Identification of Cattle Farms Chain Madura Ecosystem Based Blue Economy Concept

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Abstract

Madura Island is known as the island with agro climatic conditions are quite extreme. This condition affects the genius and plant populations that exist and the impact on animal life in these ecosystems. Ranch as one of the agricultural sector with a strategic position, as a provider of animal protein. Madura Island has an advantage in the field of cattle breeding typical Madura. The purpose of this study is assessing alternative commodity ecosystem chain efficiency improvements especially cattle cow Madura. The method used is descriptive method of analysis. The results showed a seven supporting the plant ecosystem sustainability and development of cattle breeding Madura ie ecosystems rice, maize, soybeans, peanuts, green beans, cassava and sweet potatoes. Each ecosystem has the potential of different crops in each district to be integrated with the development of cattle breeding Madura.

Keywords : Cows, Madura, Blue Economy.

1. Introduction

Madura is one of the islands that have distinct characteristics. Hot climatic conditions with temperatures ranging between 27°C - 34°C, rainfall ranges from 1600 mm/year, ranging from 89% humidity and dry soil conditions affecting the state of the plant, the type of plants, plant production and quality of existing plants. The agro ecosystem is very influential on subsequent ecosystem chain is particularly cattle breeding farm ecosystem.

As for where we know, the farm is part of the agricultural sector with a strategic position in supporting the economy. Livestock development has a strategic role and function in addition to increasing the income and standard of living of farmers also aims to fulfillment and improvement of public nutrition, especially in meeting the needs of animal protein, a provider of employment and development potential of the region, so that the role of the livestock sector must be utilized optimally. Mission of livestock development includes the provision of animal origin food, human resource development, the creation of economic opportunities, job creation and preservation and utilization of natural resources farm support.

Increasing population led to an increase in demand for food, especially the continuity of supply availability (Pauli, 2010). There is an increasing public awareness of nutrition drive increased demand for food of animal proteins which include meat from ruminant animals, especially cattle. Data Ditjennak, shows that the availability of the national beef is still experiencing shortages, forcing overcome by imports, which reached 35% of total national beef demand. Under the conditions of the development of livestock in areas that are potentially very necessary (Kadarsih, 2004). Including one on the island of Madura Madura cattle Adaiah as one potential endemic ecosystems developed. On the island of Madura in recent times cattle breeding conditions stagnated and tend to decline in production caused by various factors, one of which is the ecosystem is less support and at least the gains of cattle farms (Siswijono, 2017).

Suggest that the carrying capacity of the region for the development of livestock shown by the ability of the region to produce feed, especially forage that can accommodate and meet the needs of a population of livestock (Dziyaudin, 2012; Priyanto, 2016). Environmental factors affect the growth of livestock such as temperature, solar radiation, and humidity (Priyanto, 2016). Kadarsih adds that the differences in altitude affect the performance of

livestock. These factors are factors that affect the production and productivity of livestock. If livestock is kept in an area that does not correspond to the physiological condition of livestock, production and productivity decreases (Kadarsih, 2004). Atmiyati that the placement of livestock in the region should consider the suitability of land, availability of forage, waste from agriculture, and human resources skilled and nimble as a strategic step in utilizing resources optimally and to consider the preservation of which is based on the understanding that fundamental about the nature and the natural characteristics of the land and cattle behavior in interaction with the ground. Physical factors (environment), social, and economics are interconnected system among one another (Prasnowo, 2012).

Social and cultural factors influence the development of livestock such as the behavior of farmers in raising livestock. The response of farmers in raising livestock affected the business scale, the conditions of farmers, and the purpose of maintenance (Rusdin, 2012). An attempt is considered beneficial if the business is economically feasible, means giving short-term benefits and can be a long-term investment. Socio-cultural and economic factors also closely related to physical factors determining the success of the region in the farm.

One effort to improve profitability in the cattle business is how to take advantage of all the results are there to be used as something that gives a positive impact on the lives of Madura cattle ranchers. The concept is better known as the academic world where the blue economy concept is not only oriented towards zero waste but also how to waste it has added value. Thus the efficiency of extraction of a natural resource will increase its usefulness. This commodity is a commodity that is not widely utilized its waste, resulting in the development of a blue economy must be applied how waste strives to add value to the farmer community. Cow manure as waste is predominantly used for organic fertilizer, whereas if it is done before the process of becoming organic fertilizer can bring added value and reduce greenhouse gas emissions. If the farming community in applying the concept of a blue economy is expected to improve the welfare of society as well as reduce dependence on energy.This research aims to review alternatives commodity ecosystem chain efficiency improvements especially cattle cow Madura. Included in the study about chain supporting ecosystems Madura successful development of cattle breeding.

2. Methodology

This study used a descriptive method by conducting a survey to four regencies in Madura. Data used include primary data through field surveys and interviews with experts, then the secondary data obtained through the study of literature relevant to the research topic. The study was conducted pad March to August 2017.

3. Results And Disussion

Chain supporting ecosystems ranch. Results of field survey showed that the chain ecosystem that enables integrated with cattle ranches No 7 ecosystem that includes an ecosystem of rice, corn, peanuts, green beans, sweet potatoes, and yams wood. Each ecosystem these plants have different advantages and different extents between districts in Madura.

3.1 Rice Ecosystem

Rice as one of the strategic food commodity crop in Madura. This plant accounts for forage which is very important in the ecosystem of the farm, about 80% share of the rice plant can be used as cattle feed. Conditions on the ground shows the rice crop area in Madura illustrated in the following figure 1.

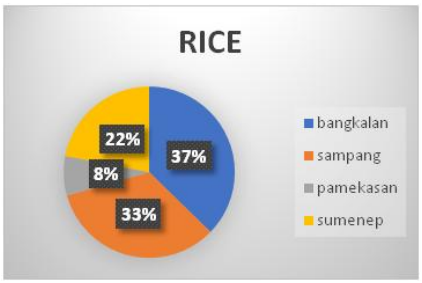

Figure 1. Rice area in madura

Data show that the area of rice crops in the region of 140,260 ha Madura so that if it is assumed that in 1 ha is able to produce 400 kg of green feed they can determine the amount of forage year amounted to 56 thousand tons a year (Biro Pusat Statistik, 2017a, 2017b, 2017c). Using a rice harvester, the animal feed ingredients will produce more (Nurdin, 2018).

3.2 Maize Ecosystem

Com known as one favorite forage for cattle in Madura. The corn crop is pretty much cultivated. In 2016 showed that the corn planted area covering an area of 286,760 ha with a distribution plant shown in the following figure 2.

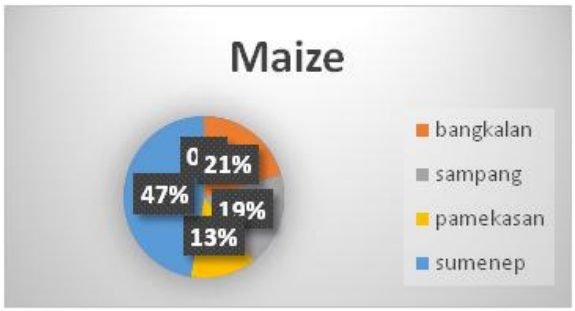

Figure 2. Abroad distribution of maize plants

Com, like rice, green plant utilization derived from the stems and leaves of the plant with the proportion of nearly 90%, so that the corn plants into one ecosystem supporting the success of farms in the region of Madura (Biro Pusat Statistik, 2017, 2017, 2017, 2017).

3.3 Soy Ecosystem

Soybean plants are included in the plants can also be used as forage for cattle farm in Madura. Distribution plants in Madura soy The district canoe with as many as 25,781 ha [5]–[8]. Soybean plants for forage proportion are not as much as the previous crop, this plant ranges from 40 to 50% can be used as forage for cattle ranching Madura. Following the distribution of soybean hectarage in Madura is shown on figure 3.

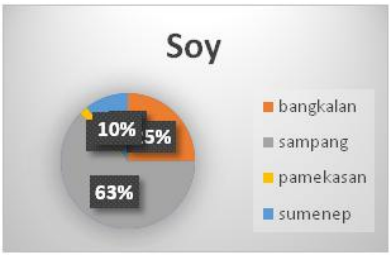

Figure 3. Soybean hectarage in madura

3.4 Peanuts Ecosystem

Bangkalan Regency is a regency with peanut planting area of the largest in Madura. With an area of 29 thousand hectares occupy About a 51% proportion of land area in Madura. So the potential for development of cattle breeding Madura with peanut ecosystem chain integration is a top priority. Commodities peanut forage from the supply side is higher when compared to soy and own habits are also used as cattle feed in Bangkalan Madura. Here acreage peanut plants in Madura (Biro Pusat Statistik, 2017, 2017, 2017, 2017). Following the distribution of peanuts hectarage in Madura is shown on figure 4.

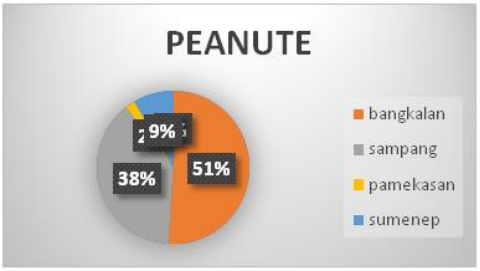

Figure 4. Peanut acreage in madura

3.5 Green Beans Ecosystem

Green beans are less of a priority in the supply of forage, besides forage produced little, area planted in Madura is not too much. Following the distribution area of green beans is shown in the figure 5.

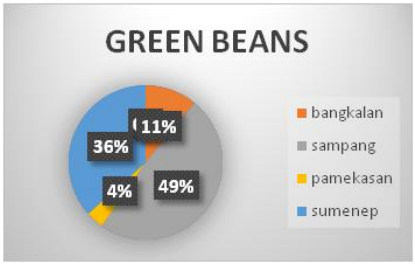

Figure 5. Area spacious green pea plants in madura

Overall land area in Madura by 23,000 ha of cultivation in the district's largest canoe and Sumenep (Biro Pusat Statistik, 2017, 2017, 2017, 2017). So by looking at the condition of the ecosystem integrase field green beans with beef cattle can be done in both areas.

3.6 Cassava Ecosystem

Impacts cassava in supporting Madura cattle farms, are less of a priority, by reason of forage produced from cassava plant is not too much and also competed with the forage needs of man as vegetable cassava leaves. Cassava ecosystems found in many districts lacquer with large area of 11,391 ha, followed by Sumenep regency. The total land area of cassava in Madura as much as 22,275 ha (Biro Pusat Statistik, 2017, 2017, 2017, 2017). Distribution ecosystem cassava plant shown in the following figure 6.

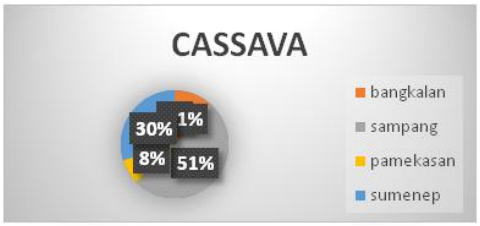

Figure 6. Distribution of cassava planting areas

3.7 Sweet Potato Ecosystem

Yamsas a source of forage for cattle Madura quite promising, with the proportion of plants to contribute almost all parts of the plant to make sweet potato ecosystem one of the priorities to be seeded. However, there are obstacles that little planting areas in all districts in Madura, Bangkalan regency in 2016 BPS data showed that the planting area 55 ha, then according to the BPS 2016 planting area is the largest sweet potato in the district as much as 1,440 ha lacquer (Biro Pusat Statistik, 2017, 2017, 2017, 2017). The great potential of sweet potato ecosystem integrated with Madura cattle farms to be developed in the coming years. Spread sweet potato acreage saw in the following figure 7.

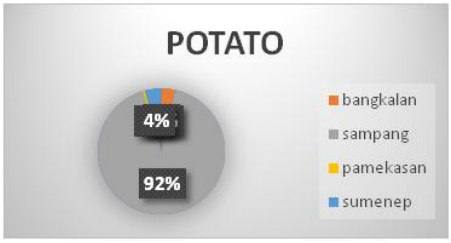

Figure 7. Sweet potato acreage in madura

3.8 Cattle Condition in Madura Ecosystem

General ecosystem overview cattle farms in Madura Madura indicates that cows are bred to have a dual function, as helpers in land management, as well as pets that are used as savings for sale. BPS data in 2016 showed that the number of cows raised as much as 936.503 tails with a distribution shown in the following figure 8.

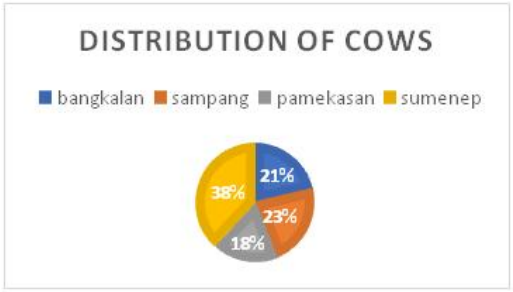

Figure 8. The distribution of cattle in Madura

Sumenep district as the largest district in the population the number of cattle in Madura.Including the number of cows in many households maintained by cattle farmers in Madura. On the outside of Sumenep district average domestic cattle ranchers maintain 1- 2 cows while in Sumenep ranges from 3 heads in each household Madura cattle ranchers. District Sumenep is known as the granary of Madura cattle with a total population of 357,038 Tail (Biro Pusat Statistik, 2017, 2017, 2017, 2017).

The blue economy concept is an economic concept that does not harm the environment. This concept was originally developed essentially for the marine sector but in its development applied across sectors. The idea of the blue economy is the economic development of marine aspects, but not only did the exploitation of marine resources, but also the maintenance and protection of marine ecosystems. This concept is a form of industrialization of marine and fisheries policy, which is based modernization. The presence of a blue economy concept is expected the acceleration of economic growth by exploiting the potential of marine and fisheries (Sari, 2020).

Blue economy concept not only optimizes the maritime potential, but it is to learn from nature, using the workings of the ecosystem where ecosystems are always working towards a higher level of efficiency to deliver nutrients and energy without emissions and waste to meet basic needs. The Blue economy concept does not diminish but rather enrich nature. Besides emphasizing the blue economy to apply the basic principles of physics, especially the law of gravity. Applying the law of gravity in terms of distributed energy efficiently and evenly without energy extraction from the outside.

In addition to the blue economy also has a social principle of inclusiveness that is the answer to a green economic deprivation is said not being able to reach the middle to lower. The Blue economy concept could support and encourage innovative small-scale industries in low-income communities such as fisheries, tourism, and other cottage industries. This is done by applying the concept of entrepreneurship, those who are able to are encouraged to open a new business field so that it can generate multiple economic effects that in turn increases the overall economy.

The Blue economy concept was first introduced by Gunter Pauli which is the development of the green economy concept (Pauli, 2010). Blue Economic answered deficiencies that exist in the green economy concept, not only in favor of environmental sustainability but seeks to improve the efficiency of the ecosystem as an objective concept.

The essence of the blue economy concept is not only to optimize the potential of the commodity by using the working principles of the ecosystem where ecosystems are always working towards a higher level of efficiency in distributing food and energy without emissions and waste to meet basic needs. This can be exemplified by water flowing from the mountain bringing nutrients and energy to meet the basic needs of life for all components of the ecosystem, from raw materials into finished products for others, the waste from one process into raw materials and energy sources for others. Blue economic principle not only oriented toward zero waste but also how to waste it has added value (Mawarsari, 2017). Thus the efficiency of extraction of a natural resource will increase its usefulness.

Commodities to be undertaken in their utilization as a blue economy concept is a commodity cattle. This commodity is a commodity that is not widely utilized its waste, resulting in the development of a blue economy must be applied how waste strives to add value to the farmer community. Cow manure as waste is predominantly used for organic fertilizer, whereas if it is done before the process of becoming organic fertilizer can bring added value and reduce greenhouse gas emissions. If the farming community in applying the concept of a blue economy is expected to improve the welfare of society as well as reduce dependence on energy.

Utilization of manure as a source of organic fertilizer is very supportive agricultural businesses. Of the many manure contained in livestock production centers, many have not been used optimally, some of which are thrown away, so it is often damaging to the environment which will consequently produce an unpleasant odor as shown on table 1.

Table 1. Content of nutrients in manure from livestock

Livestock	**Nutrient (kg/ton)**		
	N	**P**	**K**
Dairy cows	22,0	2,6	13,7
Beef cattle	26,2	4,5	13,0
Sheep	50,6	6,7	39,7
Poultry	65,8	13,7	12,8

A mature cows can produce 23.59 kg of dung every day. Organic fertilizer derived from manure can generate some much-needed nutrients plants, as shown in Table 1. In addition to producing macronutrients, manure also produces a number of micronutrients, such as Fe, Zn, Bo, Mn, Cu, and Mo. So we can say that manure can be considered as an alternative fertilizer to maintain crop production.

Biogas is a combustible gas (flammable) which is produced from the fermentation of organic materials by anaerobic bacteria (bacteria that live in air-tight conditions). In general, all types of organic materials can be processed to produce biogas, however only organic material (solid, liquid) homogeneously as feces and urine (urine) animals that are suitable for simple biogas system. In an area that a lot of the food processing industry include tofu, tempeh, fish boiled or Brem could unite the waste channel into biogas systems, so that industrial waste does not pollute the surrounding environment. This allows for the aforesaid industrial waste originating from organic material is homogeneous. Types of organic materials which are processed greatly affect the productivity of biogas systems in addition to other parameters such as the digester temperature, pH, pressure, and humidity.

However, to get the optimal combustion, pre-conditions need to be done before the biogas is burned is through the process of purification for biogas contains several other gases that are not profitable. As one example, the content of the high hydrogen sulfide gas contained in biogas when mixed with oxygen in the ratio of 1:20, it will produce a gas which is highly explosive. But so far have not reported an explosion on a simple biogas system. In addition, the biogas production process will produce the rest of manure that can be directly used as organic fertilizer on crops.

Waste biogas, the manure that has lost its gas (slurry) is an organic fertilizer that is rich in elements needed by plants. In fact, certain elements such as protein, cellulose, lignin, and others cannot be replaced by chemical fertilizers. The composition of the gas contained in the biogas can be seen in the following table 2.

Table 2. The gas composition is in biogas

Type of Gas	Volume (%)
Methane (CH4)	40 – 70
Carbon dioxide (CO2)	30 – 60
Hydrogen (H2)	0 - 1
Hydrogen Sulfide (H2S)	0 – 3

The dirt will be carried by water into the soil or river which then contaminates the groundwater and river water. Cow manure contains toxins and colly bacteria that endanger human health and the environment. Burning fossil fuels produces carbon dioxide (CO2) which contributes to the greenhouse effect which leads to global warming. Biogas provides resistance to the greenhouse effect through three ways. First, Biogas provides substitution or replacement of fossil fuels for lighting, electricity, cooking, and heating. Second, methane (CH4) produced naturally by accumulated impurities is the largest contributor to greenhouse gases, even greater than CO2. The burning of methane in biogas turns it into CO2 thus reducing the amount of methane in the air. Thirdly, in sustainable forests, the CO2 in the air will be absorbed by forests that produce oxygen against greenhouse gases.

4. Conclusion

The results in the first year of the development of the concept of blue economic in SME cattle farms Madura in improving the welfare of rural communities can be summed up as follows: (1) There are 7 ecosystems of plants supporting the survival and development of cattle breeding Madura ie ecosystems rice, maize, soybeans, peanuts, green beans, cassava and sweet potatoes, (2) Each ecosystem has the potential of different crops in each district to be integrated with the development of cattle breeding Madura, (3) Cattle Madura more generally dominated by farm people with an average ownership of cattle from 1 to 3 heads of every household farmers. So that the development of blue economy on cattle farms adds value to the farmer's community.

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