THE DEVELOPMENT OF BEEF CATTLE BREEDING BUSINESS AT ANUTAPURA PUBLIC ANIMAL HUSBANDRY SCHOOL DURING THE COVID-19 PANDEMIC AND POST EARTHQUAKE, TSUNAMI AND LIQUEFACTION IN SIGI REGENCY, CENTRAL SULAWESI, INDONESIA

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ABSTRACT

Earthquake is the vibrations on the earth's surface due to the sudden release of energy from the earthquake center in the earth. The released energy propagates through the ground in the form of vibrations. It is a natural ground movement caused by a variety of phenomena, including tectonic processes, volcanism, and explosions, as well as collapse. An earthquake with a magnitude of 7.4 on the Richter Scale that rocked the Central Sulawesi region caused the tsunami that hit the Talise Beach and the liquefaction in Petobo and Balaroa of Palu City, as well as the liquefaction in Sibalaya of Sigi Regency. After the disaster, the Sigi area, especially Bulubete Village, was the subject of flash floods due to the changes in waterways which should pass into the residential area instead through the river. This study aimed to determine the Development of Beef Cattle Breeding Business at the Public Animal Husbandry School (SPR) in Sigi Regency during the Covid-19 pandemic as well as the earthquake, tsunami, and liquefaction. This research was conducted from March to May 2022. The location of this research was determined based on purposively. This research was conducted in Bulubete Village of Sigi Regency. Population method was used in determining the number of samples which was also used as the sample of 36 breeders. The result obtained in this study was that natural disasters and the spread of covid-19 greatly affected the development of the cattle business at Anutapura SPR of Bulubete Village of South Dolo District of Sigi Regency. The population and demand at Anutapura SPR experienced a sales trend after the disaster and the covid-19 pandemic. In this case, the cattle population increased before the natural disaster and decreased after the natural disaster coupled with the covid-19 pandemic which affected the demand for beef.

KEY WORDS

Natural disaster, COVID-19 pandemic, beef cattle, SPR.

Indonesia is the largest archipelagic state in the world which has a very strategic geographical position. The number of islands in Indonesia is officially recorded as having 16,056 islands. The Certainty of this number was determined in the United Nations Conferences on the Standardization of Geographical Names (UNCSGN) and United Nations Group of Experts on Geographical Names (UNGEGN) which took place on August 7th-18th 2017 in New York of the United States. The coastline of Indonesia is 99,093 km2. Its land area reaches about 2,012 million km2, the sea is about 5.8 million km2 (75.7%), and 2.7 million square kilometers of which are included in the Exclusive Economic Zone (EEZ). The Indonesian sea, which is 2.5 times the land area, certainly has enormous potential both in terms of natural wealth and environmental services that can be used to support economic development at the local, regional, and national levels. Indonesia is a developing country with abundant natural and human resources. The number of Indonesian population based on

the results of a survey by the Central Statistics Agency (BPS) in 2010 was 237,641,326 people. A Prosperous country is not only seen from the quantity of Human Resources (HR) but also the quality. The big quantity won't have any impact on the prosperity of the country if it is not accompanied by the good quality.

An earthquake is a natural event in which there is a vibration on the earth's surface due to the sudden release of energy from the center of the earthquake in the earth. The released energy propagates through the ground in the form of vibrations. The vibration waves that reach the earth's surface are called earthquakes. This is a natural ground movement caused by a variety of phenomena, including tectonic processes, volcanism, and explosions, and collapse (Kalesaran et al., 2017).

On December 7th, 2016 Pidie Jaya-Aceh Regency was rocked by an earthquake centered in Meureudu City with a magnitude of 6.5 on the Richter Scale (Wikipedia, 2016). On July 29th, 2018 the natural disaster occurred again in Indonesia. Lombok Island mourned as an earthquake with a magnitude of 6.4 on the Richter Scale with the epicenter located 47 km Northeast of Mataram City (West Nusa Tenggara) (Wikipedia, 2018). On September 28th, 2018 an earthquake occurred with a magnitude of 7.4 on the Richter Scale which shook the Palu City, as well as Sigi and Donggala Regency (Central Sulawesi) and was accompanied by a tsunami that hit Talise Beach in Palu City and the beaches in Donggala Regency (BNPB, 2018). Just like in Pidie Jaya and Lombok, the earthquake and tsunami that occurred in Palu and Donggala also resulted in various losses and damage to the animal husbandry sub-sector including damaged cattle pens, IB posts (Artificial Insemination), Slaughterhouses (RPH), livestock markets, and forage gardens.

The livestock sub-sector is still one of the priority activities in the development of breeding business because by promoting this business, it will be able to overcome the shortage of animal protein needs. Improving the quality of Indonesian human resources, who are able to think creatively in their work, can only be achieved if our society has fulfilled protein needs. Thus, both the whole community as breeders, investors, and especially for local governments as policy makers in development, must act together for the welfare of the nation. The development of beef cattle business can be seen from the number of beef cattle population which tends to increase. The population of cattle in Sigi Regency was 17,349 cattle in 2013, continued to increase until the population reached 29,289 cattle in 2016, and it increased again by 37,327 cattle in 2017. The increase in the average population of beef cattle reaches 21.7% per year (BPS Sigi Regency, 2017).

Cattles are livestock that are commonly kept and used as one of the livelihoods of the community. They are usually raised for energy, meat, and milk. According to Sugeng (2002), cattle are more useful and have greater economic value than other livestock. A cattle breeding is an attractive business so that it is easy to stimulate business growth. On the other hand, livestock with low usefulness and economic value will easily be pushed back by themselves. This can be proven that the development of cattle in Indonesia is more advanced than large or small livestock such as buffalo, pigs, sheep, and goats. The example below shows the broad benefits of cattle and their high economic value, such as: Cattles as community savings in villages, The quality and price of meat or skin is at the top compared to buffalo and horse meat or skin, providing job opportunities as many cattle businesses in Indonesia are biased and able to accommodate a large number of workers so they can support many families, cattles are a source of community culture, for example cattle for the purpose of offerings, as *karapan* cattle in Madura, and as a measure of human dignity in society (social standing).

Cattle breeding business is one of the businesses that can be used as a source of livelihood for people in rural areas. However, most of its life is regulated and supervised by the breeder himself. The benefits of cattle for human life can be classified into economic, nutritional, and socio-cultural aspects. A cattle breeding in rural areas is generally still a small-scale community breeder. For the maintenance of cattle, even on a small scale, breeders always have difficulty in obtaining livestock business capital. Therefore, in this case, the government has been able to provide the greatest opportunity for breeders to obtain it even with the credit system or with the *gaduhan* system. According to Abidin (2002),

beef cattle maintenance generally uses three systems, they are: intensive maintenance system, semi-intensive maintenance system and extensive maintenance system

In the past, marketing in Indonesia was still an underdeveloped field of management compared to the development of accounting or financial management. However, it is totally different from today's era as each management function makes a certain contribution to strategy formulation at different levels. Marketing is the function that has the most contact with the external environment, whereas the company only has control. Marketing is a business function that identifies needs and wants. Unfulfilled needs determine and measure the size and potential of the profits. Marketing in principle is a process of distributing products produced by producers in order to reach consumers. For beef cattle producers, both livestock companies and smallholder breeders, marketing has an important role. After the product, in this case the livestock, is produced, the breeder definitely wants the livestock to arrive quickly and be accepted by consumers. According to Rianto and Purbowati (2010), breeders must go through several marketing activities, including gathering market information, storing, transporting, and selling the products. The livestock marketing system, especially beef cattle, is still simple, the path that is passed from producers to consumers is still long, the big role of traders in buying and selling livestock will cause the price received by breeders to be small as they do not have a bargaining position. Marketing strategies need to be carried out for the efficient marketing as it can motivate breeders to increase their business, thus the productivity can be increased (Ningsih et al, 2017).

The earthquake that occurred in Palu, Sigi, and Donggala caused tremendous damage and losses, ranging from infrastructure damage, buildings and educational facilities, property, to even claimed many lives. Have not yet recovered from the earthquake, tsunami, and liquefaction, since the beginning of 2019, globally without exception any country, including Indonesia, has been hit by the Covid-19 pandemic and has claimed many lives. Certainly, this adds to the slump in the industrial sector in the world and even the biggest retailers have gone out of business (Bankrupt). Therefore, an alternative strategy that can be applied during the Covid-19 pandemic and the post-earthquake recovery period a few years ago that is relevant to the condition of the industry is needed, especially the industry in the cattle breeding business. This study aims to determine the development of beef cattle breeding business at Anutapura Public Animal Husbandry School (SPR) during the covid-19 pandemic and post earthquake, tsunami and liquefaction in Sigi Regency, Central Sulawesi, Indonesia.

MATERIAL AND METHODS OF RESEARCH

The research method used was a survey method by conducting initial observations and interviews with several breeders who were under the Anutapura Public Animal Husbandry School (SPR) supervision and the key informant is the head of the Anutapura Public Animal Husbandry School (SPR). Questionnaires were used as the tool to measure the development of cattle business in each breeder and documentation as data to support this research. The research location was determined purposively expecting that the objectives of the research can be achieved. This research was conducted at Anutapura Public Animal Husbandry School (SPR) of Bulubete Village of South Dolo of Sigi Regency with the consideration that this area was directly affected by the Earthquake Disaster, became the path of the Palu Koro Fault, was a flash flood prone area, and was included in the red zone category. The number of population in the Anutapura Public Animal Husbandry School (SPR) od Bulubete Village of Sigi Regency was 194 breeders. Meanwhile, descriptive statistics was used in determining the sample size based on the Slovin formula according to Umar (2003), thus the result of the research sample obtained was as many as 36 respondents.

RESULTS OF STUDY

Sigi Regency is located in the south of the Palu Valley. Its geographical area stretches at coordinates 0o 52' 16" South Latitude (LS) to 2 o 03' 21" South Latitude and 119 o 38' 45" East Longitude (BT) to 120 o 21' 24 East Longitude. Sigi's land area is 5,196.02 Km2 or

about 7.64 percent of the total land area of Central Sulawesi. Based on its geographical location, Sigi is the only regency in Central Sulawesi Province that does not have a coastline, with regional boundaries as follows: to the north, it is bordered by Donggala Regency and Palu City, to the south, it is bordered by the South Sulawesi Province, to the west, it is bordered by Donggala Regency and West Sulawesi Province and to the east, it is bordered by Parigi Moutong Regency and Poso Regency.

Administratively, Sigi Regency is divided into 15 Districts, 156 Villages, and 1 Transmigration Settlement Unit (UPT). The location of Sigi Regency capital is in Bora Village, about 16 km from Palu City. In general, the Sigi Regency area can be reached by road trip with various distances between the District Capitals and the Regency Capital. The altitude of the Sigi Regency area ranges from 32 to 1,350 meters above the sea level, which the lowest point is Kota Pulu (Dolo Sub-district) and the highest is Dombu (West Marawola District).

Public Animal Husbandry School (SPR) of South Dolo area is a center for producing quality cattle and producing healthy and safe meat, with a caged maintenance system provided with natural and high-quality feed, which is guided by the Animal Husbandry and Animal Health Service of Sigi Regency and IPB University. The SPR South Dolo declared itself to be Anutapura SPR in 2018, witnessed and inaugurated by the Sigi Regent who was represented by Assistant 2 in the government sector of Sigi Regency Government and was inaugurated by the initiator of the Public Animal Husbandry School (SPR), namely Dr.Ir., Muladno. SPR was given the task by the government to carry out the process of fattening Donggala cattle.

Productive age is very important for business implementation because at this age, breeders are able to coordinate and take effective steps. A person's age factor also determines the level of work participation in earning a living. As a person's age increases, his participation will also increase but will also decrease at a certain age in line with the decreasing physical strength factor (Hermanto, 2012). This is in line with the opinion of Akmal (2006) which stated that the age factor will greatly affect work that relies heavily on the strength and physical abilities of the workforce. Age will greatly affect work productivity because it is more dominant to rely on physical strength. Based on this, it can be seen in the table below regarding the age of breeder respondents in SPR of Bulubete Village of South Dolo District of Sigi Regency as follows:

Table 1 – Table of Respondents' Age

No	Age (Years Old)	Total (people)	Percentage (%)
1.	14-30	7	19,44
2.	31-52	27	75,00
3.	>53	2	5,56
	Total	36	100%

From the table above, it can be seen that the age of breeder respondents in SPR were in the productive age range of 14-30 years old as many as 7 people with a percentage of 19.44%. Then, the age range of 31-52 years old is 27 people with a percentage of 75.00%. Lastly, above 53 years old, there are 2 people with a percentage of 5.56%. This age category shows that most of the breeders in the cattle business were tje in productive age, in this case, had good physical abilities in doing breeding business. This is in accordance with the theory and additionally based on the results of interviews that these breeders had learned about breeding from a relatively young age because they followed their parents who previously had breeding business as well (continuing their parents' business).

The gender of the respondents in this study was entirely dominated by 36 men, so it can be concluded that in conducting breeding business, most of them are carried out by men. In this case, men have stronger physical strength and. In accordance with the opinion by Wahyono (2013) that proper handling and placement of the right work position will also increase effectiveness and productivity as a trigger for the success of a business.

The education level of most respondents was graduated from junior high school, which is 63.89%. In terms of formal education, they lack in knowledge and scientific standards but in terms of experience, they were very experienced.

Table 2 – Education Level of Respondents

No	Education Level	Total (people)	Percentage (%)
1	SD	5	13,89
2	SMP	23	63,89
3	SMA	7	19,44
4	S1	1	2,78
	Total	36	89,47

It can be seen that there are 5 people were elementary school graduates with the percentage of 13.89%, 23 people were Junior High School (SMP) graduates with the percentage of 63.89%, 7 people were Senior High School (SMA) graduates with a percentage of 19.44%, and 1 person was a bachelor graduate with a percentage of 2.78%. Overall, it can be said that the education level of breeders was still low or was not according to scientific standards because the knowledge of animal husbandry obtained was only self-taught (from the experience of parents). Meanwhile, the lack of knowledge making it was less supportive in their efforts to develop information and innovation related to their Donggala cattle breeding business. However, regarding this case, the SPR or what is known now as SASPRI has gained knowledge from the collaboration between IPB and the Local Government so that breeders get better knowledge of management and maintenance of Donggala cattle.

One's experience in breeding livestock is seen from how long a person has been in the field of animal husbandry. The classification of respondents is based on the experience of breeding livestock. Breeding experience is very important in supporting the success of a livestock business.

Table 3 – Breeding Experience

No	Breeding Experience (Years)	Total (people)	Percentage (%)
1.	1-5	1	2,78
2.	6-10	7	19,44
3.	>10	28	77,78
	Total	36	100

From the respondents' answers to the questionnaire, it can be seen that the characteristics of the breeders are divided based on the experience in years. Starting from 1-5 years, there is 1 person with a percentage of 2.78%. Then 6-10 years, there are 7 people with a percentage of 19.44%. Lastly, above 10 years, there are 28 people with a percentage of 77,78%. Experience is a very determining factor for the success of a business. With their experience, breeders will get very valuable guidelines for obtaining business success in the future. Age and experience in breeding livestock will affect the ability of breeders to run a business. Breeders who have more experience will always be careful in taking actions by considering bad experiences in the past (Iskandar and Arfa, 2007). The same thing was also conveyed by Edwina and Cepriadi (2006) who stated that the longer a person's experience in breeding livestock, the easier it is for breeders to overcome their difficulties. The long experience of breeding livestock indicates that the knowledge and skills of livestock breeding and management of livestock rearing owned by breeders are getting better. The development of beef cattle population is an increase in the population of beef cattle both in terms of body weight gain and in the number of cattle, which are the calves of the cows. Beef cattle, commonly called beef cattle by the community, have important meanings such as investment land for the future where basically beef cattle can be sold at any time if there is any urgent need.

Generally, the condition of breeding business in Indonesia and in Central Sulawesi, especially in Sigi Regency, is still characterized by small-scale breeding and in the form of a

side business. Ironically, these days, small and medium-sized enterprises implementing relatively many low technologies are able to survive and even revive the economy of the economically-weak groups. This needs to be improved by stakeholders to observe the extent of the potential of these small and medium-scale businesses (Kumalaningsih, 2003). To answer these challenges, it is necessary to have a breakthrough in increasing production, one of which is through increasing livestock ownership in addition to the ability to manage the breeding business.

Table 4 – Livestock Ownership

No	Livestock Ownership	Total (people)	Percentage%
1	1-5	14	38,89
2	6-10	15	41,67
3	>10	7	19,44
	Total	36	100

Table 4 shows that the results of interviews with respondents of livestock ownership ranged from 6-10 cattle. It can be seen that for cattle ownership of the SPR is adequate. Based on the respondents' answers to the questionnaire, it shows that there are 14 people for the number of livestock of 1-5 cattle (38.89%), there are 15 people for the number of livestock of 6-10 cattle (41.67%), and there are 7 people for the number of livestock more than 10 cattle (19.44). Thus, it can be concluded that the number of livestock owned by beef cattle breeders at the Public Animal Husbandry School (SPR) is relatively large. This is in accordance with the statement of Hermanto (1996) who stated that livestock ownership has a positive effect on breeding business income. The more they breed the livestock, the more they increase their breeding business income.

Traditional cattle breeding is a system implemented by most breeders in Indonesia. The cage is a shelter for livestock from rain, hot sun, protection of livestock against wild animals, thieves, and a means to maintain health. Before the earthquake, some breeders in Sigi Regency placed their cattle in their yards. However, most breeders own the cattle cages that are made of bamboo and wood. However, the earthquake had an impact on the condition of the breeders' cages. This was because many cages were badly damaged by the earthquake. Therefore, breeders have to place their livestock outside the cage or tie them to trees around the house.

Cages have several important functions in a beef cattle breeding business, such as:

- Protecting beef cattle from weather disturbances;
- Place where cattle rest comfortably;
- Controlling cattle to not damaging crops around the breeding site;
- Place to collect cattle manure, protecting cattle from disturbing animals;
- Facilitating maintenance, especially in feeding, drinking, and facilitating health surveillance (Abidin, 2002).

Table 5 – The Classification of Respondents Based on Cage Conditions for Beef Cattle Breeders in Sigi Regency

No	Cage Condition	Number of Breeder	Percentage (%)
1	Do not have a cage	15	41,7
2	Slightly damaged cage	19	52,8
3	Cage heavily damaged	2	5,5
	Total	36	100

Based on the table above, it shows the cage conditions after the earthquake hit Sigi Regency. 15 breeders (41.7%) did not have any cage, 19 breeders (52.8%) had slightly damaged cages, and 2 breeders (5.5%) had heavily damaged cages. Most of the cages were located in the most remote areas impacted by the disaster. The impact of the earthquake on breeders was very diverse and had many disadvantages such as damaged cages.

Table 6 – The Classification of Respondents Based on the Range of Beef Cattle Breeding Business Losses in Sigi Regency

No	Impact	Losses (Rp)	Description
1	Slightly damaged cage	3.154.000	19 respondents
2	Cage heavily damaged	840.000	2 respondents
3	Dead cow	176.000.000	16 cows
	Total	179.994.000	

The earthquake that occurred in Sigi Regency also triggered tsunami and liquefaction. This natural disaster resulted in considerable losses for the breeders, about 52.8% of the cages were lightly damaged and 5.5% of the cages were heavily damaged.

DISCUSSION OF RESULTS

Meeting the needs that can change at any time requires the community to increase investment power, in this case the number of livestock owned by each family. In this study, the researchers looked at the development of the beef cattle population in the Public Animal Husbandry School (SPR) before and after the earthquake, tsunami, and liquefaction plus the impact of the COVID-19 pandemic. Overall, the total population of cattle in Sigi Regency from 2017 to 2021 was 224,958 cattle/year with the distribution as shown in the following figure:
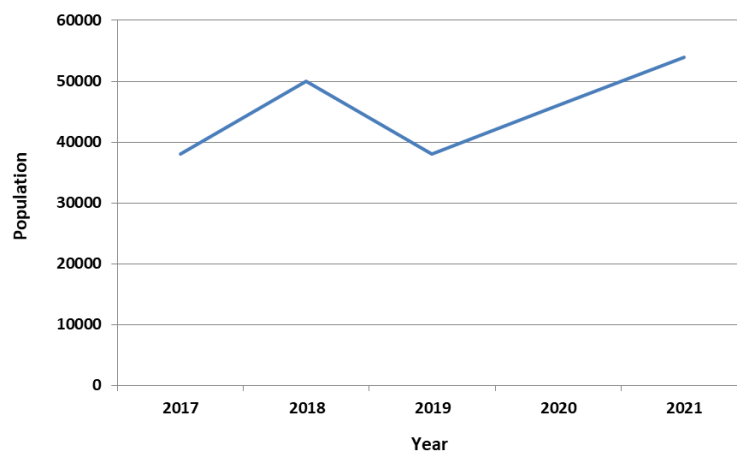

Figure 1 – The total of cattle population in Sigi Regency in 2017-2021

Based on the figure above, it shows that the cattle population in Sigi Regency was 37,327 cattle in 2017. However, in 2018 to 2019, there was a very significant population decline. In 2018, the cattle population was 49,056 cattle and there was a decline in the cattle population of 37,363 cattle in 2019. The cause of this significant decline was the earthquake, tsunami, and liquefaction that occurred in September 2018 which caused many livestock to die due to natural disasters and entered a transition period from natural disasters to the Covid-19 pandemic. However, in 2020, there was an increase in the number of cattle population of 47,011 cattle and there was an increase in the cattle population of 54,201 cattle in 2021.

The population of cattle at the research location in Bulubete Village of Dolo Selatan District in 2017 to 2021 was 1,674 cattle. In 2017, the cattle population was 459 cattle and experienced a population decline of 377 cattle in 2018. This population decline was inversely proportional to the number of population increases in Sigi Regency in 2017-2018 as Bulubete Village is one of the villages that was affected by natural disasters and was an area prone to flash flood. Meanwhile, in 2019, there was a decline again in the population of 254 cattle due to the Covid-19 pandemic outbreak and there was an increase in the population of 311 cattle in 2020. Moreover, in 2021, there was a decline in population due to the demand for beef which began to increase resulting in a population of 273 cattle.

After the natural disaster and the Covid-19 pandemic, the sale of cattle at SPR, of Bulubete Village of South Dolo District of Sigi Regency, which was the location of the research, experienced a trend in demand for beef. In 2018, there was an increase in demand for beef by 5% from the previous year, where in 2017 the demand for beef was 20.1% of the total population and in 2018 the demand for beef increased by 25.01%. This trend is inversely proportional to 2019 (entering the pandemic-19 and post-disaster period) and this increase occurred because of religious holidays which encourage breeders to sell their livestock. In this case, the earthquake, tsunami, and liquefaction disasters that occurred did not affect the level of sales of cattle breeders.

Entering 2019, there was a 10% decrease in sales. In other words, the sales level was only 15%. The decline in sales level this year was due to a drastic decline in the population as the result of very significant sales in 2018. Besides, there was a transition period of the covid-19 pandemic that attacked globally when entering 2019.
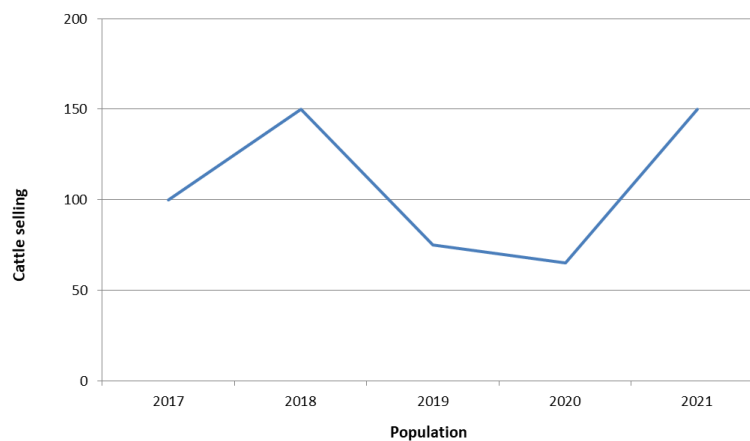

Figure 2 – The Number of livestock sold at the Public Animal Husbandry School (SPR) in 2017-2021

In 2020, the demand for beef decreased again by 3% from the previous year. In 2020, the level of demand for livestock has decreased in the market as Indonesia was in the red zone during the Covid-19 pandemic, so people's purchasing power was still decreasing and the impact on the cattle population in 2020 was increasing from the previous year. In addition, the increase in population in 2020 was also influenced by several factors, such as the birth rate and there were some breeders who bought cattle to be raised and carried out the fattening process so that they could be resold during religious holidays or wedding/traditional parties.

It was different in 2021 as the population decreased by 2% and the demand for beef increased by 12% or 25.5% overall. This year, the Covid-19 pandemic had begun to subside and the community's economy had begun to stabilize. These were what made the demand increase and more cattle distributed to other areas to meet the demand for beef in the market.

CONCLUSION

Based on the results of this study, it can be concluded that the development of beef cattle breeding business at Anutapura Public Animal Husbandry School (SPR) During the Covid-19 Pandemic and Post-Earthquake, Tsunami and Liquification Disasters were:

- The development of beef cattle breeding business at Anutapura Public Animal Husbandry School (SPR) During the Covid-19 Pandemic and Post-Earthquake, Tsunami and Liquification Disasters experienced a decline after the disaster and the Covid-19 pandemic;
- The total loss due to the earthquake that occurred was estimated at Rp. 179.994,000.

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