The growth of cattle population in West Nusa Tenggara (NTB) and its development prospects

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Abstract. West Nusa Tenggara or Nusa Tenggara Barat (NTB) Province is one of the centres of beef cattle production in Indonesia. There has few studies that concern with population trends and improvement opportunities. This research aimed at determining the Gross and Net increase of beef cattle population during 5 years of period (2014-2018) in NTB and its development prospects. The data was collected through desk study, then analysed descriptively using a qualitative approach to provide an overview of the cattle population in NTB and its development opportunities. The results showed that from 2014 to 2018, the increase in Gross and Net population growth was in line with the National Beef Self-Sufficiency Program. The development opportunities are heading to Sumbawa Island considering the land potential, the utilization of the remaining agricultural crops, and the use of *Lamtoro* tree legume as the source of protein feed.

1. Introduction
Cattle are one of livestock as meat sources to fulfil the nationwide demand of meats in achieving the sustainable food security [1]-[3]. However, up to 2018, the meat production in Indonesia can only fulfill around 60% of the national total needs. Therefore, to fulfill the demand of national beef, the imported meat was allocated around 35-40% [4],[5]. We have recorded it that in the last five years (2014-2018) beef imports were 76,887.34 tons, 50,309.02 tons, 116,761.38 tons, 118,646.84 tons and 164,260.57 tons. There were also import of live cattle sequentially: 246,834 tons, 197,604 tons, 195,764 tons, 168,589 tons and 204,683 tons [6]. The attempts to fulfill the demand of national beef have been many carried out, one of those was the declaration of program of Fulfilment of Livestock-Based Food and Small Holder Livestock Agribusiness in 2014-2018. However, up to the present time, the attempts that have been released out through the program were not showing optimal results. This was caused by the increase in food consumption to 3.73 grams in 2018. It was higher compare to consumption in 2014, which showed only 2.68 grams per capita per day [6],[7]. Meanwhile, there was a decrease in the quantity of beef cattle population with parameters including birth rate, death rate, age distribution and sex [8] and the total of slaughtering productive female cows.

West Nusa Tenggara (NTB) Province has a strategic role as a national source of breeders and beef cattle to supply to other provinces in Indonesia. Based on the 2019 Indonesian Livestock and Animal Health Statistics, the cattle population in NTB was recorded at 1,242,749. Livestock trade transactions in a year, in 2018, reached an average of 374 billion and also increased the Gross Regional Domestic Product (GRDP) of the agricultural sector in NTB. The increasing demand and meat consumption by the community can have effects on the rise of the cattle population in NTB. The potential impact is a diminishing population...
of cattle in NTB, so that the long-term self-sufficiency beef is difficult to be achieved. This could happen if, 1. The rate of calf birth rates per year is lower than the rate of the expenditure level of the total of beef cattle or breeders per year [9]; 2. The excessive rate of slaughtering of cows, productive female cows [9]; 3. High rate of cow mortality rate [10]; 4. The decrease of the quality of beef cattle as the result of the large amount of good quality bulls were being sold outside the NTB areas [11]. Having those above description, it is necessary to conduct this investigation. It aims at determining the Gross and Net increase in the beef cattle population in the last 5 years, 2014–2018 and the development prospects in NTB.

2. Materials and method
The scope of the research included NTB Province as one of the centers of beef cattle production in Indonesia. This research was conducted on January-August 2020. The data was collected through desk study and later was analyzed descriptively by applying a qualitative approach. The collected data were secondary data of 2014-2018 of various literature studies. This was analyzed to provide future estimation of the cattle population in NTB. Gross population is the sum of existing population with births and livestock entry in the same period. Net population is the result of a reduction of the gross population with the number of cattle being sold, slaughtered, and those affected by death [12].

3. Results and discussion
3.1. Cattle population in NTB
NTB Province as one of the production centers for beef cattle and breeders has a significant role in supplying the needs of breeders and beef cattle to over 12 provinces in Indonesia. In the period of five years, 2014-2018, the percentage of calf births in NTB were in average of 27.12% per year from the gross cattle population and to cows by 80%. This is in accordance with Sudrana, et al. [13] which stated that the calf birth rate to the population is 27.49% and 76.12% to the cows.

Table 1. Gross and net population of cattle in NTB 2014-2018.

| Year | Birth | Slaughtered/Export/Dead | Gross Population | Net Population |
|------|-------|-------------------------|------------------|----------------|
|      | Head  | %                       | Head            | aR (%)         | Head           | bR (%)         |
| 2014 | 364,965 | 26.68                   | 353,903         | 1,367,696      | 1,017,793      |
| 2015 | 379,805 | 27.25                   | 338,585         | 1,393,598      | 1,055,013      | 4.07           |
| 2016 | 393,379 | 27.16                   | 355,673         | 1,448,392      | 1,092,719      | 3.57           |
| 2017 | 413,834 | 27.47                   | 357,014         | 1,506,553      | 1,149,539      | 5.20           |
| 2018 | 426,084 | 27.04                   | 392,053         | 1,575,623      | 1,183,570      | 2.96           |
| Average | 395,613 | 27.12                  | 359,446         | 1,458,372      | 1,098,927      | 3.95           |

*aR (%) = Gross population growth rate per year.
*bR (%) = Net population growth rate per year.

Based on Table 1 it is shown that the rate of slaughtering cattle both male and female was 5.55% per year on average, while sales or number of cattle released from NTB province an average of 2.28% per year and calf mortality 3.60% per year. Gross cattle population in NTB province averaged 1,458,372 with growth (aR%) averaging 3.60% per year. The lowest gross population growth of 1.89% occurred in 2015, while the highest 4.58% occurred in 2018. The absence of cattle intake from outside NTB, reinforces the statement that NTB province is one of the national beef cattle producers. This has been achieved through local government policy by empowering cattle farmers in NTB with natural mating and artificial insemination. Besides that, the local government is also trying to protect cattle from various infectious diseases such as Anthrax, SE and BEF.
Based on Figure 1 it is depicted that the growth of cattle population in NTB in the period of 2014 - 2018 has increased. The increase in population is marked by an increase in the number of productive cows by 40% per year from the population and calf births by 80% per year from the productive cow’s population. The increase in cow’s population is also caused by a decrease in calf mortality (an average of 3.6% per year) and a decrease in the number of cows slaughtering, with a range of percentage of cows slaughtering from 2014-2018 of 9.06% -12.23% per year.

Figure 1. Productive cows and calf birth population.

Figure 2 shows that the number of beef cattle and breeders from NTB has decreased because of the local government's policy in maintaining the sustainability of cattle and increasing cattle population in NTB. This is under opinion [14] which states that in implementing the development of cattle population, determining livestock export including controlling slaughter of productive cows needs to be considered and calculated precisely to keep the population balance in an area.

Figure 2. Export of breeders and beef cattle.

| Year | Export of Breeders | Export of Beef Cattle |
|------|-------------------|----------------------|
| 2014 | 9,885             | 45,081               |
| 2015 | 7,049             | 13,520               |
| 2016 | 3,668             | 11,397               |
| 2017 | 3,402             | 10,953               |
| 2018 | 625               | 11,244               |

| Year | Productive Cows | Calf Birth |
|------|-----------------|------------|
| 2014 | 456,207         | 364,965    |
| 2015 | 474,756         | 379,805    |
| 2016 | 491,724         | 393,379    |
| 2017 | 517,293         | 413,834    |
| 2018 | 532,606         | 426,084    |
Based on Figure 3, it is shown that the net population growth of cattle in NTB province in 2015 was 4.07%, has experienced decrease in population growth in 2018 for 2.96%. Several factors can cause according to Antara [15] the decline in cattle population both locally and nationally such as the needs of farmers, a cut down in cattle import quotas and likewise in the quality of local cattle because of inbreeding. Unlike the case with Net, Gross cattle population in NTB province has increased growth every year. This is generated by several factors, such as the total of calf birth growth each year that could not compensate the total of cattle being slaughtered, the number of dead cows and those exported from NTB. This is in line with the previous study [16] which stated that the increasing quantity of extermination is due to the unsuccessful efforts to expand meat production per unit of livestock. It is also due to ongoing slaughter of productive cows in NTB. Slaughtering productive cow in two consecutive years of 2016-2018 was 200 heads or 3.33%; 35 or 0.61%; 76 heads or 1.34% of slaughtering cows [17]. However, generally, the 2014-2018 period showed the rise in Gross and Net population growth which in line with the National Beef Self-Sufficiency Program, that beef self-sufficiency will be achieved in 2026 [18]. The average net growth of cattle population (3.95%) was higher than Gross cattle population in NTB (3.62%). This can be interpreted that in those 5 years the accumulated gain in cattle population was greater than the total of cattle slaughtering, cattle mortality, and cattle expenditure from NTB province.

The implications of this research are: first, the population growth of cattle will increase through birth rates, without having to raise the quantity of livestock input from other provinces. Second, having an increase in delivery rates, the amount of cattle sold and slaughtered also increase. So, it impacts increasing the income and welfare of producers. Third, if we can reduce the calf mortality rate, the sales, slaughter and net population will increase even higher. The interest of farmers of cattle farming is indeed higher. This is in line with the National beef self-sufficiency program.

3.2. Opportunities for cattle development in NTB

West Nusa Tenggara comprises two main islands, Lombok and Sumbawa. From the geographical and demographic conditions, the island of Sumbawa has greater potential for the development of beef cattle in NTB. Although the comparison of NTB cattle population in the two islands is not too much different at around 43%; 57%, the area of Sumbawa is over 75% of NTB's territory and is only inhabited by about 30% of NTB's population [19]. This shows that there is still a large area of land available on Sumbawa Island for the development of beef cattle in NTB. Besides the wide availability of land, the opportunity for developing beef cattle on the island of Sumbawa is also supported by the availability of the remaining food crops as corn straw, soybeans and peanuts that have not been used as source of supply. For example, the island of Sumbawa is one of the national centres of corn production with a harvest area in 2012 reaching 87,876 ha [19]. Corn is a potential source of feed with high productivity. One hectare of maize land can

![Figure 3. Gross and net growth of cattle population in NTB.](image-url)
produce 3-4 tons of dried Stover with a moisture content of 20% [20] this means that the number of corn straw on the island of Sumbawa annually reaches 263,628 tons. With reference to the need for dry matter intake of about 1-3% cow's body weight and maintenance protein content 12% [21], while the crude protein substance of corn is as much as 7.4% [22] then about two-thirds of the cattle feed needs can be fulfilled from maize and the rest from the tree legume such as lamtoro, which is widely found in Sumbawa [23]. With the use of maize straw as source of supply, the island of Sumbawa can even uphold the increase of another cattle population of around 120 thousand heads. This shows that the island of Sumbawa still has wide area with the support of sufficient feed time for the development of beef cattle in NTB. Besides land area and availability of other superior foods that support the expansion of cattle in NTB are, 1) cattle as a hereditary social capital in NTB breeder communities, 2) as the location for purification of the National Bali Cattle, 3) as a centre for the development of Hissar Cows, 4) area which is declared free from various infectious animal diseases, 5) cattle surplus becomes one region supplying National cattle needs, 6) sources of national cattle and beef cattle [24-26].

4. Conclusion
The results showed that in the period of 2014-2018 the increase of gross and net population growth were in line with the National Beef Self-Sufficiency Program. The development opportunities are heading to the Sumbawa Island with its land potential, the utilization of the remaining agricultural crops and the use of Lamtoro tree legume as a source of protein feed.

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