentrate generally consists of rice bran, banana trunk, and sagu. The majority of farmers do not give concentrate routinely to their cattle. The amount of time to provide the concentrate ranges from 10 to 60 minutes, depending on the types of concentrate and the number of cattle. Water provision is done once or twice a day and it takes about ten minutes.

To add the amount of feed, farmers usually herd their cattle once a day. This activity can take place in farms, orchards, or road sides. In general, farmers take out their cattle at 16.00 to 17.45 WIB (Indonesian west standard time) or before the dusk prayer. Distance

influences the amount of herding time also. Herding is mainly performed by women, which is in contrast to a previous report by [12] who observed herding to be mostly conducted by men.

4.2.2 Values of LoE on the shelter management

The values of LoE on the shelter management are described in detail in Table 2.

Table 2. Values of LoE on the shelter management

No	Activity		LoE	
		Husband	Wife	Both
1	Building	3.38	0.00	0.63
2	Cleaning	0.64	0.96	2.40
3	Maintaining	3.28	0.12	0.60
4	Taking out livestock	0.20	0.82	2.98
5	Putting in livestock	0.20	0.82	2.98
	Average	1.54	0.54	1.92

Source : primary data analysis (2022)

Husbands generally conduct activities that require more strength. Therefore building (LoE=3.38) and maintaining (LoE=3.28) shelters are carried out mostly by men. Meanwhile cleaning shelter (LoE=2.40) and bringing cattle in (LoE=2.98) and out (LoE=2.98) of shelter are performed by both spouses. To support the animal husbandry activities, farmers furnish supporting tools around animal shelters, such as feed and water troughs, hoe, rake, machete, etc [13]. In addition to feed and water troughs, waste holders and drainage could be found in a cow-calf operation.

Cattle pens in Nagari Lakitan Utara are close to the houses of the farmers. This arrangement facilitates the management of the cattle as well as prevents animal thefts [14]. Shelters function as a facilty to assist in managing livestock production, such as giving provisions, cleaning, breeding, preventing theft, and increasing manpower efficiency. Farmers clean the pens twice a day, in the morning and in the afternoon. The cattle are taken out of the shelters during the cleaning that takes about 10 to 20 minutes. Pen cleaning is performed to increase comfort for the animals and reduce the incidence as well as spread of diseases. Additionally, farmers burn some leftover forage near the pens in the early evening to repel insects and provide warmth to animals.

4.2.3 Values of LoE on the livestock reproductive management

The values of LoE on the livestock reproductive management are described in detail in Table 3.

Table 3. Values of LoE on the livestock reproductive management

No	Activity		LoE	
		Husband	Wife	Both
1	Monitoring estrus	0.00	0.24	3.76
2	Contacting inseminator	1.35	1.68	0.97
3	Overseeing AI	1.52	0.51	1.98
4	Monitoring pregnancy	0.24	0.20	3.56
5	Monitoring calving	0.12	0.20	3.67
6	Post-calving care	0.08	0.16	3.76
	Average	0.55	0.50	2.95

Source : primary data analysis (2022)

The management of reproduction is one of the important aspects in the sustainability of a cow-calf operation. Farmers' good knowledge of reproduction can increase the efficiency of their livestock business by accurate estrus detections and thus reduce repeat breeding [15]. Cows in estrous can be detected from vulvar swelling accompanied with increased pink coloration and clear mucous secretion from the vulva [16].

Contacting inseminators is mostly done by the wives with an LoE value of 1.68. This is most likely a result of women spending more time at home than men, to monitor the condition of their cattle. These women immediately call inseminators upon observing estrus for prompt AI procedures. Meanwhile both spouses contribute equally in estrus monitoring, AI supervision, pregnancy monitoring, calving monitoring, and post-partum calf care, with respective LoE of 3.76, 1.98, 3.56, 3.67, and 3.76.

The majority of study participants employ artificial insemination (AI) for their cow breeding needs. Natural breeding has become rare in Indonesia because of the significant increased efficiency of AI [17]. AI is performed by a technician (inseminator) depositing bull semen in a cow uterus using a metal rod, which is often called AI gun or rod. [18] The advantages of AI that include genetic improvement, cost efficiency, and disease prevention. AI improves the genetic makeup of a local herd because the semen is usually collected from superior bulls. By not having to raise breeding bulls, farmers can reduce expenditure in their operation. Hygienic practices can be conducted more easily in AI and therefore it can reduce the spread of sexually transmitted infections among cattle.

4.2.4 Values of LoE on the livestock health management

The values of LoE on the livestock health management are described in detail in Table 4.

Table 4. Values of LoE on the livestock health management

No	Activity		LoE	
		Husband	Wife	Both
1	Monitoring livestock health	0.00	0.12	3.88
2	Contacting Veterinarian	1.38	1.50	1.13
3	Applying	1.90	0.38	1.71

No	Activity		LoE	
		Husband	Wife	Both
	medication			
4	Caring for sick livestock	0.06	0.24	3.70
5	Applying vitamin	2.57	0.38	1.05
6	Bathing livestock	2.49	0.20	1.31
	Average	1.40	0.47	2.13

Source : primary data analysis (2022)

Men do the majority of applying medications and vitamins, as well as bathing the cattle with respective LoE values of 1.90, 2.57, and 2.49. Meanwhile, women do the majority of contacting the veterinarians (LoE=1.50) for illness in livestock. However, health monitoring is mostly conducted by both spouses (LoE=3.88).

Livestock health monitoring is conducted to reduce the incidence of diseases, that can reduce the efficiency of and even destroy the operation. The more common maladies in beef cattle include tick infestation, bovine ephemeral fever (locally known as *Jumalang*), and others. As previously mentioned in the shelter management, farmers clean their cow pens twice a day [19]. The 2 biosecurity aspects, which are hygiene and sanitation, must be performed for a good livestock operation. There are two types of livestock farmers in terms of health management, which are those who do not employ biosecurity measures at present nor in the future and those who briefly perform biosecurity measures [20].

4.2.5 Values of LoE on the livestock procurement management

The values of LoE on the livestock procurement management are described in detail in Table 5.

Table 5. Values of LoE on the livestock procurement management

No	Activity		LoE	
		Husband	Wife	Both
1	Purchasing	1.33	0.00	2.67
2	Selecting	1.33	0.00	2.67
	Average	1.33	0.00	2.67

Source : primary data analysis (2022)

The activities of purchasing and choosing cattle are in majority carried out by both spouses with identical LoE values of 2.67. Cattle procurement can be funded with self-financing, livestock share, or endowment. Self financing often comes from the joint savings of the spouses. Meanwhile, livestock share may come from other family members, friends, or even other community members. This option is popular to those who do not have sufficient fund to buy cattle on their own [21]. The cattle selection process is mostly based on visual examinations and farmers must choose their calves usually based on the available capital.

4.2.6 Values of LoE on the livestock sales management

The values of LoE on the livestock sales management are described in detail in Table 6.

Table 6. Values of LoE on the livestock sales management

No	Activity		LoE	
		Husband	Wife	Both
1	Selling	0.00	0.04	3.96
2	Determining sale price	0.00	0.00	4.00
	Average	0.00	0.02	3.98

Source : primary data analysis (2022)

The activities in selling (LoE=3.96) and determining sale price (LoE=4.00) involved both spouses the majority of time. These results contradict a report from [22], in which women had limited roles in the commercial side of livestock raising. There were frequent market imbalances caused by this gender gap. However, there seems to have been gender advancements in Nagari Lakitan Utara where women actively engage in this aspect of animal husbandry.

Beef cattle raising in Nagari Lakitan Utara can also be a social safety net, in which farmers only sell their cattle when they need some fund, instead of being based on market forces. There were 8 families among 100 participants who have yet to sell their charges. They consider their livestock as savings and only sell them for emergency.

The farmers have not optimally utilized the manure produced by their livestock. This waste is usually collected around the pens and used when needed in the farms without any special treatment, such as composting. This biowaste has the potential to increase family income and reduce pollution if treated properly [23].

4.2.7 Values of LoE on the monetary management

The values of LoE on the monetary management are described in detail in Table 7.

Table 7. Values of LoE on the monetary management

No	Activity		LoE	
		Husband	Wife	Both
1	Managing funds	0.00	0.61	3.39

Source : primary data analysis (2022)

In general, the money from cattle sale is held by women. However, when it comes to managing the finances, the majory effort and control are performed by both spouses, as indicated by LoE value of 3.39.

4.2.8 Average values of LoE on each management activity

The average values of LoE on each management activity are described in detail in Table 8.

Table 8. Average values of LoE on each management activity

No	Management Activity		LoE	
		Husband	Wife	Both
1	Feed and water provision	0.82	0.86	2.32
2	Shelter	1.54	0.54	1.92
3	Reproduction	0.55	0.50	2.95
4	Health	1.40	0.47	2.13
5	Livestock procurement	1.33	0.00	2.67
6	Livestock sales	0.00	0.02	3.98
7	Monetary management	0.00	0.61	3.39

Source : primary data analysis (2022)

The LoE values in Table 8 show that women in general have a large role in beef cattle raising operations. They are closely involved in managements of feed and water provision, shelter, reproduction, health, sales, and finances. The roles of women are needed in the management of family-scale livestock business. Women provide significant resources for the continuity of the enterprise [24]. Family farms need women to help increase cost efficiency, especially in terms of manpower availability. When husbands assume dual roles as the head of the family and breadwinner, they cannot effectively carry out the management of animal husbandry. Women can enter the scene by assisting the management of the families' livestock business, which in turn can enhance the welfare of the families [25]. Increased roles of women, as well as acknowledgment of their rights of access and control, in livestock operations can increase family income and improve family welfare.

5 Conclusion

Gender equality is one of the main goals in sustainable developments. A gender perspective is needed in national development to achieve more justice and equality for both women and men. Women play a role in various fields including on livestock sector.

Women (wives) in beef cattle raising households in Nagari Lakitan Utara, Lengayang subdistrict, Pesisir Selatan regency, Sumatra Barat province, have significant roles in their livestock operations. In general, women's roles can be observed through the husbandry activities starting from managing the provisions to managing the finances resulted from livestock sales. The specific activities that the majorities are conducted by women include herding, and contacting inseminators and veterinarians. Meanwhile, men perform the majority of forage gathering, shelter building and maintenance, medicine applications, vitamin applications, and cattle bathing. Both spouses have the same efforts and controls on forage feeding, concentrate preparation and feeding, water provision, pen cleaning, moving cattle in and out of pens, estrus monitoring, AI supervision, pregnancy monitoring, calving monitoring, post-calving care, health monitoring, caring ill livestock, purchasing and selecting calves, and selling and managing the finances from cattle sales.

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