The role and utilization of feed in supporting UPSUS SIWAB in East Aceh District

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Abstract. Supporting the SIWAB program, especially in East Aceh, requires a guarantee of adequate feed availability, for that, information on aspects of regional potential is needed, so that the location chosen for development efforts is a potential area. The research objective was to determine the potential of natural resources in terms of the availability of forage for the development of ruminant farms. Research and data collection were carried out in East Aceh District in 2017. The method used research analysis is descriptive. The data needed is in the form of potential natural resources seen from the availability of forage. The variables observed included: (1) ruminant livestock population data, (2) food crop production data, (3) livestock groups, (4) the number of livestock officers. The largest population of cattle is in Peudawa Subdistrict with 17,683 AU (Animal Unit) the production of by-products of food plants is 713.44 tons/year and feed needs of 20,158.25 tons/year. The largest population of buffalo is in Bireun Bayuem Subdistrict, amounting to 3,062.40 AU, production of food crop by-products worth 904.73 DDM tons/year and feed needs 3,491.14 DDM tons/year. It was concluded that the insufficient need for by-products of food crops could be surplus in other districts by using the by-products of plantation, horticulture and agro-industrial crops to support the SIWAB program in East Aceh District.

1. Introduction
The Ministry of Agriculture predicted that Indonesian meat production in 2018 will not be able to meet national needs. Based on data from the Central Statistics Agency [1], the cattle population in 2017 was 16,599,247 heads, which increased by 3.59 from 2016. Beef production in 2018 was 496,302 tonnes, but the demand for domestic beef in 2018 reached 662,540 tonnes. assumption of an average national consumption of 2.5 kg/capita/year. According to [2] domestic production is only able to meet around 65%, the shortfall is met from imported products in the form of 20% frozen beef and 15% domestic fattened feed. In order to accelerate the achievement of increased productivity and beef cattle population in maintaining germplasm, the government launched the UPSUS SIWAB program (Special Efforts for Mandatory Pregnant Cows). This program aims to accelerate the increase in pregnant cattle and buffalo populations, which is a continuation of the meat self-sufficiency program. [3]. The results of the study stated that the management of feeding for ruminants is one of the problems often faced by breeders [4-9] and the amount of feed given [10] so that to support the success of the program it is necessary to
implement a strategy to optimize resource use locally by optimizing productive land and processing specific location-specific agricultural by-products by substituting forage for livestock [11] as a source of nutrition for ruminants.

There are three main things that need to be considered in developing animal husbandry in an area, namely livestock, human resources in this case as managers and land resources as a place for livestock to live, breeders and forage as well as technological factors. The development of livestock in an area needs to measure the potential area for livestock to be developed, because livestock production will depend a lot on the carrying capacity of feed, which is about 80%, which is reflected in the area of forage land and agricultural residues. East Aceh District, which is located in Aceh Province, has a number of advantages in various fields, such as Agriculture and Animal Husbandry. This district has a population of 60,040 beef cattle and 13,304 head of buffalo in 2018 with 3281 breeders in families spread across 24 sub-districts. This district is one of the areas that has the highest rice field area in Aceh Province. The majority of land is wetland, reaching 33,073 ha, paddy fields that have been passed through irrigation by 51.69% or 17,094 ha and the rest are rainfed rice fields [1]. Cattle and food crops are two mainstay commodities in this district, therefore the existing potential can be optimized in one farming system due to the abundance of agricultural by-products during the harvest season. All of this can be achieved with a sustainable approach that utilizes local feed sources, through technological innovation by agricultural by products as a potential source of animal feed [12]. The purpose of this study is to see the role and utilization of agricultural by-products as well as how much contribution and availability as forage for livestock in the development of ruminants to support the SIWAB program in East Aceh district.

2. Materials And methods

2.1. Place and time of research
The study was conducted from January to December 2017-2018 in East Aceh District, Aceh Province.

2.2. Types and data collection
Sampling at the research location was carried out using purposive sampling method with the consideration that some of the farmers / breeders in East Aceh district have used agricultural by-products. The method of analysis used in this research is descriptive research method with a quantitative approach. Data sources are primary data and secondary data. Secondary data were obtained from the Livestock Service Office, Food Crops and Horticulture Service and the Central Bureau of Statistics in the form of livestock population and on the area and production of food crops data. Based on secondary data, the calculation of the number of livestock units, the production of food crop waste and the capacity of livestock will be calculated. Other supporting data relating to this research was obtained from study reports and various other literature resources.

2.3. Observed variables
The observed variables include the population of large ruminants, namely beef cattle and buffalo, is located in a sub-district in East Aceh district using the animal unit (AU) calculation unit. Data on the population of large ruminants was obtained from the Livestock Service Office of East Aceh district in 2018. Meanwhile, data on the population of large ruminants is calculated based on the production level (weaning, off weaning, young, adult and imported cattle). The structure of beef cattle population based on age is (a) Weaners with an age <1 year have a composition of 19.30% of the population; (b) Off weaning >1 year old has a composition of 25.85% of the population; (c) Young people aged 2-4 years have a composition of 18.15%; (4) Adults >4 years old have a composition of 26.89%; and (5) Imported cattle have a composition of 9.81% [13]. Furthermore, the beef cattle population based on age was converted into animal units (AU) using the method [14]. The unit value of beef cattle according to [14] is 0.25 AU for calves (weaning and off weaning), 0.6 AU (young) and 1.00 (adult and imported). The unit value of buffalo is calculated according to [15] specifically 0.88 AU.
The minimum need for forage for large ruminants using the calculation of [16] which is 1.14 tonnes digestible dry matter (DDM) / year. Estimated production of food crop waste per hectare per year which is calculated based on the estimated production of food crops (rice, corn and soybeans) with data sources from the Food Crops and Horticulture Service of East Aceh district and was calculated according [16].

3. Results and Discussion

3.1. Geography of East Aceh District

Geographically, East Aceh District is located between 4˚09'21.08 "- 5˚ 06'02.16 North Latitude and 97˚15'22.07 " - 97˚34'47.22 "East Longitude with a wide range of altitudes, ranging 0 to 240 meters above sea level and a slope of 1 to 5 degrees, consisting of 24 sub districts, 513 villages, covering 60 settlements. East Aceh District area is 6040.60 km² or 10.53 percent of the total area of Aceh Province. The largest area is Serbajadi sub District that is 2165.66 Km² and the smallest is Darul Falah Subdistrict, covering an area of 42.40 Km². East aceh regency is strategic location because it is located in primary path (Medan – Banda Aceh) so that it is a potential area to be developed [1].

3.2. Potential of ruminant livestock development based on base areas

Ruminant livestock has economic value, not only utilizing its energy for working livestock but also a main business for breeders. Cattle is one of the livestock commodities developed in marginal areas in Indonesia, and has sufficient opportunities and potential to be developed with semi-intensive and rural-intensive business models, as well as a high contribution for farmers as an additional source of income [17]. In essence, the ultimate goal of beef cattle business is to obtain optimal profits [18].

The need for animal protein consumption continues to increase in line with the increase of Indonesia's population. One of the needs for animal protein can be fulfilled from large ruminants, namely beef cattle [19] and buffalo [20]. The government once launched the animal protein self-sufficiency grand design program to perfect the meat self-sufficiency program in 2014. The animal protein self-sufficiency grand design program includes the grand design of beef cattle and buffalo [21].

The population of cattle and buffalo in East Aceh District as shown in table 1 for ruminants, sub districts used as a base for cattle were Peudawa, Ranto Peurelak, Bireun Bayeum, Peureulak, Darul Aman, Nurussalam, Idi Rayeuk, Mandat while for sub-districts used as a base for buffalo, were Bireun Bayeum, Ranto Peureulak, Peureulak, Nurussalam, East Idi and Darul Aman. Sub-districts with great potential as a basis for cattle and buffalo development are Ranto Peurelak, Bireun Bayeum, Peureulak, Darul Aman, Nurussalam sub-districts. Bireun Bayeum and Ranto Peureulak sub-districts are very potential as the basis for cattle and buffalo development because they have the largest population of ruminants in East Aceh district.

3.3. Potential of beef cattle development based on forage sources

Feed is a main factor influencing the success of livestock business in increasing the body weight of livestock. Suherman and Kurniawan [22] stated that the development of livestock areas integrated with other sub-sectors can take advantage of by-products in the form of agricultural by-products. The introduction of forage protein sources (grass and legume) in grazing areas is important not only in providing cheap and easy feed but also guaranteed quantity and quality feed [23,24]. Adequacy of forage in terms of quantity and quality is the main requirement in breeding as well as increasing the population of cattle [25,26]. Utilization of agricultural by-products as alternative feed is one of solution to overcome the shortage of ruminant feed [27].
### Table 1. Population of beef cattle and buffalo by age and conversion to animal units (AU)

| Sub District       | Population of beef cattle (head)¹ | Weaned calves population (head)² | Weaning cattle population (head)³ | Population of young cattle (head)² | Adult population (head)² | Imported cattle population (head)² | Beef cattle population (AU) ³ | Buffalo Populations (AU)⁴ |
|--------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|--------------------------|-----------------------------------|-------------------------------|---------------------------|
| Serbajadi          | 8.00                             | 1.54                             | 2.07                             | 1.45                              | 2.15                     | 0.78                              | 5                            | 66.00                     |
| Simpang Jernih     | 391.00                           | 75.46                            | 101.07                           | 70.97                             | 105.14                   | 38.36                            | 230                          | 272.80                    |
| Peunarom           | 441.00                           | 85.11                            | 114.00                           | 80.04                             | 118.58                   | 43.26                            | 260                          | 142.56                    |
| Bireun Bayeur      | 10491.00                         | 2024.76                          | 2711.92                          | 1904.12                           | 2821.03                  | 1029.17                          | 6.177                        | 3.062.40                  |
| Rantau Selamat     | 963.00                           | 185.86                           | 248.94                           | 174.78                            | 258.95                   | 94.47                            | 567                          | 14.08                     |
| Sungai Raya        | 784.00                           | 151.31                           | 202.66                           | 142.30                            | 210.82                   | 76.91                            | 462                          | 72.16                     |
| Peureulak          | 7781.00                          | 1501.73                          | 2011.39                          | 1412.25                           | 2092.31                  | 763.32                           | 4.581                        | 2.145.44                  |
| Peureulak Timur    | 3483.00                          | 672.22                           | 900.36                           | 632.16                            | 936.58                   | 341.68                           | 2.051                        | 125.84                    |
| Peureulak Barat    | 994.00                           | 191.84                           | 256.95                           | 180.41                            | 267.29                   | 97.51                            | 585                          | 479.60                    |
| Ranto Peureulak    | 11198.00                         | 2161.21                          | 2894.68                          | 2032.44                           | 3011.14                  | 1098.52                          | 6.593                        | 1.259.28                  |
| Igi Rayeuk         | 1945.00                          | 375.39                           | 502.78                           | 353.02                            | 523.01                   | 190.80                           | 1.145                        | 343.20                     |
| Peudawa            | 30033.00                         | 5796.37                          | 7763.53                          | 5450.99                           | 8075.87                  | 2946.24                          | 17.683                       | 458.48                    |
| Banda Alam         | 773.00                           | 149.19                           | 199.82                           | 140.30                            | 207.86                   | 75.83                            | 455                          | 37.84                     |
| Igi Tunong         | 961.00                           | 185.47                           | 248.42                           | 174.42                            | 258.41                   | 94.27                            | 566                          | 79.20                     |
| Darul Ihson        | 988.00                           | 190.68                           | 255.40                           | 179.32                            | 265.67                   | 96.92                            | 582                          | 205.92                    |
| Igi Timur          | 931.00                           | 179.68                           | 240.66                           | 168.98                            | 250.35                   | 91.33                            | 548                          | 684.64                    |
| Darul Aman         | 4140.00                          | 799.02                           | 1070.19                          | 751.41                            | 1113.25                  | 406.13                           | 2.438                        | 597.52                    |
| Nurussalam         | 3901.00                          | 752.89                           | 1008.41                          | 708.03                            | 1048.98                  | 382.69                           | 2.297                        | 976.80                    |
| Darul Falah        | 979.00                           | 188.95                           | 253.07                           | 177.69                            | 263.25                   | 96.04                            | 576                          | 344.08                    |
| Julok              | 1256.00                          | 242.41                           | 324.68                           | 227.96                            | 337.74                   | 123.21                           | 740                          | 79.2                      |
| Indra Makmur       | 931.00                           | 179.68                           | 240.66                           | 168.98                            | 250.35                   | 91.33                            | 548                          | 19.36                     |
| Pante Bidari       | 700.00                           | 135.10                           | 180.95                           | 127.05                            | 188.23                   | 68.67                            | 412                          | 146.08                    |
| Simpang Ulim       | 967.00                           | 186.63                           | 249.97                           | 175.51                            | 260.03                   | 94.86                            | 569                          | 41.36                     |
| Mandat             | 2001.00                          | 386.19                           | 517.26                           | 363.18                            | 538.07                   | 196.30                           | 1.178                        | 53.68                     |

Total 60,040.00 11,587.72 15,520.34 10,897.26 16,144.76 5,889.92 35,350 11,707.52

¹ Livestock Service Office of [1]; ² data processing based on population and age according to the [13]; ³ processed data for total beef cattle population in livestock units according to [14], ⁴ data processed based on [16]

The provision of feed for ruminants can be done by using the by-products of agro-industry, plantation, agriculture, and horticulture so that breeders will get optimal benefits. The growth of ruminant livestock can be accelerated through the provision of good quality feed, in addition to utilizing local resources, especially those from agricultural, plantation and agro-industrial waste [2,28]. The availability of the by product of plantation, horticulture and agro-industry will reduce the problem of feed for farmers so that breeders will not experience difficulties. De Lima [29] states that agricultural waste or fibrous feed waste (straw) is an important component for providing ruminant animal feed. Sources of agricultural by-products are obtained from food crop commodities and their availability is influenced by the cropping pattern and harvested area of food crops in an area. Types of agricultural waste that can be used as a source of feed for ruminants are rice straw, corn straw, soy straw, peanut straw, cassava shoots and sweet potato straw. Table 2 shows the percentage of contribution of food crops by product as a source of feed (DDM ton/year) in East Aceh district. Abundant yields based on
the harvested area of the plant will affect to the by-products that can be used as ruminant animal feed. An increase in agricultural land area, it will contribute to increased agricultural waste production [30].

Table 2. Percentage and contribution of food crop by-products as a source of feed (DDM ton/year)

| Sub district | Rice | Gogo | Rice | Corn | Soy | Mung Bean | Peanuts | Sweet Potato | Cassava | Total waste production in tonnes (DDM/yr) | % |
|--------------|------|------|------|------|-----|-----------|---------|--------------|---------|------------------------------------------|----|
| Serbajadi    | 1,505.84 | 1,594.88 | 1,262.4 | 0 | 0 | 0 | 0 | 0 | 4,363.12 | 8.99 |
| Simpang      | 354.62 | 651 | 120.3 | 0 | 0 | 0 | 0 | 0 | 1,125.92 | 2.33 |
| Jerah        | 1,266.72 | 468.72 | 1,978.8 | 0 | 0 | 0.40 | 0 | 0 | 3,714.63 | 7.65 |
| Peunarun     | 729.96 | 17.36 | 141.9 | 15.51 | 0 | 0 | 0 | 0 | 904.73 | 1.86 |
| Bireun       | 318.78 | 231.00 | 16.8 | 0 | 0 | 0.40 | 5.74 | 9.90 | 582.62 | 1.30 |
| Bayeun       | 768.6 | 0 | 29.1 | 1.32 | 0 | 0 | 0 | 0 | 799.02 | 1.66 |
| Rantau       | 4,567.92 | 133.2 | 56.43 | 0 | 0 | 0 | 0 | 0 | 4,757.55 | 9.80 |
| Selamat      | 658.84 | 50.4 | 20.46 | 0.43 | 0 | 0 | 0 | 0 | 730.13 | 1.50 |
| Sungai       | 780.78 | 28.8 | 0 | 0 | 0 | 0 | 0 | 9.81 | 2,846.59 | 5.86 |
| Ranto        | 2,024.4 | 84 | 665.7 | 2.31 | 0 | 0 | 0 | 0 | 2,776.41 | 5.72 |
| Peureulak    | 4,567.92 | 133.2 | 56.43 | 0 | 0 | 0 | 0 | 0 | 4,757.55 | 9.80 |
| Timur        | 658.84 | 50.4 | 20.46 | 0.43 | 0 | 0 | 0 | 0 | 730.13 | 1.50 |
| Peureulak    | 2,807.98 | 28.8 | 0 | 0 | 0 | 0 | 9.81 | 2,846.59 | 5.86 |
| Barat        | 2,024.4 | 84 | 665.7 | 2.31 | 0 | 0 | 0 | 0 | 2,776.41 | 5.72 |
| Peureulak    | 552.58 | 0 | 6.6 | 0 | 0 | 0 | 0 | 0 | 559.18 | 1.15 |
| Peulawa      | 660.52 | 48.3 | 4.62 | 0 | 0 | 0 | 0 | 0 | 713.44 | 1.47 |
| Banda        | 810.32 | 114.9 | 40.92 | 0 | 0 | 0 | 0 | 0 | 966.14 | 2.00 |
| Alam         | 1,299.2 | 289.8 | 0 | 0 | 0 | 0 | 0 | 1,589.00 | 3.27 |
| Idi Tunong   | 408.8 | 189 | 22.44 | 0.43 | 0 | 0 | 9.84 | 630.52 | 1.30 |
| Darul Ihsan  | 256.48 | 216.6 | 38.61 | 0.43 | 0 | 5.77 | 9.84 | 527.74 | 1.09 |
| Idi Timur    | 1,430.38 | 154.5 | 14.52 | 0 | 0 | 0 | 0 | 0 | 1,599.40 | 3.29 |
| Aman         | 1,584.94 | 44.7 | 24.75 | 0 | 0 | 0 | 0 | 1,654.39 | 3.41 |
| Nurussalam   | 681.38 | 7.2 | 0 | 0 | 0 | 0 | 0 | 688.58 | 1.42 |
| Darul Falah  | 1,618.96 | 282.3 | 27.06 | 0 | 0 | 0 | 0 | 1,928.32 | 3.97 |
| Julok        | 564.9 | 168.6 | 88.77 | 0 | 0 | 0 | 0 | 0 | 822.27 | 1.69 |
| Indra        | 2,132.06 | 260.4 | 1,901.7 | 160.71 | 0 | 0 | 0 | 0 | 4,454.87 | 9.18 |
| Makmur       | 3,994.76 | 52.2 | 0 | 0 | 0 | 0 | 0 | 0 | 4046.96 | 8.34 |
| Pante        | 5,767.02 | 45.9 | 0 | 0 | 0 | 0 | 0 | 0 | 5,812.92 | 11.97 |
| Bidari       | 36,764.56 | 3,308.2 | 7,942.2 | 524.7 | 0.43 | 0.40 | 5.76 | 9.85 | 48,556.10 | 100 |

Source: Agricultural Office of East Aceh (processed data), 2017-2018

Table 2 shows that the potential by-products of food plants in producing animal feed in East Aceh District was 48,556,096 DDM tons/year. The total food crop waste production was mostly produced from rice at 40,072.76 DDM tonnes/year and the least comes from peanut was 0.40 DDM ton/year. The greatest potential for food availability from food plant waste was Madat subdistrict at 5812.92 tonnes/year DDM (11.97%) and the least amount was East Idi Subdistrict at 527.74 tonnes/year DDM (1.09%). The potential of food crop by-products is the ability of an area to produce animal feed in the form of food crop by-products that can meet the needs of a number of ruminant livestock populations not only in fresh but also dry form, without special processing. The residue of the food crops can usually be used as livestock feed. The production of food crop by-products depends on the area of harvest of the food crop. The potential amount is the potential for potential feed availability. The high production of food crop by-products affects the carrying capacity of an area. Thus it can be argued that the
production of by-products of food crops can assist in the provision of feed for ruminants, especially cattle and buffalo.

3.4. Beef cattle and buffalo populations and feed needs.

In line with the increasing population of ruminants, the need for forage from year to year is always increasing. On the other hand, the area of grazing area is decreasing. To overcome the shortage of grass or other forage, one of which is the use of agricultural by-products as animal feed. Thus, for the development of ruminants in an area, efforts should be made to utilize agricultural by-products, given the very limited supply of grass and other forages as feed.

| Sub Districts | Population of Beef Cattle | Need for beef cattle DDM (tonnes / year) | Buffalo Population | Need for buffalo DDM (tonnes / year) | Total DDM Needs (tonnes / year) | DDM Production (ton / year) |
|---------------|---------------------------|--------------------------------------|--------------------|-------------------------------------|-------------------------------|----------------------------|
| Serbajadi     | 4.71                      | 5.37                                 | 66.00              | 75.24                               | 80.61                         | 4,363.12                   |
| Simpang Jernih| 230.21                    | 262.44                               | 272.80             | 310.99                              | 573.43                        | 1,125.92                   |
| Peunaron      | 259.65                    | 296.00                               | 142.56             | 162.52                              | 458.52                        | 3,714.63                   |
| Bireun Bayune | 6,176.84                  | 7,041.60                             | 3,062.40           | 3,491.14                            | 1,0532.73                     | 904.73                     |
| Rantau Selamat| 566.99                    | 646.37                               | 14.08              | 16.05                               | 662.42                        | 582.62                     |
| Sungai Raya   | 461.60                    | 526.22                               | 72.16              | 82.26                               | 608.49                        | 799.02                     |
| Peureulak     | 4,581.26                  | 5,222.63                             | 2,145.44           | 2,445.80                            | 7,668.44                      | 4,757.55                   |
| Peureulak Timur| 2,050.70                 | 2,337.80                             | 125.84             | 143.46                              | 2,481.26                      | 730.13                     |
| Peureulak Barat| 585.24                   | 667.18                               | 479.60             | 546.74                              | 1,213.92                      | 2,846.59                   |
| Ranto Peureulak| 6,593.10                 | 7,516.14                             | 1,259.28           | 1,435.58                            | 8,951.72                      | 2,776.41                   |
| Idi Rayeuk    | 1,145.71                  | 1,305.49                             | 343.20             | 391.25                              | 1,696.74                      | 559.18                     |
| Peudawa       | 17,682.68                 | 20,158.25                            | 458.48             | 522.67                              | 20,680.92                     | 713.44                     |
| Banda Alam    | 455.12                    | 518.84                               | 37.84              | 43.14                               | 561.98                        | 966.14                     |
| Idi Tunong    | 565.81                    | 645.03                               | 79.20              | 90.29                               | 735.31                        | 1,589.00                   |
| Darul Ihsan   | 581.71                    | 663.15                               | 205.92             | 234.75                              | 897.90                        | 630.51                     |
| Idi Timur     | 548.15                    | 624.89                               | 684.64             | 780.49                              | 1,405.38                      | 527.73                     |
| Darul Aman    | 2,437.53                  | 2,778.78                             | 597.52             | 681.17                              | 3,459.96                      | 1,599.4                    |
| Nurussalam    | 2,296.81                  | 2,618.36                             | 976.80             | 1,113.55                            | 3,731.92                      | 1,654.39                   |
| Darul Falah   | 576.41                    | 657.11                               | 344.08             | 392.25                              | 1,049.36                      | 688.58                     |
| Julok         | 739.50                    | 843.03                               | 79.20              | 90.29                               | 933.32                        | 1,298.32                   |
| Indra Makmur  | 548.15                    | 624.89                               | 19.36              | 22.07                               | 646.96                        | 822.27                     |
| Pante Bidari  | 412.14                    | 469.84                               | 146.08             | 166.53                              | 636.37                        | 4,454.87                   |
| Simpang Ulim  | 569.35                    | 649.051                              | 41.36              | 47.15                               | 696.20                        | 4,046.96                   |
| Mandat        | 1,178.14                  | 1,343.08                             | 53.68              | 61.20                               | 1,404.27                      | 5,812.92                   |

Total | 35,350 | 40,299.06 | 11,707.52 | 13,346.57 | 53,645.63 | 48,556.10

To determine the capacity of livestock in an area, it is necessary to calculate the potential of feed amount to meet livestock needs in the form of agricultural waste conversion factors. This conversion factor can be obtained by calculating the main production of a commodity and its by-products, and its ability to support livestock production per unit of livestock [31].

As shown at table 3, the calculation of the population of cows and buffaloes and feed needs in East Aceh District namely the Serbajadi, Pante Bidari, Simpang Ulim, Peunaron, Simpang Jernih and Madat.
sub districts, Pante Bidari sub-district was very potential as a basis for cattle and buffalo development because it has the largest population of ruminants and sufficient feed needs in East Aceh district. According to the Directorate General of Animal Husbandry of the Republic of Indonesia [13], in principle, the development of integration of livestock into farming, both in food crops, horticultural crops and plantation crops, is to cultivate livestock without reducing productivity and plant activities. In fact, hoping that this integration can increase crop productivity as well as livestock production. the integration of livestock and plants aims to achieve a mutualism synergy leading to help reducing production costs.

4. Conclusion
The largest population of cattle is in Peudawa Subdistrict with 17,683 AU, the production of by-products of food plants is 713.44 tons/year and feed needs of 20,158.25 tons/year. The largest population of buffalo is in Bireun Bayeum Sub district, amounting to 3,062.40 AU, production of food crop by-products worth 904.73 DDM tons/year and feed needs 3,491.14 DDM tons/year. It was concluded that the insufficient need for food crop by-products could be surplus in other districts by using the by-products of plantation, horticulture and agro-industrial crops to support the SIWAB program in East Aceh district.

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