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## Competitiveness of Smallholder Beef Cattle Farming in Gorontalo District, Gorontalo

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### ABSTRACT

The objectives of this study were to analyze the competitiveness of the beef cattle farming in Gorontalo District, to analyze the impact of government policies on competitiveness and to analyze the impact of changes in input and output factors of production to competitiveness. Primary data were obtained from 60 respondents were selected using non-probability sampling method. The analysis methods used were Policy Analysis Matrix (PAM) and sensitivity analysis. The results of the analysis showed that the commodity beef cattle in Gorontalo District has a weak competitiveness. The impact of policy to the beef cattle farming showed that the farmers are not protected by government policies ( $EPC < 1$ ). The impact of changes in input and output of production on the competitiveness showed that: 1) the increase in the price of domestic meat and the world respectively 8.44% and 10% will increase the competitiveness, 2) an increase in the price of feeder cattle at 3.28%, forage feed costs by 10% and labor costs by 10% will impact beef cattle farming do not have a competitive advantage but still have a comparative advantage, and 3) increase in meat production about 12.72% will increase the competitiveness of beef cattle.

Keyword: Beef cattle, Comparative advantage, Competitive advantage, Policy analysis matrix

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### Introduction

The agricultural sector in Indonesian development has an extremely important role. The strategic role of the agricultural sector is reflected from the position of the agricultural sector as a food and feedstuff supplier, labor absorbing, and source of income (Kementan, 2010). In 2017, agriculture sector contributed amounted IDR 1.78 trillion or 13.14 percent of the GDP at current price and absorbed more than 35 percent of total workforce (Khairiyakh *et al.*, 2015; BPS, 2018). One of the agricultural subsectors is the livestock subsector, this subsector has some important roles such as provide essential food-nutrition, supporting viable livelihoods which allow people to make better dietary and health choices, top 10 highest-value agricultural commodities, contributes 15%-80% global agricultural gross domestic product, help to make optimal use of the planet's biomass, and contributing to reducing greenhouse gas emissions (WEF, 2019).

The government priority in the current livestock products is beef. The accomplishment of the needs of today's beef comes from domestic and import. Kementan (2017) stated that in 1983-2017

period, the volume of beef imports tended to climb and the gap between the volume of exports and imports was wider, the highest import occurred in 2016 with value accounted for 132.72 thousand tons.

The accomplishment of food that comes from domestic country has been realized to be more important because if we rely on imports, it may lead "the food robustness" of Indonesian beef to be vulnerable to global markets. The study of Sunari *et al.* (2010) concluded that the price of the cattle and beef imports affect Indonesian cattle market, so that commodity is vulnerable to the effects of global market. Meanwhile, nowadays Indonesia has signed agreement of Free Trade Area namely ASEAN-Australian-New Zealand Free Trade Area (AANZFTA) (Presidential Decree No. 26 of 2011). That deal is included that the beef imports tariff elimination in 2020. That policy will certainly have an impact on the competitiveness of the beef cattle. Some of the other policies now a days are: 1) the imports tariff on feeder cattle, rice bran, cornmeal, bone meal, and vitamin B6 are 5% (Ministry of Finance Decree No. 213 of 2011), and 2) the application of subsidies on gasoline with the highest selling price is IDR 6,500/litre (Ministry of

ESDM (Energy and Mineral Resources) Decree No. 18 of 2013).

Free trade can threaten the local beef cattle livestock sector if the local cattle cannot compete with the import cattle. Therefore, the competitive advantage of the owned products is needed to get the benefit of the openness of markets. Soedjana and Priyanti (2017) reviewed that Indonesia has a good potency to produce live beef cattle through technologies and innovations of palm oil-beef cattle system integration which boost production efficiency. Gunawan *et al.* (2019) stated that integrated crop-livestock-forestry systems are able to increasing productivity, livestock production, farmer income and realize beef self-sufficiency. Khairiyakh *et al.* (2015) used Location Quotient (LQ) to identify contribution of agricultural sector on Indonesia economy. They reported that agricultural sector is basic sector in 29 provinces. Further, in Gorontalo, the livestock is basic subsector. Thus, the study on the competitiveness of the beef cattle in Gorontalo district is important to be conducted to analyze the competitiveness of the beef cattle farming in Gorontalo district to face the free market competition.

The dynamics of the beef price shows that the domestic beef price is more expensive than the imported beef price. During the period of January 2018-December 2018 there were differences in the price of domestic and imported beef. The domestic beef price in the consumer level in Gorontalo province at that period was IDR 110,568/kg, while the imported beef price was IDR 60,044/kg (Kementan, 2018). One of the centers of the beef cattle in Gorontalo province is in Gorontalo district. Anugrah and Sejati (2010), found that in Gorontalo district, the ownership of the cattle in general is 2-3 cattle/household and the fattening pattern in general is by grazing. Meanwhile, Zubair (2010) stated that the daily body weight gain (ADG) of the cattle without the feed concentrates in Gorontalo district in average is 330 g/day, but with the feed concentrates is 870 g/day. However, there are opportunities for development of the beef cattle farming because the carrying capacities in Gorontalo Province can support 927,424 animal unit (AU) of cattles, while the total population of beef cattles in 2008 are 172,166 AU (Rouf and Sariubang, 2010). Based on the research problems, the objectives of this study were: 1) to analyze the competitiveness of the beef cattle in Gorontalo district, 2) to analyze the impact of government policy on the competitiveness of the beef cattle in Gorontalo district, and 3) to analyze the effect of changes of production input and output factors to the competitiveness of the beef cattle in Gorontalo district.

## Materials and Methods

The study was conducted in Gorontalo district that was purposively selected because most of the cattle population of the Gorontalo province is located in this area, mostly about 42.34% (77,851 heads). Sampling was done by using a non-

probability sampling; this was due to the unavailability of data population or sample frame of the cattle farmers of intensively fattening farming that was economy-oriented. There were two sub-districts (i.e.: Boliyohuto and Tolangohula sub-district) that were selected based on the consideration of the cattle traders (52.21%), the number of the cattle population (19.49%) and the farmers of beef cattle fattening (19.35%). Then, there were selected 30 respondents from each sub-district. Overall, the sample taken was as much as 60 respondents. The sample taking from each sub-district was by using the accidental sampling method. Levine and Stephan (2010) stated that for many population distributions, a sample size of at least 30 is large enough.

The type of data that is used in this study is including primary data that obtained from the respondents of the beef cattle farmers by using questionnaire. The data collection was conducted in October-November 2013. The secondary data obtained from various related institutions such as BPS, Ministry of Agriculture and other institutions. The primary sources include: 1) business investment that consists of cages and equipments, and 2) the amount of usage and the input price, namely feeder cattle, the number and price of forage and concentrate, drugs/medicines and vitamins, marketing and transportation costs.

One of the methods of analysis that is used to measure the livestock competitiveness is the Policy Analysis Matrix (PAM) (Emam and Salih, 2011; Nwigwe *et al.*, 2016). PAM can also measure the impact of the government intervention on the fattening beef cattle farming. The form and indicator calculation of Policy Analysis Matrix can be seen in Table 1.

Indicators of the level of competitiveness in the PAM are domestic resource cost (DRC) and private cost ratio (PCR). Value  $0 < \text{DRC} < 1$  means that the domestic resources costs in social price (the imported price) is less than the value-added output of commodity, so the commodity has a comparative advantage. PCR calculation is identical to the DRC, but it is calculate at the private price (market price) received by the farmers. The calculation of some indicators in PAM can be seen in Table 2.

Sensitivity analysis aims to find out the extent to which changes in output prices, input prices, productivity, and exchange rates affect the competitiveness of farming (Fahmid *et al.*, 2018). The application of the sensitivity analysis previously has been used to complete the PAM method (Emam and Musa, 2011; Adegbite *et al.*, 2014). The determination of the magnitude changes is based on the trend in the change of input and output factors publicized by the related institutions. Those are: 1) the increase in the retail price of meat in Gorontalo Province from 2008 to 2012 by 8.44% (Kementan, 2013), 2) the increase in the world prices for meat by 10% from 2003 to 2012 (Anonim, 2013), 3) the increase in the price

Table 1. The form and indicator calculation of policy analysis matrix

Item	Revenue	Cost		Profit
		Tradable Input	Domestic factor	
Private Price	A	B	C	D = A-B-C
Social Price	E	F	G	H = E-F-G
Divergence	I = A-E	J = B-F	K = C-G	L = D-H

Source : Pearson *et al.* (2003).

A: Private revenue, B: Private tradable input, C: Private domestic input, D: Private profit, E: Social revenue, F: Social tradable input, G: Social domestic factor, H: Social profit, I: Output transfer, J: Input tradable input transfer, K: Factor transfer, L: Net transfer.

Table 2. The calculation of PAM indicators

Indicators	Equation
Private profitability	D = A-B-C
Social profitability	H = E-F-G
Output transfer	I = A-E
Input transfer	J = B-F
Factor transfer	K = C-G
Net transfer	L = D-H; L = I-J-K
Private cost ratio (PCR)	PCR = C/(A-B)
Domestic resource cost ratio (DRC)	DRC = G/(E-F)
Nominal protection coefficient on outputs (NPCO)	NPCO = A/E
Nominal protection coefficient on inputs (NPCI)	NPCI = B/F
Effective protection coefficient (EPC)	EPC = (A-B)/(E-F)
Profitability coefficient (PC)	PC = (A-B-C)/(E-F-G); D/H
Subsidy ratio to producers (SRP)	SRP = L/E; (D-H)/E

A: Private revenue, B: Private tradable input, C: Private domestic input, D: Private profit, E: Social revenue, F: Social tradable input, G: Social domestic factor, H: Social profit, I: Output transfer, J: Input tradable input transfer, K: Factor transfer, L: Net transfer.

of the weight of lively beef in Gorontalo Province in 2008-2012 by 3.28% (Kementan, 2013), 4) the increase in the forage cost by 10%, it is calculated from the increase in labor costs from 2003 to 2012 (BPS, 2012), 5) the increase in labor costs from 2003 to 2012 by 10% (BPS, 2012) and 6) the increase in the national meat production in 2014 to the production in 2013 by 12.72% as a result of the success of the beef self-sufficiency program (BSSP) (Kementan, 2012).

## Result and Discussion

### Competitiveness analysis

The results of the competitiveness analysis and private and social profits of the beef cattle farming in Gorontalo district can be reviewed in Table 3. Based on the profits analysis, it was revealed that the profits of the beef cattle farming in Gorontalo district in the private price had positive value of IDR 83,022/head. This implied that the beef cattle farming in Gorontalo district is profitable or viable financially. Similar to the social price, the beef cattle farming is viable economically because the social profits in the beef cattle farming in Gorontalo district had positive value of IDR 267,809 head/period. The profitability is equals to reduction between revenue and cost. At market and social price shows that the beef cattle farming received positive income. The private profitability is lower than its social price is indicating that government policy (i.e: tax and retribution) makes the income gained by farmers is smaller than its efficiency price. Moreover, the tradable inputs are more expensive at private price. Similarly, that cattle farming profitability at market price is lower than its social price in West Nusa Tenggara and East Nusa Tenggara of IDR 6,175,098 per cattle and IDR 2,031,419 per cattle, respectively (Nalle *et al.*, 2017; Sudirman *et al.*, 2017).

Table 3. The competitiveness analysis and private/social profits of the beef cattle farming in Gorontalo District

Pearson *et al.* (2003) defined competitive advantage as the ability of agricultural systems to compete under existing technologies and prices or whether farmers earn profits facing actual market price. ADB (1992) stated that competitive advantage is an indicator of whether a country commodity will be successful to compete in the international market which is measured based on the price paid to producer for production factors and the output sold to consumer, under the assumption that system were intervene by government regulation. Government can intervene in agriculture by using three kinds policies such as agricultural price policies (taxes and subsidies, international trade restrictions and direct control), public investment polices (public investment in infrastructure, human capital, research and technology) and macro-economic polices (monetary and fiscal policies, foreign exchange rate policies and factor price, natural resource and land use policies) (Pearson *et al.*, 2003).

Competitive advantage analysis is based on the value of PCR, it is known that the beef cattle farming has a competitive advantage. PCR value of 0.945 indicates that to obtain value-added output of the beef cattle farming for one unit on the actual condition when there is a government policy, it is needed domestic factor costs by 0.945. The competitive advantage of the beef cattle can increase if the domestic resource costs can be minimized (Tawaf, 2009). Paramecwari (2015) and Mallu *et al.* (2018) concluded that low cost labor, utilization of feed from natural resources for lower feed cost and uses better technology are source of competitiveness. Low labor cost leads farmers to gain competitiveness due to lower cost of production.

Comparative advantage is used to determine whether a commodity has economic advantage for expanding production and

Item	Revenue	Cost		Profit
		Tradable input	Domestic factor	
Private price	9,098,394	7,579,504	1,435,869	83,022
Social price	7,990,447	6,117,108	1,605,530	267,809
Divergensi	1,107,948	1,462,396	(169,661)	(184,787)

producing commodity with a comparatively lower cost than the social opportunity costs of other alternatives, excluded all government intervention (ADB, 1992). Pearson *et al.* (2003) stated that comparative advantage is an indicator where resources are allocated efficiently and thus the highest generation of income. Moreover, the social prices of tradable commodities are given by comparable world prices because the import or export price is the best measure of the social opportunity cost of the commodity. For an exportable, the export price is a measure of the opportunity cost of an additional unit of domestic production since that unit would be exported, not consumed domestically. For an importable, the import price indicates the opportunity cost of obtaining an additional unit to satisfy domestic demand. Comparative advantage is reflected by the domestic resources cost ratio (DRC) indicator. DRC value of 0.857 means that it is needed the domestic factor costs by 85.7 percent per unit of the value added. Therefore, the beef cattle farming in the Gorontalo District has a comparative advantage without the government policy. This result is consistent with the previous studies that the beef cattle farming has a competitive and comparative advantage as DRC and PCR values are less than one (Muthalib *et al.*, 2010; Indrayani, 2011; Yuzaria and Suryadi, 2011; Sudirman *et al.*, 2017). In contrast to previous reports that beef cattle farming in Bojonegoro is not competitive due to increased fuel prices, low average daily weight gain and application of cattle import quota (Lestari *et al.*, 2017).

The results of the comparison between the competitive and comparative advantage showed that the competitive advantage of the beef cattle in Gorontalo district was lower than its comparative advantage (PCR > DRC). This result was agreement with previous studies that competitive advantage of beef cattle farming was smaller than its comparative advantage (Lestari *et al.*, 2017; Nalle *et al.*, 2017; Sudirman *et al.*, 2017). It is meaningful, with the government policy such as tariff on the beef and cattle imports by 5%, the input tariff of the beef cattle farming by 5% and the quota of the beef and feeder cattle have not been able to increase the competitive advantage of the beef cattle farming. There are some strategies could be implemented by government to boost competitive advantage such as 1) in the output sector, restrict of cattle or beef import through tariff and non-tariff regulation which led to improve of domestic cattle/beef supply, 2) in input sector, government should reduce input taxes even provide subsidies of production input-feeds, particularly for small-scale farmers, develop crop/plantation-cattle integration system, utilize agricultural and agro-

industrial by product due to inexpensive and abundant, use of breeds adapted to tropical climate, improve of access and land tenure by farmer or companies 3) empowerment of farmers in term of input technologies, financial support, information and markets (Paramecwari, 2015; Soedjana and Priyanti 2017; Agus and Widi, 2018). Lestari *et al.* (2017) stated that beef cattle were not competitive apart from being caused by import quotas also due to low weight gain. Soedjana and Priyanti (2017) suggested that better regulation, market-oriented, reduce production costs and increase efficiency are needed to improve the competitiveness of the livestock subsector.

#### Impact of output and input policies

The magnitude of the impact of input or output policies can be seen in the third row in the PAM matrix related to the divergence effect that is the output, input, factor, and net transfers. The impact of policy can also be seen as a relative measure between the private and social prices measured by indicators of nominal protection coefficient output (NPCO), nominal protection coefficient input (NPCI), effective protection coefficient (EPC), the profitability coefficient (PC) and subsidies ratio for producers (SRP) (Pearson *et al.*, 2003).

#### Impact of output policies

The impact of government policy on the output of the beef cattle in Gorontalo district showed that the output transfer had positive value, it means that the farmers receive a higher output price than its social price (Table 4). It also means that the government has provide protection to the farmers because they gain income over the social price by IDR 1,107,948/head. This conforms to the findings of previous studies that the beef cattle farming has positive value between IDR 767,100/head and IDR 2,290,001/head (Indrayani, 2011; Muthalib *et al.*, 2010; Yuzaria and Suryadi, 2011). The increased private price compared to social price could be attributed to the provision of the beef import tariffs by 5%, the application of the beef import quota, as well as non-tariff policy regarding animal health status, the status of infectious diseases as well as free of mad cattle disease. Other than the national policy, there are security and supervision of livestock and meat retribution and cutting and veterinary inspection retribution.

Table 4 shows that nominal protection coefficient output (NPCO) of the beef cattle in Gorontalo district was more than one. NPCO measures the comparison of the farmer's revenue in private price and social price. It describes how

Table 4. Indicators of the impact of government policy on the competitiveness of the beef cattle in Gorontalo District in 2013

Indicators	Value
Output transfer	IDR 1,107,948
Nominal protection coefficient on outputs	1.139
Input transfer	IDR 1,462,396
Factor transfer	(IDR 169,661)
Nominal protection coefficient on inputs	1.239
Effective protection coefficient	0.811
Net transfer	(IDR 184,787)
Profitability coefficient	0.310
Subsidy ratio to producers	(0.023)

much the different of the output's actual price from the output's parity price. In the actual conditions, the farmers received a higher income by 1.139 times than the social price. It indicated that beef cattle farmers were protected by policy (beef import, import quota and non-tariff policy). Therefore, the farmer's revenue in private price is 14 percent higher than the world price. The positive value of NPCO is also reported in some areas in Indonesia, e.g. Agam District, West Sumatra by 1,1 (Indrayani, 2011), Jambi reached 1.34 (Muthalib *et al.*, 2010) and Bojonegoro District by 1,1 (Lestari *et al.*, 2017).

#### Impact of input policies

Input of the beef cattle farming in this study was divided into 2 parts, those were tradable inputs and domestic factors. Input policy of the beef cattle farming in Gorontalo District has led the farmers to buy the tradable inputs that are more expensive than its social price (the input transfer of the beef cattle farming has positive value) (Table 4). The farmers paid a higher input than its efficiency by IDR 462,396/head. This is also reflected in nominal protection coefficient input (NPCI) that was more than one (Table 4). NPCI value of 1.239 has meaning that the farmers pay the production inputs more expensive by 23.9% than the conditions without policy. The positive input transfer value has occurred because in 2013 the government still applied the import quota of the feeder cattle so the domestic cattle supply was reduced. The reduced supply can lead to the increase in the actual price. Besides, the input of the cattle production in the private price is more expensive due to the imposition of the import tariffs by 5% and value added tax by 10% to the input of the beef cattle production such as the bone meal, vitamins, drugs/medicines and salt. However, the government has given subsidies on the premium fuel as the transportation facilities.

Transfer factor (FT) is the difference between the private price of domestic input from the social price. FT indicate the existence of government policies towards domestic input producers. Government intervention on domestic input is usually in the form of a subsidy policy on prices or subsidies on the cost of production. The domestic factor inputs were paid less than the social price by IDR 169,661/head by the farmers (Table 4). This difference is due to the fact that the interest rate of private capital (5.6-8.1%) is lower than in social (13.5%). Paramecwari (2015)

reported that feedlots in Lampung and West Java pays lower domestic input price than the social price due to subsidy IDR 1,464,522 /head and 1,438,889 IDR/head, respectively. On the contrary, Mallu *et al.* (2018) stated that beef cattle farmers in East Kalimantan pays higher factor domestic cost (i.e labor cost, working capital, investment capital, cage and equipment shrinkage cost) than its efficiency cost due to taxes and cost of capital interest.

#### Impact of input and output policies

Impact of input-output policies on the beef cattle farming in Gorontalo district is negative, this means that the implementation of the policy have not protected the beef cattle farming (Table 4). The lack of government protection against the beef cattle farming has caused the farmers to lose the potential profit by IDR 184,717/head. In sum, the overall input-output policies have not provided the economic incentives.

Net protection coefficient (NT) of 0.811 means that with the existence of the input-output policies of the beef cattle farming, the earned added value of profits after the government intervened the beef commodity policy is lower than what should be received by the farmers. Thus, the input-output policies have obstructed the farmers. The profitability coefficient (PC) value in the beef cattle farming in Gorontalo district showed the value that was less than one, which was equal to 0.310, meaning that overall the existing policies can only result in the private profit by 31% from the social profit when there is no implementation of input-output policies. Based on the ratio subsidies for producer, the beef cattle farming in Gorontalo district had negative value means that the government intervention caused the farmers to paid the production cost higher than the opportunity cost of production. SRP value of 0.023 means that the farmers spend the production cost 2.3% higher than its efficiency price.

#### Impact of the changes of input and output production

The changes of the production input and output are based on the changes in the private and social beef price, the increase in input price (the feeder cattle, grass and labor) and the effect of government policy on the beef cattle farming (increase in meat production as a result of the success of beef meat self-sufficiency program).

Table 5. Impact of the changes of input and output production on the competitiveness

Scenario	Competitive advantage (PCR)	Comparative advantage (DRC)	Changes (%)	
			PCR	DRC
Base value	0.945	0.857		
8.44% increase in domestic meat price	0.628	0.857	(33.5)	0
10% increase in world meat price	0.945	0.601	0	(29.8)
3.28% increase in feeder cattle	1.090	0.857	15.3	0
10% increase in grass cost	1.010	0.904	6.87	5.48
10% increase in labor wage	1.015	0.914	7.40	6.65
12.72% increase in production	0.537	0.556	(43.1)	(35.1)
1-6 combination	0.476	0.458	(49.6)	(46.5)

The simulation result of the changes in these factors can be seen in Table 5.

Competitive advantage of the beef cattle farming is very sensitive to changes in the price of the feeder cattle compared to the changes in the feed and labor costs (Table 5). Increasing the feeder cattle price by 3.28% improved the PCR value from 0.945 to 1.09 indicating the beef cattle farming has no competitive advantage. Increasing the feed and labor cost each at 10% led to the weakened of the competitiveness with the each PCR value has increased to 1.010 and 1.015. Conversely, the increased in the domestic meat prices at 8.44% increased the competitive advantage (PCR reduced from 0.945 to 0.628).

Competitiveness of the comparative advantage will be decreased if there is an increase in the grass feed and labor cost, but the effect of the increase in grass price has greater impact than the increase in labor costs (Table 5). The increase in the feed costs by 10% led to a decreased in the comparative advantage that the DRC value increased to 0.904. The increase in labor costs at 10% increased the DRC from 0.857 to 0.914. In contrast, the increase in the world meat prices at 10% improved the comparative advantage (DRC reduced from 0.857 to 0.601).

The success of the efforts to increase production by 12.72% resulted in an increase in the competitiveness of the beef cattle farming, both comparative (DRC reduced to 0.556) and competitive advantage (PCR decreased to 0.537). The impact of changes in inputs and outputs factor simultaneously (scenario 7) resulted in increased competitive advantage (PCR=0.476) and comparative advantage (DRC=0.458). Indonesian government has guidance to increase domestic beef or cattle production and to reduce imported cattle through Beef Self-Sufficiency Program, they are namely: 1) provide local beef and feeder cattle (develop breeding and fattening local cattle, crop-livestock integration system, increase quality of abattoir) 2) improve productivity and reproductivity of local cattle (optimize of artificial insemination and nature mating, provide high quality feed), 3) prohibited slaughtering productive cows, 4) Provide local breed (develop of cattle breeding business), 5) arrange domestic stock of beef and feeder cattle (Ariningsih, 2014). Holmann *et al.* (2008) and Bauer *et al.* (2016) underlined that competitiveness can be obtained from economies of scale through decreasing production costs. They offered the creation of cluster, vertical integration and adoption of new technologies which leads to increase the profitability and efficiency. The Sugiarto *et al.* (2017) used business efficiency as indicator of

competitiveness. They predicted that increasing number of cattle will improve competitiveness due to the increase of business efficiency. Moreover, increasing one cattle would boost competitiveness (business efficiency) by 0.122. On the contrary, Paramewari (2015) studied that 30% reduction in cattle population leads to decreasing of comparative and competitive advantage of feedlots in Banten, Lampung and West Java due to decrease of profit business. The feedlots in Lampung suffer the biggest loss which reduce 52% of PCR (comparative advantage) and 61% of DRC (competitive advantage).

## Conclusions

The beef cattle farming in Gorontalo district has a competitiveness that is reflected by competitive advantage (PCR<0) and comparative advantage indicators (DRC<0). The implementation of the input and output policies do not protect the beef cattle farming in Gorontalo district. The feeder cattle prices give more sensitive impact to the competitiveness compared to the changes in forage or labor cost. The increase in inputs will reduce the competitiveness of the beef cattle. The changes in the private and social meat prices and the increase in the meat production give sensitive impact to the cattle competitiveness, and it will increase the competitiveness.

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