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Higher education and sustainability of beef cattle in the village of South Sulawesi Indonesia

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Abstract. Bone Regency is an agricultural area which includes food crops, livestock and fisheries. This area is a very large producer of livestock, so in this study analyzed how the influence of tertiary institutions in their role in the form of community service in the form of assistance to groups of farmers in the area, especially in the village of Bune. In this study using the method used quantitatively to see the role of tertiary institutions, data was obtained through a questionnaire with a sample of 30 people and the statistical tools used were Path Analysis is to compare all the variables used so that there is a picture of the role of tertiary institutions in the development of farmers' businesses in the village of Bune. The results of the research show that with the assistance provided by tertiary institutions, it can improve the competence of cattle ranching, namely technically, entrepreneurial and managerial abilities, from these variables after being analyzed using statistics shows that technical competence, entrepreneurship, and managerial influence the increase in productivity, so that the cattle farming business managed by the community in Bune Village can be sustainable.

Keywords. Farming Business, Higher Education, and Sustainability

Introduction

Countries in the world are very advanced because they are supported by various economic activities carried out by their people. The economies that have benefited most from inward transfer technology have national innovation systems that have strengthened their 'national absorptive capacity' (Mowery, DC, & Oxley, JE 1995). Activities that move in the industrial sector by relying on technology so as to increase the productivity of goods and services and improve the welfare of the community. Developed countries not only move in the industrial sector but also in the agricultural sector, especially livestock products, from available data known in 2017, it is known that countries such as the United States in terms of livestock production are very advanced with the number of cattle production reaching 87,730,000 heads cattle, China has 104,188,000 cattle. head of cattle and a country like Australia is one of the major cattle producing countries with a total of 2,240,000 head of cattle. This is achieved through various programs, sound understanding of institutional expectations through good communication and clear lines of authority, (Klein, HJ, & Bayne, KA 2007). The contribution

of the livestock sector to the economy of the country in developed countries, this is very large shows that developed countries are not only in the industrial sector but also the livestock sector.

The country of Indonesia is a large country with a tropical climate, the structure of the country's economy is built from the agricultural sector, this sector provides a very large contribution, and many sources of community work are carried out in the agricultural sector (agricultural products, livestock, and fisheries). During the Covid-19 issue, as it is today, the resilience of the agricultural sector has helped many people in meeting the needs for food and other agricultural products such as cattle ranching produced by many people in the village. At the same time, the need for a higher labor productivity is supported by the rapid spread of milking machines (Bieleman, J. 2005).

Cow farm production has a strategic role in supporting economic growth in Indonesia as a large contributor to the amount of cattle farms in Indonesia in 2019 as many as 1,907,455 head of cattle, thus cattle production can form domestic products, supply and produce foreign exchange through exports, supply of raw materials for industry especially the food industry, employment providers for the community, and the increase in community income. With the population of cattle in Indonesia has the potential to be further developed, this is supported by the availability of animal feed as an agricultural country.

The role of livestock commodities is dominated by large livestock commodities such as cows, this farm can develop due to the support of natural factors that provide a lot of food sources, so that the livestock business can be further developed. livestock business subsector that can contribute to the national economy. National contribution in 2017 contributes to the Gross Domestic Product reaching 15.97%, while the livestock sector from year to year gives a large role reaching 3.85% so that the human resources absorbed in this sector have also helped many people in getting field work.

South Sulawesi is one of the potentials in Indonesia which has a village, namely Bune Village, which is the largest cattle producer in South Sulawesi, The population of cattle in Bune Village is 3,417 head of cattle or 63.5% of the total number of cattle in Libureng Subdistrict carried out by the community (BPS, 2017) from the data shows that the potential for animal husbandry is quite large. Bune Village as a cattle breeding center in Libureng District, the main occupation of the Bune Village community is dominated by farmers and ranchers. Even though the average community owns and maintains cattle, their livestock management still adopts traditional breeding patterns, namely raising cattle without being caged so that it is difficult to identify passion and damage the environment, there is also community behavior, namely productive cattle into beef cattle which are supposed to be breeders that can produce high productivity. This is done by farmers before or without the participation of tertiary institutions in the development of animal husbandry business.

Higher education as an academic institution has carried out various activities to the community in the form of dedication and assistance so that the production of livestock products can increase. Only by taking into account all society issues, can the multidisciplinary approach yield useful information to the modern consumer in a manner that can develop sustainable animal production systems (McGlone, JJ 2001). This happens because the development of knowledge from the community in the form of technical competency development, managerial competence and entrepreneurial competence. Increasing the spirit of entrepreneurship in various business activities can increase productivity (Saleh, H., & Idris, M. 2019). With the development of competence as a manifestation of the role of universities in the community, especially for cattle breeders in Bune Village, Libureng Regency, South Sulawesi, it can be more developed and sustainable.

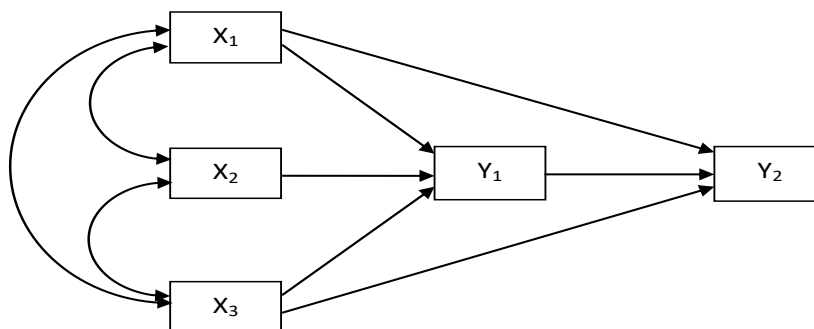
Research Methodology

The research locations were Bune Village, Libureng District, Bone Regency, South Sulawesi Province. The selection of the village was based on interviews with the breeders' group, that Bune Village was relatively of good quality cattle. The scope of this study is the competence of cattle farmers. In this study, questionnaires were distributed to obtain information as basic data from various activities of farm groups while accompanied by universities, namely how to see the technical competencies of breeders, entrepreneurial competencies possessed in farming and how the managerial competencies of breeders. Other data is the development of cattle farm production in Bone district, As for the number of respondents in the sample is 30 cattle farmers. In the analysis of the relationship between variables used to determine the technical competencies, entrepreneurial competencies, and managerial competencies with livestock business productivity and the sustainability of cattle farming in Bune Village. The analysis method, namely Statistical Path Analysis, is used in the weighting analysis. Regression weighting is predicted in a model compared to the observed correlation matrix for all variables and statistical alignment test calculations are also performed (David Garson, 2003). The structural equations X_1 , X_2 , and X_3 are exogenous variables and Y_1 and Y_2 are endogenous variables.

$$Y_1 = \beta_{Y_1X_1}X_1 + \beta_{Y_1X_2}X_2 + \beta_{Y_1X_3}X_3 + \epsilon_1$$

$$Y_2 = \beta_{Y_2X_1}X_1 + \beta_{Y_2X_2}X_2 + \beta_{Y_2X_3}X_3 + \epsilon_2$$

Figure 1. Structural Path Analysis Model



Note: X_1 = technical competence, X_2 = entrepreneurial competence, X_3 = managerial competence,

Y_1 = increased productivity and Y_2 = sustainability of cattle business

Results and Discussion

A. Development of Cattle Farming Products in Bune Village

The potential in Bone Regency as an agricultural area is very supportive in the development of animal husbandry, agricultural production, horticultural crops and plantation products managed by the community, a lot of waste is produced, but this waste has been used by farmers as a very useful feed, meaning farmers no difficulty in getting animal feed. Such waste can be of good use if managed properly. The existence of tertiary institutions which has provided income to farmers groups, has provided knowledge that is how to process agricultural waste into animal feed so that livestock business can develop rapidly in this area. Large animal husbandry businesses have contributed to the regional economy.

The economic development in Bone Regency can be seen from various aspects that contribute, namely agriculture, animal husbandry, forestry and fisheries. Bone Regency economic growth data in 2018 reached 8.90%.

Table 1. Development of Business Field and Its Contribution

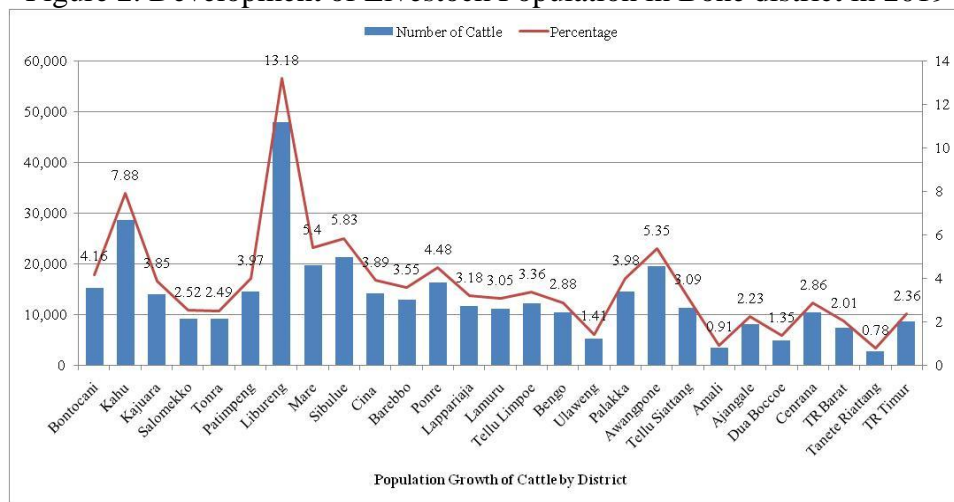
No	Business field	2014	2015	2016	2017	2018
1	Agriculture					
	a. Crops	33.59	34.46	62.30	63.03	63.81
	b. Horticultural Plants	1.40	1.41	2.46	2.28	2.08
	c. Other Horticultural Plants	1.35	1.48	2.76	2.71	2.44
	d. Seasonal Plantation	1.24	1.24	2.09	1.97	1.84
	e. Annual Plantation	12.20	12.41	21:30	20.68	20.28
	f. Cattle farm	3.35	3.39	6.21	6.39	6.60
	g. Agriculture & hunting services	1.60	1.64	2.88	2.95	2.96
2	Forestry	0.15	0.18	0.16	0.16	0.15
3	Fishery	42.09	43.79	43.17	44.87	44.70

Source: BPS of Bone Regency, 2020

The available data shows that Bone regency as a whole provides an overview of the potential of livestock business, especially cattle breeding, this is greatly supported by existing natural resources, namely the agricultural sector in Bone regency in percentage, namely in 2018, the contribution reaching 63.81%, this means to develop livestock business does not encounter any problems in terms of animal feed, because the agricultural waste produced can be a source of animal feed. Farm waste with simple processing by the breeders can meet the needs of the cattle that they maintain. From the data, it is also illustrated that the potential of cattle breeding business in Bone regency where, cattle breeding results experienced an increasing trend, namely in 2014 the percentage of contribution was only 1.60% and in 2018 increased to 2.96%. The development of animal husbandry business in Bone Regency is inseparable from the size of the land and the availability for animal feed and the increase in knowledge from farmers in carrying out animal husbandry activities obtained from the participation of the government with various tertiary institutions in South Sulawesi.

The growth of cattle population in South Sulawesi Province increases 6% annually, with the largest livestock population in the Regency of Bone reached 422,059 head of cattle and nationally ranked third. This success was obtained by the Bone Regency as a form of concern from the government in helping the community together with various tertiary institutions. The university has carried out various activities by involving lecturers and students to contribute to the knowledge of the livestock community in developing the cattle breeding business. Cow farms in Bone Regency are spread in 27 districts, this livestock business is mostly carried out by the community because it has economic value and provides employment for the community, regarding the development of livestock businesses based on existing districts in Bone district as follows:

Figure 2. Development of Livestock Population in Bone district in 2019

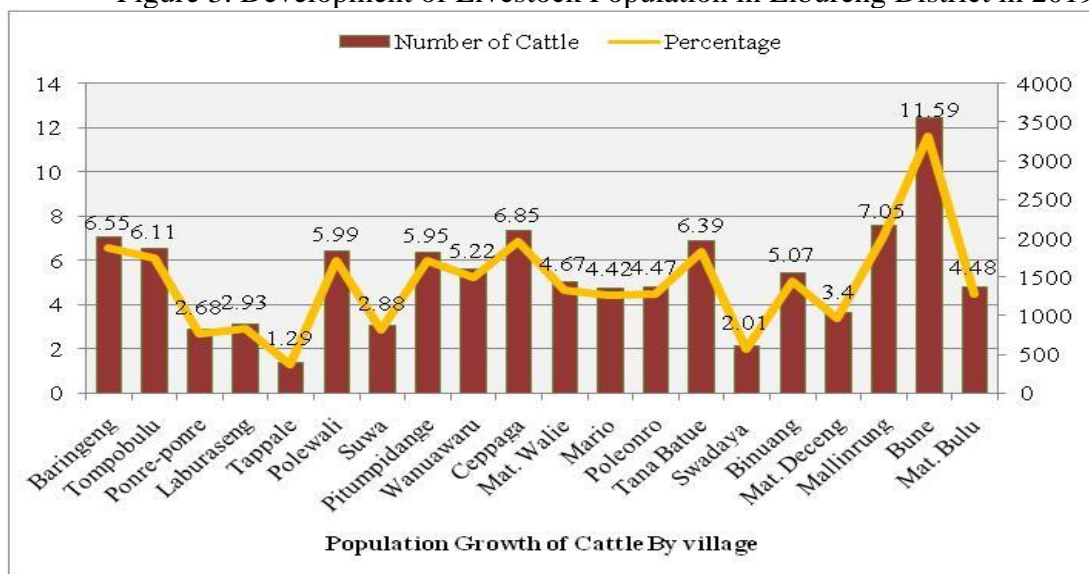


Source: BPS of Bone Regency, 2019

In figure 2. There are several sub-districts that have the largest contribution to cattle production in Bone Regency, namely Libureng District has a population of cattle farms reaching 47,826 or 13.18 of the total livestock in Bone Regency, the amount of livestock is obtained because of the community dominantly works in the agriculture and animal husbandry sector and is assisted by various universities in South Sulawesi in developing livestock business, the second sub-district producing livestock in Bone Regency is Kahu District with a total of 28,581 cows or a percentage of 7.88% while Sibulue Subdistrict is the third district which produces the most number of cattle with 21,163 head of cattle or 5.83%.

The author takes the object of research in the village of Bune, this village is a cattle producer in Bone Regency and even in South Sulawesi Province, it can be seen from the data displayed in graphical form showing that Bune Village is one of the villages that produces a lot of cattle, from the research results obtained data gives a picture of the population of Bune Village totaling 1,682 inhabitants and the number of livestock the cattle reached 422,059, as follows:

Figure 3. Development of Livestock Population in Libureng District in 2019



Source: BPS of Bone Regency

Villages in Bo Regencyne is a producer of cattle and is the main occupation in addition to agricultural, plantation, forestry and fishery activities. If compared to other regions in South Sulawesi, Bune Village is the largest cattle producing region, this activity is very supportive of the economic activities of the community from the results of the livestock business. In Figure 2 illustrates the large amount of cattle production managed by the community, Bune Village is the largest cattle producing area with a total of 3,555 head of cattle or 11.59%, the Malinrung Village area of the second cattle producer in Libureng District with the number of cattle reaching 2,162 cows or 7.05 cattle and the third highest number of cattle producing areas is Ceppaga Village with 2,100 cows or 6.85%. The amount of cow production in Bune Village is due to the role of the Village Head who has carried out various activities by collaborating with various universities in the form of partner villages, this partner village is fostered by universities in the development of livestock business and this is carried out in the form of service and conduct research.

B. The Role of Higher Education in the Development of Animal Husbandry Business

In the era of globalization, human resources are needed that are able to compete with the international world so education is needed to be able to analyze the problems that exist in society, such as the Indonesian state has natural resources needed to manage them, so that labor or human resources sourced from abroad are not easy to enter to process existing resources but managed by existing human resources so that employment is wide open for the community, thus the role of universities in developing livestock business in the community is basically related to competitiveness data on human resources. What was done was to improve community welfare and fight poverty, in line with the opinions of Saiz-ylvarez, JM, & Palma-Ruiz, JM (2019), briefly emphasize the importance of applying open cooperation in the fight against inequality and poverty. The main task and function or role of universities in developing human resources refers to increasing competence in the mastery of science and technology.

Higher education institutions in Indonesia must be able to contribute to the nation's competitiveness, namely (1). Quality, meaning that the resulting output is able to provide solutions to problems that exist in the community, such as the problem of animal feed shortages. It is expected that the resulting resources can guide farmers in making good animal feed, as well as in terms of managing livestock businesses so that the efforts of farmers to benefit. (2). Giving access, that is, human resources in universities get accents to apply their knowledge to the community, especially the livestock groups in the village.

Human resources from universities through research and community service are able to explore and process the wealth and diversity of natural resources for the welfare of society. To increase the productivity of cattle farming, especially in the village of Bune, the role of tertiary institutions is expected to increase the potential of the farmers in the village, competency can increase if the personnel or human resources of the tertiary institutions provide various assistance in terms of managing the livestock sector in village (Saleh, H 2018). As a form of assistance to the breeders' community, a lot of things are done by universities in this case the human resources of teachers and with students to do community service. The assistance provided by universities such as training in making animal feed, training in making cages, providing assistance in developing livestock business, financial management and various activities related to livestock business development.

Figure 4. Assistance Activities for Cattle Farming Business Development in the Village Bune



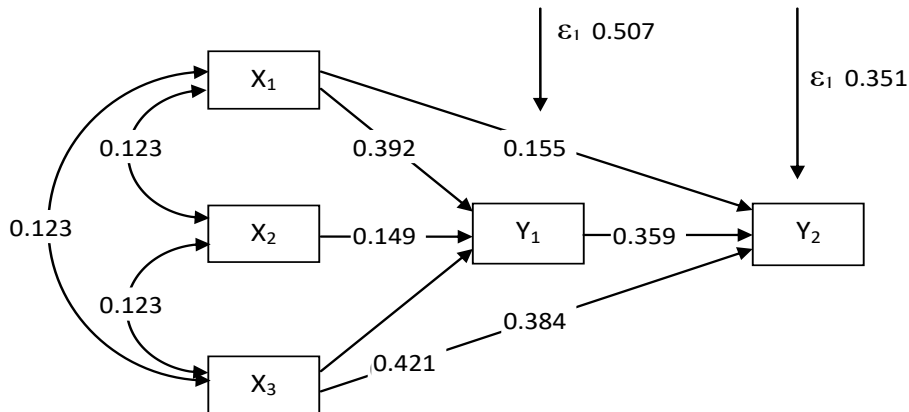
Accompaniment Higher education provided in the form of various trainings, the development of livestock business in Bone Regency especially in Bune Village cannot be separated from the role of the government and the role of tertiary institutions in assisting farmers in Bune Village. The assistance is in terms of developing livestock breeds, nutrition and animal feed, reproduction, livestock comfort, and processing of livestock products. According to Narayan G. Hegde (2019), Significant factors which have contributed to the success were genetic improvement, promotion of suitable technologies, development of infrastructure to strengthen the value chain and mentoring of small livestock owners to address their technical and business related problems. With the assistance in the form of partner villages with higher education institutions can improve skills in conducting livestock business activities, to find out the success of tertiary education towards farmer groups, research is conducted by giving a list of questions to get data on improving technical competence, managerial competence and entrepreneurial competence to increase productivity and sustainability of the cattle breeding business in Bune Village, Bone Regency.

As for the managerial autonomy, a cattle rancher must have competence in running his business with a strong mental attitude, competence must be the basis for a person to be a good breeder, for that it is necessary to learn and hone competence in business practices while entrepreneurial competence is needed to improve ability in running a livestock business, an entrepreneurial function of how the ability to take the factors of production used to produce livestock businesses. One of the factors of production is labor, according to Binita Tiwari & Usha Lengka (2015) states that entrepreneurial competence is to attract developing and maintaining the human capital needed to achieve the desired business, meaning that in the livestock business, human resources play an important role, so it needs to be maintained and developed its capabilities in carrying out cattle breeding business activities.

Through the role of universities so that an increase in competence is formed technical competency, entrepreneurial competence and managerial competence, from the competence will be measured how much influence on the productivity of cattle business in the village of Bune so that this business will be sustainable for the community. To see the effect, an analysis tool using the method is used Statistical Path Analysis, the structural equation results for the model are:

$$Y_1 = 0.392 X_1 + 0.149 X_2 + 0.421 X_3 + \varepsilon_1$$

$$Y_2 = 0.155 X_1 + 0.359 Y_1 + 0.384 X_3 + \varepsilon_2$$



The results of the analysis obtained with the assistance of tertiary institutions to groups of cattle farmers in the village of Bune have a very big influence that is the formation of technical competence, entrepreneurial competence and managerial competence so that the productivity of cattle business can increase and be sustainable. Statistically, it can be seen that the value of 0.392 shows that technical competency has an effect on increasing productivity, but on business sustainability does not have a direct effect but indirectly influences, meaning that the technical competency possessed by cattle farmers can increase productivity so that this business can be sustainable. Sustainable business cannot be separated from intensification activities, according to (Mironova, N., et, al 2019) its intensification are a complex system of interrelated measures for maintenance, fodder production, feeding and breeding of animals, as well as technical modernization, rational use of resources. As for entrepreneurial competence, it has no effect on increasing productivity with a value of 0.149, this shows that the entrepreneurial knowledge possessed by livestock has not been widely applied in conducting cattle business. Whereas 0.421 shows the results that the formation of managerial competence for breeders groups has an influence on increasing the productivity of cattle in the village of Bune, can also directly influence the sustainability of cattle businesses in the area. While the statistical value of 0.359 means that with increased productivity of livestock products, livestock businesses managed by the community can be sustainable.

Higher education with the local government has provided a lot of assistance to groups of farmers in Bune Village so that technical competence is formed, so that the community has knowledge of developing good and quality livestock germs, making nutrition and animal feed so that it can meet the feed needed by cattle, do not have to bring in the form of buying animal feed but can be produced by existing breeder groups by utilizing agricultural waste so far many are disposed of not utilized by the community. In line with what is explained by Mukson, SM, Sari, PI, & Setiyawan, H. (2008), cattle development factors are influenced by land area, availability of food, labor, capital, zooteknis behavior, education level and length of breeding while the rest are influenced by other factors. For entrepreneurship potential, there have not been much applied concepts of how to do a good business in livestock business by utilizing the existing potentials and opportunities, so that more assistance is still needed in terms of growing entrepreneurial spirit in managing livestock business. While the managerial competency that can be obtained by farmer groups from the role of higher education in the form of community service has given the community knowledge of how to do business planning, workforce

1 management, marketing and financial management. This shows that with the growing development of the competency owned by farmers, livestock business can be sustainable.

Conclusions

Bune Village is a source village with a cool climate and most of the people are engaged in agriculture and animal husbandry. If compared to other villages in Bone Regency, this area is considered a prosperous area, meaning that the livestock business carried out by the community has helped the economy a lot in meeting needs. The number of cattle population in the village of Bune exceeds the number or population of the population, this development is greatly supported by the area of land and food sources for livestock business conducted by the community. The large livestock business that has been carried out by the community in Bune Village needs to be maintained, so that the regional government, especially the head of Bune Village, has opened himself to always collaborate with various parties, especially with higher education institutions and private universities. Collaboration with universities and local governments through community service programs, the community especially breeders' groups have gained a lot of knowledge in the form of technical competence, breeders understand how to make good animal feed, make good pens and how to improve the process of breeding cattle, also getting knowledge of entrepreneurship competency with knowledge of cattle ranchers has insight in conducting cattle breeding business, namely how to not only meet needs but marketed out so that it has a large added value received by cattle ranchers. Another competency that is gained is managerial competence, namely the building of the ability of farmer groups how to manage finances from livestock business so that the business benefits the community.

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