International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

Swot Analysis Developing Pasture Agroekosistem of Bali Cattle in Indonesia (Case Study in Fatuana Pasture of North Central Timor District)

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***Abstract*—** *Dry natural conditions and prolonged dry season in the region of East Nusa Tenggara province affect the availability and reduced nutritional value of feed. One effort to improve livestock productivity is to know the effect of the interaction between climate on livestock and feed that can be identified through the measurement of the carrying capacity of the region.*

Research on the productivity display of the Fatuana grazing area in North Central Timor Regency, East Nusa Tenggara was conducted using qualitative descriptive methods with primary and secondary data. The results of the research indicate that the Fatuana area is the location for developing pasture-based Bali cattle.

The limiting factors for the development of beef cattle in this area are climate, soil, weeds, reproductive efficiency, disease, marketing, facilities, institutions, and policies. The strategies that can be taken to develop Bali cattle in the Fatuana Pastures are the implementation of the pastura revitalization, construction of seed centers, integrated service posts, cattle breeding and fattening, marketing and promotion, strengthening human resources, technology dissemination, and experimental studies.

***Keywords*—** *Pasture, Fatuana area, SWOT analysis.*

I. INTRODUCTION

Timor Tengah Utara Regency (TTU) is an autonomous region in the province of Nusa Tenggara Timur (NTT) with an area of 2.669,7 km^2 and a population of 249.771 people with a population growth rate of 1,71%/year (BPS 2018). The TTU region is the same as other regions in NTT province in general where it has a very long dry climate (8-9 months) and a relatively short rainy season, which is 3-4 months, but the livestock sector continues to contribute significantly to the regional economy and income of farmers and communities in the region (Riwukore dan Habaora 2019[a]).

One area that has the potential to produce cattle in the TTU district is the Fatuana area. However, the dry natural conditions and prolonged dry season in areas in NTT affect the availability and reduced nutritional value of feed. Riwukore and Habaora (2018) reported that climate caused the ability of cattle production to be still low, namely 0,25-0,30 kg/cattle/day so that the impact on the length of livestock raising to achieve ideal selling weight. Livestock only depend on forage in the grazing land without regard to aspects of nutritional adequacy. This condition needs to be examined carefully so that when a cattle population development plan is planned in an area, knowledge of the potential of the region is needed, especially the availability of forage feed in support of increasing livestock population to be developed and how much potential the region can accommodate cattle.

Therefore, by paying attention to feed sources in dry areas that are not yet adequate, especially the quality of feed such as in Fatuana, beef cattle farming needs improvement efforts. One effort to improve livestock productivity is to know the effect of interactions between climate on livestock and feed that can be identified through the measurement of the carrying capacity. Carrying Capacity is the ability of land agroecosystems to accommodate livestock according to forage availability (Habaora 2015). The interactions that occur between cattle-grass-season-land determine the performance of cattle. Climate is the main barrier among other subsystems (Riwukore dan Habaora 2018).

Climate-crop-livestock interaction is a feature of the system that determines cattle productivity. Each subsystem is covered by various elements, both individually and together with the elements in the subsystem and / or in other subsystems directly or indirectly affect the appearance of livestock (Habaora 2015; Kleden *et al*. 2015; Karti *et al*. 2015; Habaora 2017). Among the whole subsystems, the climate is a limiting factor for other subsystems. Whereas the management subsystem is an alignment to unite and integrate all other subsystems so as to produce optimum livestock productivity and the preservation of natural resources to support the preservation of pasture-based livestock business (Tamba *et al.* 2014; Jermias *et al.* 2016; Sanger *et al.* 2016).

The Fatuana area is one of the areas under the auspices of the Livestock Service Office of Timor Tengah Utara Regency to be an integrated model of integrated dryland development. To find out the level of productivity of interactions between climate, plants and livestock and the supporting and limiting factors, it is necessary to conduct a research activity.

II. METHODS

This research was conducted for 2 (two) months, from June to July 2019 in the Fatuana Region, Timor Tengah Utara Regency, Nusa Tenggara Timur Province. The research

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technique is conducted by a convenience sample, which is a collection of samples that are directly available and can be directly used for research (Riwukore *et al*. 2019[a]). Based on this technique, the sample used was the Head of the Regional Technical Implementing Unit of Fatuana in the Timor Tengah Utara and his Assistant Manager. The type of data used is primary data and secondary data. Primary data were obtained from interviews with questionnaire guidelines, and technical measurements of grass production were carried out in Fatuana area using quadrant techniques. Quadrant technique is done by throwing the quadrant regularly at a distance of 5 steps from the location, then the type of feed vegetation in the frame of the quadrant is cut ± 5cm from the soil surface. The vegetation is then weighed to determine its weight for analysis. Whereas secondary data was obtained using internet documentation techniques, namely data and information retrieval from the annual report of the Meteorology and Geophysics Agency of Timor Tengah Utara Regency, Central Statistics Agency of Timor Tengah Utara Regency, Scientific Journals, Scientific Magazines, etc., obtained by downloading on the internet. The data analysis technique used in this research is descriptive, which is explained quantitatively and qualitatively through decision making with the SWOT technique (Strength, Weakness, Opportunity, and Threats). Then the concept of beef cattle development in the Fatuana Pasture Region was developed in the form of policies and master plan.

III. RESULTS

1. Profile of the Fatuana Area Farm

Fatuana pasture is geographically located in Timor Tengah Utara Regency, Nusa Tenggara Timur Province with an area of ± 40 hectares are. This location is the center of the development of Bali cattle (breeding and fattening) and forage. This area is managed by the Conventional Zone Regional Technical Implementation Unit as an extension of the Timor Tengah Utara Regency Animal Husbandry Service.

The development of Bali cattle in this region began in 2010 with 140 cows (40 male and 100 female cattle) being raised, but because this area is endemic to Brucellosis, many cattle have died. When conducting this research, there were only 43 cattle available (23 male cattle and 20 female cattle).

The opening of the forage plantation area (Indonesia: Hijauan Makanan Ternak/HMT) in this area is considered to be less successful because the land planted with Pennisetum purpureum and king grass has been invaded by Chromolena weeds and reeds. Cattle grazing location that rely on native grass have also been invaded by the same type of weed. The impact of the presence of weeds in this area causes a decrease in body weight of livestock due to the lack of nutrients from the feed consumed.

Fatuana pasture has 2 (two) reservoir, namely water conservation buildings in the form of ponds/basins to collect runoff and other water sources to support agriculture, livestock, forestry, and so on. But the condition of the reservoir has been badly damaged since 2009 and at the time of this research, there was no improvement. Reservoirs damage is allegedly due to poor reservoir construction and not in accordance with the development of budget planning. Damage to this reservoir has an impact on water use for irrigating forage-constrained fodder and only serves as a location for drinking cattle when grazed. In addition to reservoirs, utilization of water consumption for livestock is also obtained from rivers in this region. However, the use of irrigation cannot be done because of limited infrastructures such as water suction machines and drainage.

The rainy season in this region does not help much because its distribution is uneven. The highest rainfall intensity only occurs in December (271 mm) and in February (260 mm), while in other months it only has rainfall intensity <100 mm. Thus this region was identified as a dry area so that it quickly affected the growth of plants to be high in lignin and silica content. In addition, the impact on land use is not optimal from the area manager because of limited water and area infrastructure. This is further compounded by the length of the dry season (± 8-9 months).

The Fatuana pasture has an average air temperature of 26,05^{0}C with a maximum temperature range of 29^{0}C and a minimum temperature of 22,20^{0}C at 83,50% relative humidity. This temperature and humidity condition is considered not to affect the productivity pattern of cattle because it is still in the normal range. Riwukore and Habaora (2018) stated that normal temperatures in raising cattle in tropical climates range between 18^{0}C-37^{0}C. Fatuana pasture has a mild soil texture, meaning low clay texture and high texture of sand and other large particles so that this area is identified as having a lithosol soil type with shallow soil solum, sensitive to erosion so that hard plants and grasses are more dominant. Soil texture like this that causes the Fatuana pasture is always invaded by Chromolena weeds and reeds (60-70%). Soil texture affects the ability of water resistance and water infiltration rate. Rough soils cause rapid water location infiltration so that there is no run-off of the surface even after heavy rain, but the soil is unable to retain large amounts of water. the opposite, the clay is so fine in texture that little water penetrates the lower levels, especially after the clay surface becomes wet and fluffy (Tamba *et al.* 2014; Siba *et al.* 2017; Putritamara *et al.* 2018). The topographical condition of the Fatuana region is bumpy flat ± <40%. In general, the ecological type classification of the Fatuana Zone is A11 because it has low rainfall and low soil fertility. Riwukore and Habaora (2019[b]) stated that the limiting factors in areas classified as A11 ecological types were water, nutrients, and drainage. In general, environmental suitability for grazing beef cattle farming can be seen in Table 1.

Based on Table 1 shows that the environmental influence of the Fatuana pasture is positive to the development of beef cattle because the characteristics of environmental suitability for the grazing system are quite in accordance with the consideration of the anticipatory treatment of climate effects that have an impact on water availability. Whereas related to water quality, according to the Health Profile of Timor Tengah Utara (TTU) states that the general water quality at TTU is suitable for consumption.

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TABLE 1. Environmental suitability for grazing systems

Characteristics	Ordo the suitability of grazing patterns for livestock environments	
	Suitable	Not suitable
Temperatures (t)		
Average temperature (^{0}C)	18-37	< 18 and > 37
Humidity (%)	60-90	< 60 and > 90
Water availability (w)		
- Dry moon (<100 mm)	< 8 months	> 8 months
- Rainfall/year (mm)	750-4.000	< 750 dan > 4.000
- The existence of water sources	there is	there is no
Water quality (q)		
- pH	6,5-9,0	< 6,5 dan > 9,0
Terrain (s)		
- Slope (%)	< 40	> 40

Source: Riwukore dan Habaora (2018)

Management of cattle grazing in the Fatuana area is rotational, divided into 5 paddocks, and how to herd cattle using a semi-intensive system, which is cattle released foraging from morning to evening, and at dusk, the shepherd returned to the cage. At certain times, livestock are fed grass and was given forage at night in an unbalanced portion. Cattle stable facilities in the Fatuana pasture are individual cage and overcapacity occurs because from 43 cattle population, only 23 cows inhabit the cage, while the remaining 20 cows are tethered to trees and cages. Habaora (2015) or Riwukore and Habaora (2018) stated that generally the cattle-raising system in the province of Nusa Tenggara Timur is semi-intensive and uses a mixed housing system (communal, individual, and tethered in the area around the cage or trees around the house yard).

The reproductive performance of Bali cattle in the Fatuana pasture shows a low reproductive capacity because the ability to produce calves from 20 female brooders is only 6 calves or only 30% of calves born during a 3-year period (2016-2018). Then from 6 calves that were born, a number of 5 calves died were identified Brucellosis. Riwukore dan Habaora (2018) stated that the cow's reproductive efficiency of 95% was influenced by feed, health, and environmental factors. The reproductive efficiency of cattle is considered good can be seen from the ability of the mother to be pregnant at least 75% and the ability to give birth to a calf at least 85% of the total pregnancy of cattle. The ability of livestock rearing management in the Fatuana pasture is considered not optimal because the treatment of livestock recording has not been implemented properly. Managers at UPTD Fatuana do not have accurate data on calf births, livestock deaths, and breeding patterns. Meanwhile, the Fatuana area has inseminators that have been trained and fostered in competent courses, but because it is not supported by the provision of good insemination facilities and infrastructure, the expertise of inseminators is not optimally utilized. Therefore, there is a need to improve the overall management of feed, health, and the environment in the Fatuana Region to achieve maximum reproductive efficiency of cattle.

The cattle marketing system in the Fatuana area is still considered to be very bureaucratic. Every cattle sold from this area is prohibited from carrying out traffic from the district of Timor Tengah Utara. This prohibition is caused because the Fatuana Zone is endemic to brucellosis, so the Head of the Region (Regent Raymundus Fernandez) issued Regents Regulation No. 9 of 2006 concerning Permanent Procedures on Procedures for Granting Recommendations for Large Livestock Expenditure Permit in Timor Tengah Utara Regency which is considered to be very bureaucratic because the requirements are too long and convoluted. The purpose of the issuance of this Bupati Regulation is to protect the livestock population in TTU, however, the requirements stated in the PERBUP indicate inconsistencies with Bylaw No. 22/2007 concerning licensing because legal breeding animals are brought out of the TTU and Bylaw No. 57/2001 concerning Animal Market Retribution for permitting licensing for the slaughtering of cattle/buffaloes and breed/feeder. In addition, this regulation is difficult because the prerequisites for issuing livestock issuance permit recommendations must be re-verified, meaning that it creates a high-cost economy because the procedure is run twice. Meanwhile, the Perbup does not explain in detail about the impact of the mismatch between permit recommendations and verification results. The function of the Regional Government for the welfare of the people is also eliminated because the services provided by the Animal Husbandry Department in the form of weighing/measuring / examining animal health must be paid using semiotic donations. This regulation is also not in accordance with the legal principles because it shows a discrepancy with Dass Sollen and Das Sein between the ideal and the reality (Riwukore *et al.* 2019[b]). This can be seen from the Fatuana area which has Slaughterhouse and Animal Clinic facilities but has never operated so the Perbup only shows anticipation of the impact of problems on livestock and veterinary but is not followed by the reality and dynamics of eligibility for livestock and veterinary. Therefore, this Perbup must be revised to develop a sustainable beef cattle farm.

The Fatuana area is based on the concept of not optimal waste management, which is shown by leaving cattle manure just piled up in cages and scattered in grazing locations without any use. Although this area has biogas and compost facilities, the facility is in a heavily damaged condition and is not utilized. Zalizar *et al.* (2013) states that animal waste, if not treated properly, will have a negative impact on human health, livestock, and the environment. Faza *et al.* (2013) states that cattle livestock waste has economic potential and is beneficial for nature conservation. Riwukore dan Habaora (2018) reports if the production of cattle waste in an area of 8.120,5 kg/day produces 317,7 m3 / day for cooking fuel for 1.049,3 hours/day.

2. Carrying Capacity in Fatuana Pasture

Carrying capacity is the ability of land agroecosystem to accommodate livestock according to the availability of forage. Estimation of livestock needs forage based on the carrying capacity that has a relationship to the type of livestock, forage production, season, and area of land agroecosystem. Forage needs by a cow are influenced by age groups, where adult cattle need forage 35 kg / head / day, young cattle 15-17,5 kg / head / day, and calf 7,5-9 kg / head / day. In general, the need for feed consumption for cows is 10% of body weight. Grass

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and forage production in an agroecosystem is largely determined by climate and soil fertility. Forage quality is determined by the ratio of cell contents (nutrient content) and cell walls (silica and lignin) of the forage. The cell wall is a component of low digestibility and its proportion increases with increasing plant age. Silica and lignin are complex carbohydrate compounds which chemically are constituents of plant cell walls which are relatively difficult to digest by carbohydrate-breaking enzymes (Habaora 2015; Riwukore and Habaora 2018; Riwukore and Habaora 2019[bc]). Thus the higher the proportion of lignin and silica in the forage the lower the proportion of cell contents and have an impact on the quality of forage nutrition consumed by cattle. This condition is getting worse if there is overgrazing in the livestock area. Therefore, consideration of the ability of the area to accommodate a number of animals so that the need for forage in one year as animal feed is available and sufficient is very important.

TABLE 2. A sampling of grass on paddock using quadrant techniques

Envelope	Temporary conditions pastoring		Conditions before pastoring	
	Grass Weight (kg)	Grass height (m)	Grass Weight (kg)	Grass height (m)
1	0,10	0,3	1,03	1,0
2	0,10	0,5	0,43	0,8
3	0,15	0,3	0,38	0,9
4	0,25	0,3	0,53*	0,9
5	0,10	0,4	0,43*	0,8*
Average	0,16	0,36	0,61	0,98

Source: primary data (processed)

Based on the data in Table 2, biomass production can be calculated using the instructions of Subagio and Kusmartono (1988) as follows.

$$\text{Grass production}(\text{ton / ha}) = \frac{(\text{Sampling Weight}(\text{gr}) \text{ x Volume Area})}{(\text{Volume value area})}$$

$$\textit{Grass production}\ (ton/ha) = \frac{160\,x\,40.000}{1.000.000}$$

$$= 6,4 \text{ ton condotion after grazing}$$

$$\textit{Grass production}\ (ton/ha) = \frac{610\,x\,40.000}{1.000.000}$$

$$= 25,3 \text{ ton conditions before being grazing}$$

The data above is then converted to capacity based on location conditions that have not been pastored by considering the proper use factor (PUF) in the medium category (45%), the amount of available forage per hectare is 45% x 25.3 tons = 10,98 tons (10.980 tons) kg per year). Furthermore, considering the climate element (long dry season), the rest period of grass to regrow after pasturing for 30 days (1 month) is 70 days (10 weeks).

The average weight of a cattle in the Fatuana Zone is 250,5 kg so that cattle need fresh forage as much as 10% of body weight, which is 25,5 kg/day. Thus the fresh forage needs of a cattle for 30 days is 25,5 kg / day x 30 days = 765 kg / month (0,765 tons / month). Therefore, the immediate forage that must be available in the Fatuana Zone for a cattle / hectare are / month is (0,765 / 10,98) = 0,08 ha / month.

Then do the calculation of land area requirements per year using the formula Voisin (1995), namely (y-1) s = r, where y (the ratio of land area required for a cow per year to month), s (period of grazing), and r (rest period). Thus (y-1) 30 = 70, then y = ((70/30) + 1), and y = 2,3 + 1 = 3,3. Based on this Voisin formula, the annual land area requirement is: 3,3 x 0,08 ha / head / month = 0,264 ha / head / year. The Fatuana area has 43 head of cattle raised in an area of 40 hectares, then 40 x 0,264 heads = 10,56 heads/ha. Thus the capacity of the Fatuana area is only for 10.56 head of cattle and there is an overcapacity of 32,44 head of cattle.

IV. Discussion

SWOT analysis is an analysis used in identifying and analyzing internal strategy factors (strengths and weaknesses) and external (opportunities and threats) for further use in determining/selecting alternative final strategies to be implemented (Kusumastuti 2015). Thus the SWOT analysis of the identification of internal and external factors can be carried out on the subsystems as follows.

1. Climate subsystem, including information about rainfall, rainfall patterns, rainy months, dry months, temperature, and humidity. *Strength*: (1) climate data is easily accessed through many data sources such as BPS and BMKG, making it easier to analyze Fatuana areas based on climate data recording; (2) Fatuana UPTD is a regional government agency so that it has personnel and there is cooperation with the Unimor campus and Undana Campus as experts for assisting and guiding the area; (3) Fatuana UPTD has 1 water source and 1 large river that never dries in the dry season so that it can become a source of water to the reservoir to be drained through drainage. *Weakness*: (1) The capability of analyzing climate data recording has not been implemented in the implementation of activities in the Fatuana Zone; (2) reservoirs as water storage centers have not been repaired due to local budget constraints; (3) feed technology when abundant forage in the rainy season has not been done so that livestock are still completely dependent on forage available in paddock with low quality and relatively small amount of feed due to weed invasion, accompanied by maintenance management is still semi-intensive without providing additional feed; (4) management of river water management as a source of water for forage has not been done. *Opportunity*: (1) Fatuana UPTD received multi-years funds from the TTU APBD of Rp129.500.000, -, for the development of forage feed, which in the Draft Budget Budget (RAB) included items for repairing reservoirs to anticipate drought; *Threats*: (1) erratic rainfall; (2) the discussion of funds between the DPRD and the Regional Government that is full of sectoral interests causes delays in operating funds to be delayed.
2. Soil subsystem, including information on land area, soil type, soil texture, chemical composition, and topography. *Strength*: UPTD Fatuana has an area of 40 ha with a light soil texture; *Weakness*: the type of soil in the Fatuana area is litosol with shallow soil solum, sensitive to erosion so it is suitable for weed invasion (chromolena and reeds);

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Opportunity: the existence of soil conservation efforts by the Local Government of TTU through the Additional Expenditure Budget (ABT) for the development of forage areas; *Threats*: Ecology Fatuana area is type A11 with the characteristics of low rainfall and low soil fertility so that it becomes the main limiting factor for water, nutrient, and drainage infiltration.

3. Crop/forage subsystems, including information on forage types, forage production, capacity, grazing pressure, carrying capacity, and land use management. *Strength*: grazing management uses a paddock approach to facilitate the regulation of livestock rotation on regrowth, and has a paddock for forage; *Weakness*: each paddock is covered with weeds between 60-70% while grass is only ± 30% and tree legume is around 10-20%, the chemical composition of the grass contains more coarse fibers and silica due to climatic influences, 32.44 overgrazing occurs in each paddock cattle tail so that the performance of the cow is thin; *Opportunity*: the existence of feed experts from campus has the potential to change weeds as a source of feed using technological interventions; *Threats*: weed invasion with resistance to soil management.
4. Livestock production subsystem, including information about the maintenance system, and housing facilities. *Strength*: livestock have regular grazing time through a semi-intensive system, the Fatuana UPTD has adequate grazing and personnel management facilities, and has a waste expert if optimized utilization of the waste facility; *Weakness*: cattle are experiencing stress caused by grazing pressure, personnel do not understand well the benefits of supplementary feeding, not all livestock can place pens, and the condition of waste handling facilities that start to deteriorate is getting worse due to not being repaired; *Opportunity*: politically received budget support from the Local Government of TTU such as a fund to purchase livestock totaling 100 heads and funds to improve regional infrastructure; *Threats*: inconsistency of government budget that is full of interests, much UPTD personnel are lazy on the grounds of not getting salary/wages, livestock productivity is less desirable because it is an endemic area of Brucellosis**.**
5. Reproductive subsystems, including information about mating systems, birth patterns, livestock mortality rates, and general breeding patterns. *Strength*: UPTD Fatuana has sufficient skilled inseminators, has female and male cattle for breeding; *Weakness*: inseminator is passive because of the lack of supporting infrastructure, the reproductive efficiency of livestock is very low, personnel never do recording, and livestock mortality is high; *Opportunity*: the presence of productive female purchasing items in the budget discussion at the DPRD, and the government policy on breeding livestock using artificial insemination; *Threats*: Fatuana area is endemic to brucellosis, and there is a regulation that prohibits the import or export of livestock in TTU.
6. Marketing subsystem, including business planning and marketing. *Strength*: UPTD Fatuana area has a master plan for livestock business development, and has a slaughterhouse; *Weakness*: the master plan is only oriented towards increasing the number of livestock by importing rather than improving breeding management, and the RPH has never been used so as to accelerate damage because it is rarely used; *Opportunity*: cattle as a leading export commodity to consumer areas such as Jakarta, and NTT are areas of cattle production centers; *Threats*: the ability of Brucellosis bacteria that are resistant to technological interventions, and the presence of Perbup.

The key to success is a very important determining factor in achieving organizational goals and objectives. Based on the SWOT analysis above, it can be detailed the key success factors based on the subsystem, namely: Fatuana area becomes an independent area and center for beef cattle development in Indonesia in general and in NTT in particular. To achieve the key success factors, operational, holistic and sustainable policies, strategies and master plans are required in the following manner.

1. Seed independent policy can be pursued by building seed barns in the Fatuana Region by utilizing investment funds from the government or private sector. The master plan that needs to be prepared, namely: the development of the seedling area model, the development of management in maintaining the security of livestock stock, the inventory requirements for the procurement of seedlings and their procurement techniques, the preparation of the area model, the improvement and construction of the area facilities, the guidance and assistance of personnel, the formulation of the management of the seedling area management.
2. Independent feed policy can be pursued with a strategy to optimize the use of forage sources and build a feed industry in the region. The master plan that needs to be prepared is development of potential forage sources, improvement of technology for the use of weeds as feed, inventory of forage sources, training in aquaculture technology and supply systems accompanied by feed management systems, determination of feed industry locations, preparation of feed industry design, preparation of management systems feed, and implementation of the development of the feed industry.
3. The policy for optimizing public services can be pursued by investing and subsidizing public service facilities, integrated service management, and equitable service facilities. The master plan that needs to be prepared, namely the development of service facilities (type, number, location, institutions, etc.), increasing the resources of facility management personnel, identifying the determination of the location and needs of service facilities, preparation of service facility management systems, and construction of service facilities (quarantine, holding ground, training center).
4. Business-scale policy (business branch or main business), pursued by providing packages to increase business scale, determine potential business types (fattening or breeding), and increase the role of the private sector in the business. The master plan that needs to be prepared, namely: development of business scale models with livestock as the main component, development of livestock breeding

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supply systems, development of livestock farming partnership systems, business pattern inventory, determination of economies of scale and partnership systems, procurement of seeds and facilities.

5. The sustainable germplasm management policy can be pursued with a strategy of managing local cattle resources (Bali cattle) and sustainable resource management. The master plan that needs to be prepared is the development of germplasm resources, development of resource management systems, improvement of HR personnel, inventory and mapping of potential resources, and preparation of management guidelines.
6. Institutional professionalism policy, can be pursued by developing personnel resources and collaborating with universities, NGOs and the private sector. The master plan required is: the development of institutional cooperation, identification of the need to develop HR for personnel in the UPTD, an inventory of partners in the development of animal husbandry, and the formulation of a partnership model.
7. The investment climate policy is pursued by revising regulations that are appropriate to investment and promoting investment profiles in the region. The required master plan is to reformulate the regional regulations and regional head regulations that are detrimental, the development of a regional investment profile information system, the preparation of provisions that can increase investment interest, the preparation, and publication of investment profiles of the Fatuana Zone.
8. Integrated quality standardization policy, can be pursued by the use of quality seeds, healthy cultivation management, standardization of post-harvest handling, standardization of waste management systems, and standardization of transportation systems. The master plan required is the development of aquaculture technology, the development of postharvest technology, the development of animal husbandry product transportation systems, the setting of quality standards, integrated technology training, and quality assurance, identification of facilities and infrastructure needs for livestock product transportation, and procurement of facilities and infrastructure..

The implementation of the policies, strategies, and master plan above can be done through a model tool as a process of completing and strengthening the systems and efforts to develop livestock in the Fatuana Zone. The components of this model do not stand alone but are interconnected with one another. The model appears from the programs, sub-programs, targets, and institutions involved.

Performance evaluation needs to be carried out to evaluate the implementation of the development as outlined in the Fatuana Zone masterplan because evaluation with feedback on the results of the implementation is useful in formulating corrective measures. Evaluation of development can be carried out by first establishing performance indicators. Therefore, performance indicators should be quantities that can be measured easily and cheaply. Measurement of the level of performance in the evaluation includes measuring the performance of activities, measuring program performance, and measuring the performance of policies.

TABLE 3. Matrix model for implementing policies, strategies, and master plans

Programme	Sub Programme	Goals	Institutional Partners
revitalizing pastura	Grass pasture and legume pastura	Feed Resistance	UPTD Fatuana, Department of Animal Husbandry, Bappeda, Campus, CSR
Construction of livestock breeding centers	- Buildings and laboratories - Procurement of livestock seeds	Stock stabilization and seed quality	UPTD Fatuana, Department of Animal Husbandry, Campus, Private, CSR
Development of integrated service posts	- Building and equipment procurement - HR training and development	Accelerating population increase	UPTD Fatuana, Department of Animal Husbandry, Campus, Private, CSR
Bali Cattle Breeding	- Ranch / pasture system - Semi-intensive and intensive patterns (integration)	Provision of germplasm and seeds continuously	UPTD Fatuana, Department of Animal Husbandry, Campus, Private, CSR
Bali cattle fattening	Paronization and intensification of Bali cattle	Population stabilization and local or long-distance exports	UPTD Fatuana, Department of Animal Husbandry, Private
Marketing and Promotion	Development of marketing networks, and marketing digitalization	Product optimization, added value and investment	UPTD Fatuana, Department of Animal Husbandry, Office of Cooperatives, Private
Strengthening animal husbandry resources	Training and development	Development of creativity and innovation	UPTD Fatuana, Department of Animal Husbandry, campus
Dissemination of livestock business technology	The introduction of cultivation technology and the strengthening of HR personnel	Certification of personnel skills	UPTD Fatuana, Department of Animal Husbandry, Campus, Private, CSR
Experimental studies	Comparative study of development	Adoption of innovation in the region	UPTD Fatuana, Department of Animal Husbandry, Campus, Donors

V. CONCLUSION

The Fatuana area is a location for the development of Balinese cattle based on grazing land, and its management is under the auspices of the Livestock Service Office of North Central Timor Regency. The limiting factors for the development of beef cattle in this region are climate, soil, weeds, reproductive capacity, disease, marketing, infrastructure, institutions, and policies. Therefore the strategies that can be carried out to develop Balinese cattle in the Fatuana Region are the implementation of a pasture revitalization program, the construction of a nursery hall, integration of integrated service posts, breeding and fattening of Bali cattle, marketing and promotion, strengthening HR personnel, technology dissemination, and experimental studies.

Jefirstson Richset Riwukore, Bagus Priyo Purwanto, Ahmad Yani, Rudi Priyanto, Luki Abdullah, Asnath Maria Fuah, Yohanes Susanto, and Fellyanus Habaora, "Swot Analysis Developing Pasture Agroekosistem of Bali Cattle in Indonesia (Case Study in Fatuana Pasture of North Central Timor District)," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 2, Issue 11, pp. 24-30, 2020.

Conflicts of Interest

The authors declare no conflicts of interest regarding this manuscript.

Acknowledgements

This research did not receive any specific funding.

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