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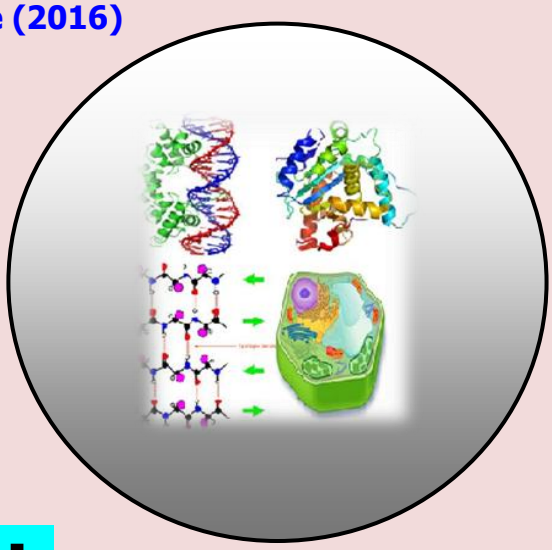

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Sustainability Level Analysis of Integrated Cattle Farm-Based Areas in Lima Puluh Kota Regency

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ABSTRACT

This study was aimed to analyze the status of integrated cattle farms-based areas sustainability in Lima Puluh Kota District based on five dimensions of sustainability. This study used analysis method of Multidimensional Scaling (MDS) called Rap-BANGKAPET and the results were expressed in form of sustainability index and status. Leverage and Monte Carlo analysis were conducted to find out about attributes that affect the sustainability index and status and error effect. Prospective analysis was used to formulate scenarios for the improvement of future sustainability status. Sustainability analysis results indicated that ecological dimension was in less sustainable status (46.50%), economic dimension was fairly sustainable (69.53%), social and cultural dimensions were fairly sustainable (55.14%), infrastructure and technology dimensions were less sustainable (45 , 48%) and legal and institutional dimensions were less sustainable (47.46%). Of the 73 (seventy-three) attributes analyzed 24 (twenty four) attributes needed to be addressed because they had sensitive influence on the increase in sustainability index and status with error level (error) was very small at level of 95%. In order to improve the status of future sustainability (long-term), a scenario need to be done was progressive-optimistic scenario through overall improvement in all sensitive attributes for the improvement of the status of a region.
***Keywords**: Sustainability status of ecological, Economic, Social, Cultural, Technological, Legal Dimensions of Lima Puluh Kota Regency*.

INTRODUCTION

In order to get optimum benefit, the development of farm management needs to meet the criteria of sustainable development through the association of economic interest, social-culture, and ecological sustainability (Saragih and Sipayung, 2002). It is expected that by implementing the development of sustainable beef cattle farms-based areas, it can increase the income of farmers or ranchers and improve the contribution to regional real revenue (PAD), employment and spread income, apply technology to improve productivity, law-abiding and farm institutional functioning. Thus, a comprehensive study is needed to formulate policy and scenarios of the development of sustainable integrated beef cattle farms-based areas.

Lima Puluh Kota Regency is a center of beef cattle production in West Sumatra havingpotential for future development. Beef cattle population in 2010 is 57.236 head and the main livelihood of the people is agriculture (62%), which supports the provision of feed both forage and agricultural waste. There is a Livestock Breeding Institute - Forage Animal Feed (BPT-HMT) of Padang Mengatas as technological transformation. The location is strategic because it borders with Riau Province as the largest consumer of beef products from West Sumatera. The average growth of cattle in Lima Puluh Kota Regency in the last 5 (five) years (from 2005 to 2010) is 9.36% per year (BPS (Bureau of Statistic) of Lima Puluh Kota Regency, 2014). In Lima Puluh Kota Regency of West Sumatra beef cattle farms has excellent potential to be developed and has been established as the leading commodity area. The policy has gained great response from the community based on 6 (six) facts in field. **First,** market demand for commodities of breeding beef cattle is fairly high. **Second,** the potential of available land and the availability of food resources are very supportive for the development of beef cattle farms. **Third,** the suitability of agroclimate conditions. **Fourth,** society culture and workforce in the region is sufficient to support the development of beef cattle breeding business. **Fifth,** sufficient local government support for beef cattle sector. **Sixth,** livestock product markets provide excellent market opportunities. In addition to meet the needs of Lima Puluh Kota Regency farm products serve the needs of other cities. It is indicated by the number of slaughtered livestock and poultry and cattle that come out each year (BPS District Lima Puluh Kota, 2014). This study aimed to determine the sustainability status of integrated beef cattle farms-based areas in Lima Puluh Kota Regency from five dimensions of sustainability, namely: ecological, economic, social and cultural, infrastructure and technology, legal and institutional dimensions. By knowing the sustainability status of an area based on five dimensions of sustainability will facilitate the improvement on sensitive attributes that affect the improvement of the sustainability status of the area, especially on sustainability dimensions with lower status in order to support the development of the area.

RESEARCH METHODELOGY

Research Location and Time

The research was conducted at Lima Puluh Kota Regency of West Sumatra Province. Determination of the location of research was based on the consideration that Lima Puluh Kota Regency has the potential for the development of integrated beef cattle farms-based area and is supported by adequate public facilities and infrastructure. The location was selected purposively consisted of 3 (three) districts, namely: Luhak, Situjuah Limo Nagari, and Lareh Sago Halaban at Lima Puluh Kota Regency West Sumatra Province. The research was conducted from January to August 2015.

Types and Sources of Data

The type of data required in the analysis of sustainability of the development of beef cattle farms-based area was primary data in form of attributes related to the five dimensions of sustainable development, namely: ecology, economy, social, technology / infrastructure and legal / institutional. Primary data can be sourced from the selectedrespondents and experts and direct observation in research location.

Data Collection Method

Data collection methods in the analysis of sustainability of the development of integrated beef cattle farms-based area in Lima Puluh Kota Regency was conducted through interviews, discussions, questionnaires and field surveys. Respondents in the study area consisted of various experts and *stakeholders* related to the research topic.

Data Analysis Methods

Multidimensional Scaling (MDS) Analysis

Analysis of sustainability of the development of integrated beef cattle breeding-based area was conducted using *Multidimensional Scaling* (MDS) approach called Rap-BANGKAPET approach;

which is the development of *Rapfish* method used to assess the status of fisheries sustainability. The analysis of sustainability was expressed in Sustainability Index of the Development of Integrated Livestock-Based Area (IKb-BANGKAPET).

Each attribute of each dimension was given a score based on scientific judgment of the scorer. The range of scores was 0-3 or depended on the circumstances of each attribute defined from bad (0) to good (3). The score of each attribute was analyzed multi-dimensionally to determine one or several points that reflect the position of the sustainability of development of *agropolitan* area assessed relative to two reference points, namely point *(good)* and bad points *(bad).* According to Kavanagh (2001) that the score value, which is the sustainability index value of each dimension, is categorized into bad (0-25); less (26-50); fair (51-74); and good (75-100).

Prospective Analysis

Prospective analysis was carried out in order to produce a farm-based sustainable regional development scenario in Lima Puluh Kota Regency for the future by determining the dominant factors that affect the system performance.

The effect between factors was given a score by expert using assessment guidelines of prospective analysis, namely: 0 (no effect); 1 (small effect), 2 (moderate effect); and 3 (very strong effect). Future possibilities can be best determined based on the determination of future key elements from several factors or elements having great influence on the development of the integrated beef cattle farms-based area in Lima Puluh Kota Regency that demand immediate action.

RESULT AND DISCUSSION

Sustainability Status of Integrated Cattle Farm-Based Area in Lima Puluh Kota Regency

In the study of the development of integrated cattle farms-based area in Lima Puluh Kota Regency, the determination of the sustainability index of the area was determined on five dimensions of sustainability, namely: ecology, economy, social and cultural, infrastructure and technology, as well as legal and institutional with attributes and value of scoring resulted from expert opinion. Based on the analysis using Rap-BANGKAPET (MDS) sustainability index values for ecological dimension was 46.50% (less sustainable status), legal and institutional dimensions was 47.46% (less sustainable status), infrastructure and technology dimensions was45 , 48% (less sustainable status), sociocultural dimension was 55.14% (fairly sustainable status), and economic dimension was 69.53% (fairly sustainable status). In order for the index values continue to increase in the future up to the sustainable status, improvements on sensitive attributes that affect the ecological dimension index values are needed. Attributes assessed by experts was based on the existing conditions of the area. Index value of the five sustainability dimensions as a result of Rap-BANGKAPET analysis is presented in the following Figure 1.

Scenario Regional Development Strategy for Development of Regions Based Ranch Cattle Sustainable Integrated in District Lima Puluh Kota

The regional development strategy for Lima Puluh Kota Regency for the development of integrated beef cattle-based sustainable agropolitan area was conducted using prospective analysis to predict the future possibilities in accordance with the objectives to be achieved.

The sustainability analysis income (MDS) resulted in 24 (twenty four) factors or attributes that are sensitive from the 73 (seventy three) attributes examined and submitted to experts for prospectively analyzed (Table 1).

Table 1. The key factors that influence the development of the integrated beef cattle farms -based area in Lima Puluh Kota Regency.

No.	Factors of Sustainability Analysis
Ecological Dimensions (7 key factors)	
1.	The availability of waste management installation of animal slaughterhouse (RPH)
2.	The availability of animal slaughterhouse (RPH)
3.	Cage cleanliness.
4.	The availability of WWTP agro-industry of livestock product.
5.	The quantity of farm waste.
6.	Feed carrying capacity.
7.	Distance of farm location to the settlements.
Economic Dimensions (4 key factors)	
8.	The availability of farm agro-industry.
9.	Market for farm agro-industryproduct.
10.	The availability of feed industry.
11.	The availability of cattle market/sub terminal of agribusiness.
Social Culture Dimensions (5 key factors)	
12.	Agro-farm employment level.
13.	Community's role in agro-livestock business.
14.	Number of people who work in the field of agro-livestock.
15.	Time allocation for agro-livestock business.
16.	Family participation in agro-livestock business.
Infrastructure - Technology Dimensions (4 key factors)	
17.	Processing technology of livestock products.
18.	Waste treatment technologies of farms / agro-livestock.
19.	The availability of agro-industry farm buildings.
20.	The availability of public infrastructure and facilities.
Legal-Institutional Dimension (4 key factors)	
21.	Agricultural extension agencies / Agricultural Extension Centers
22.	The availability of microfinance institutions (Bank / Credit).
23.	Agropolitan regional governing body.
24.	Livestock farmer cooperatives.

Based on the results of the analysis of the level of interest among factors seven (7) key factors/determinants were found to have strong influence and less strong interdependency among factors, namely:

(1) The availability of agro-livestock.
(2) The availability animal slaughterhouses (RPH)
(3) Number of people working in the field of agro-livestock.
(4) Livestock farmer cooperatives.
(5) Market for farm agro-industry products.

(6) The availability of agro-farms building.
(7) The availability of the feed industry.

Thus, those seven factors needed to be managed well and various possible circumstances *(state)* in the future were made to achieve sustainable development of integrated beef cattle farms -based area in Lima Puluh Kota Regency to support the implementation of regional autonomy.
The availability of livestock products processing industries, such as: beef meat processing industry, leather processing industry, and organic fertilizer industry will require large quantity of raw materials of cattle. In addition, it will require and absorb numbers of laborsin this area, require the availability of adequate slaughterhouses and animal feed industry. The existence of livestock industry will also affect farm products market and have much impact *(multiplier effects)* on the development of the region and in turn, improve the regional gross domestic product (GDP). Therefore, the availability of livestock products processing industry greatly assists the region in order to promote the growth of the region and increase the GDP of the region. The existence of livestock processing industry will also increase locality of mutually supportive and reinforcing leading commodity agri business including small industries, product processing, marketing services and agro-tourism to optimize the benefits of natural resources, efficiently and economically. Therefore, no waste is wasted or not utilized for the welfare of society (no waste integrated farming).
In terms of feeding, breeders generally still relied on feed from surrounding residence. Cattle ranchers, for example, utilize natural grasses that grow in pastures, orchards and forests and use agricultural waste and agro-industrial waste available in the region. The dependency on natural grass will bring obstacles during dry season. In order to ensure the availability of food and nutritional adequacy of livestock, the development of feed industry is needed in this area, especially the availability of agricultural products (corn) and agricultural waste (rice straw, corn leaves, cassava leaves, ground bean leaves, and shoots of sugar cane) and waste of agroindustry (rice bran, soybean pulp, soy pulp and corn cobs) that can be used for animal feed. With the existence of animal feed industry in this region, in addition to meet the needs of the animal feed in its own area, the product can be sold to other areas. The industry can also absorb local labors and provide *multiplier effects* for the region, so that the feed industry can contribute income to the communities and region.
In order to establish a developed integrated beef cattle farms -based area, the existence of cooperatives is needed to facilitate people who look for fund/capital, accommodate and market agro-livestock products and facilitate economic activities of micro-finance services of local communities. Cooperative formed preferably an effort of awareness and participation of the community in implementing the development program for their own interest. In this pattern, society itself has the initiative and play role in their activities, so that its success is largely determined from the sense of responsibility of the society itself. The initial step of forming this cooperative is advocacy, organizing, and community empowerment (Suyitman, 2010).

CONCLUSION

Based on the existing condition of farm-based research location in Lima Puluh Kota Regency, dimensions of ecology, technology infrastructure, as well as the legal and institutional were less sustainable; while the economic and socio-cultural dimensions was fairly sustainable. In a multidimensional, beef cattle-based area at Lima Puluh Kota Regency was quite sustainable with 24 sensitive attributes were influential in improving the sustainability index. To improve the status of the sustainability in the future (long-term), a scenario that needs to be done to improve the status of development of agropolitan in the breeding-based area in Lima Puluh Kota Regency is progressive-optimistic scenario by overall improving in all sensitive attributes or at least 7 attributes of key factors generated from the prospective analysis. Therefore, all dimensions will be sustainable for the development of integrated beef cattle farms-based agropolitan.

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REFERENCES

Central Bureau of Statistics (BPS) District 2014. *Lima Puluh Kota in Figures:* Payakumbuh: Cooperation Bappeda and BPS District Fifty City.

Kavanagh, P. 2001. *Rapid Appraisal of Fisheries (Rapfish) Project. Rapfish Software Description (for Microsoft Exel)* .University of British Columbia, Fishries Centre. Vancouver.

Saragih, B. 2000. *Based Livestock Agribusiness.* USESE Foundation and the Centre for Development Studies University. Bogor.

Saragih, B. and T. Sipayung. 2002. Biological utilization in developmentalism and environmentalism. Paper Presented at the International Seminar on Natural Resources Environmental Economic Accounting Held in Yogyakarta, Indonesia, April 29.

Suyitman. 2010. Model-based sustainable development agropolitan integrated beef cattle farms in Situbondo. Dissertation. Graduate School of Bogor Agriculture University. Bogor.

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