

Potential of Agricultural By-Product as Ruminant Feed in North Aceh District

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ABSTRACT

North Aceh District is one of the districts that produces ruminants and has great potential in the agricultural sector which will produce by-product so that it can be used as animal feed. The study was conducted from January to December 2018 in North Aceh district, Aceh Government. This study is a descriptive study. From the results of the study, it was found that the potential of agricultural by-product that could be used as feed was 5.145 rice (DDM / ton), peanuts 3.508, green beans 1.249, corn 261.530, cassava 146.332, soybean 145.420 and sweet potato 15.077 (DDM / ton). Almost sub-districts have the potential for by-product from rice plants except for the Nisamsubdistrict. Baktiya Subdistrict is the largest producer of by-product from cassava, rice and sweet potato plants with a percentage of 12.43. The second place was followed by Sawang sub-district with potential by product from soybeans, cassava, corn, rice, and peanuts with a percentage of 9.23 and in third place was Tanah Jambo Aye sub-district with potential by-product from peanuts, cassava, soybeans, corn, sweet potatoes and rice. the percentage of 6.59 and finally the Geureudong Pase sub-district with the potential of cassava, peanuts, green beans, rice and corn with a percentage of 0.86. It can be concluded that with the increasing population of ruminants, it will require alternative feed obtained from agricultural byproduct which has potential in all sub-districts of North Aceh District.

Keywords: Agricultural by-product, Feed, Ruminants, Digested Dry Matter

1. INTRODUCTION

Agricultural crops in addition to primary products also produce by-products by-products. From the aspect of animal feed, agricultural by-products can be sources of protein and high fiber materials. In North Aceh district, development in agriculture has become one of the priorities of the local government. Apart from being one of the rice barns and food buffer areas in Aceh Government. The area of productive agricultural land provides abundant harvests and is followed by agricultural by-products. Countries that have high demand for livestock products such as Japan, South Korea and Taiwan have increased the value of agricultural by-products by converting the by-products into animal feed [1].

The increase in the need for animal protein encourages livestock researchers to increase livestock productivity so that the availability of food, especially animal protein, is guaranteed. The availability of fluctuating feed and insufficient nutritional needs of

livestock to express their genetic potential to the fullest, causes livestock productivity to be relatively low [2]. One of the efforts to increase this is through the development of livestock in accordance with the available feed resources in an area.

Constraints related to the quality, quantity and sustainability of feed availability are caused by several factors, namely: climatic components, soil conditions, increasingly narrow land area and the dry season with high temperatures making plants for feed difficult to obtain, especially grass species. [3]. Provision of forage for ruminants is difficult due to land limitation for forage cultivation in order to an alternative forage is needed [4]. On the small scale farm, the cattle feed uncertainty forage types depend on fluctuations of feed availability which depends on the season [5]. Utilization of by-products is one alternative to increase the economic value of the by-products [6] directed to be able to optimize the use of local feed raw materials [7].

Agricultural by-products is cheap feed, a source that can be used as an alternative feed for ruminants [8]. Until now, the potential of agricultural by-products is still a product that has not been used, so it is necessary to study the possibility of its utilization as optimal feed. Failure to develop livestock populations in an area is usually the result of not taking into account the carrying capacity of available feed [9,10].

This paper aims to determine the potential of agricultural by-products as ruminant feed in North Aceh District. With the hope of providing information and input to farmers about the potential of agricultural by-products that can be used as feed in North Aceh District.

2. METHODS

2.1. Place and time of research

This research was conducted in North Aceh District, Aceh Province from January to December 2018. The data used is in the form of a literature study from several other literatures.

2.2. Research methods

The methods used are literature studies and secondary data analysis. The data required is secondary data from [11] and other reading sources related to this research. Secondary data needed in the form of natural resource potential to see how much contribution and availability as forage for ruminant livestock in the future. The data required consists of data on food crop production and ruminant livestock populations.

2.3. Data analysis

Quantitative and qualitative analysis used in the form of a series of calculations to obtain the availability of ruminant feed indicated by the carrying capacity of the area to accommodate a number of livestock populations seen from the availability of forage for ruminants. Total feed availability comes from the amount of natural forage feed and the amount of feed from agricultural by-product. The total feed requirement is the feed requirement of all ruminants in the area. Calculation of the amount of feed from agricultural production is as shown in **Table 1**.

3. RESULTS AND DISCUSSION

3.1. Geographical conditions of North Aceh district

North Aceh District is one of the regencies in Aceh Province which is located in a geographical position between 040 43' - 050 16' North Latitude and 96° 47' - 970 31' East Longitude. North Aceh District has an area

of 3,296.86 km² with its capital Lhoksukon covering 27 sub-districts, 852 villages and 70 mukim. Administratively, it is bordered by North Aceh District, to the north by Lhokseumawe City, to the south by Bener Meriah District, to the east by East Aceh District and to the west by Bireun District.

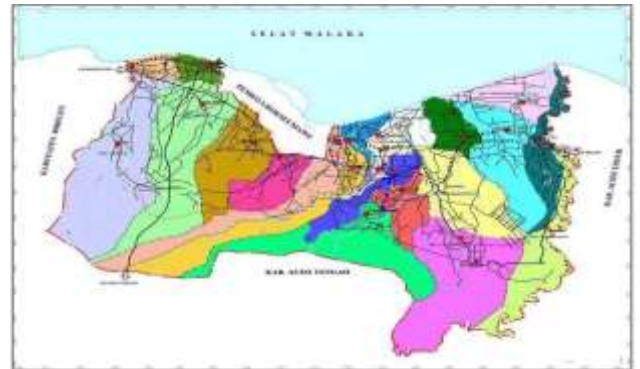


Figure 1. Map of North Aceh District. Source : [11]

In October 2001, three sub-districts in the North Aceh region, namely Banda Sakti District, MuaraDua District, and BlangMangat District were converted into Lhokseumawe City. This district was divided into two, namely North Aceh District and Lhokseumawe City.

3.2. Feed from agricultural crop by-products

Feed is a mixture of single feed ingredients or combinations, both processed and unprocessed, which is given to livestock for survival, production and reproduction [13]. Feed is one of the most important factors in a livestock business. Providing good nutrition accompanied by good management strategies can increase productivity [14]. On the other hand, the potential for local feed raw materials from agricultural by-products is mostly used as fuel, and industrial raw materials [15] which are of value to rice farmers if they know the benefits [16]. Forage demand could be fulfilled by utilizing abundant number of agriculture and plantation by-products which processed through feed technology [17]. Appropriate formula needs to be developed to sustain and maximize the utilization of the resource [18]. Optimization on the uses of by-product derived from agriculture, plantation and agro-industry could lower the cost and increased productivity [19,20, 21].

If the by-products is used properly and optimally, quality and cheap feed is obtained, so that it can increase the income of farmers, increase population and livestock productivity and open up business opportunities. [22, 23] have emphasized the utmost importance of using local feed resources as the key driving force to increase the productivity of animals. Based on **Table 2**, it can be seen that the potential for

agricultural by-products that can be used as feed is 5.145 rice (DDM/ton), 3.508 peanuts, 1.249 green beans, 261.532 corn, 146.332 cassava, 145.420 soybeans and 15.077 sweet potatoes (DDM/ton). High potential of rice straw was farmers in Southeast Asia, including Indonesia, produce approximately 80% rice in the world [24]. Almost all sub-districts in North Aceh District have the potential for by-products from rice plants except Nisam sub-district.

Baktiya District is the largest producer of by-products production from cassava, rice and sweet potato plants with a percentage of 12.43. The second place is followed by Sawang sub-district with potential by-products from soybeans, cassava, corn, rice, and peanuts with a percentage of 9.23 and in third place, Tanah Jambo Aye sub-district with potential by-products from peanuts, cassava, soybeans, corn, sweet potatoes and rice with the percentage is 6.59 and the last is Geureudong Pase sub-district with the potential of cassava, peanuts, green beans, rice and corn with a percentage of 0.86.

Figure 2 showed the population of large ruminants (cows and buffaloes) in North Aceh District from 2014-2018. The sub-districts that have the most cattle and buffalo are in Sawang, Cot Girek, and Baktiya sub-districts and all sub-districts have these livestock. Local cattle as a whole can adapt well to climatic conditions, limited feed and water [25]. Buffalo rearing with grazing patterns and integration patterns with food crops and plantations can be applied to increase the effectiveness of the use of feed and land resources [26]. The carrying capacity of feed continues to decline due to the development of livestock population and competition in land use for livestock business (grazing) with food crops, plantations, and housing [27,28]. With this system, it is able to suppress production inputs with the principle of reducing business risk through diversification so that the sustainability of land resources is better maintained, farmers are expected to be able to utilize by-products into feed raw materials that are cheap and easy to obtain in North Aceh District so as to reduce production costs for livestock business.

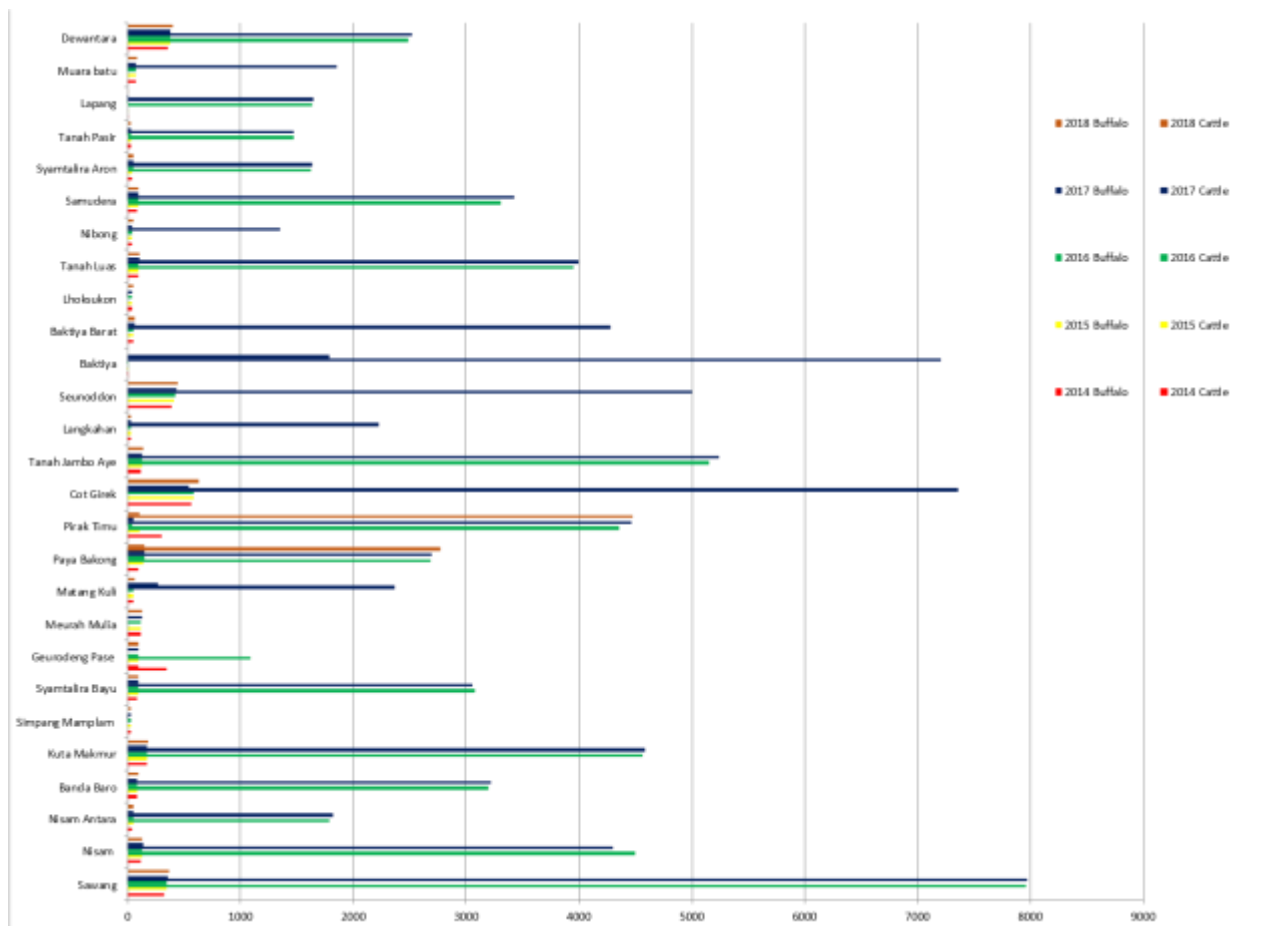


Figure 2. Livestock Population by Sub district and Kind of Livestock in Aceh Utara District, 2014 - 2018 .Sources : [11]

One of the priority programs the Aceh's Government in achieving food self-sufficiency is meat self-sufficiency, namely increasing the population of ruminants [29]. The territorial approach, the use of appropriate technology, applying new methods that are more efficient, productive and sustainable, is an effort to achieve the goal of livestock development in meeting the nutritional needs of the community [30]. The

4. CONCLUSION

The population increase program needs to be followed by the provision of quality feed throughout the year. The potential of agricultural by-product as ruminant feed in North Aceh district is located in Baktiya sub-district with a total by-products production of 710.871 (DDM tons/year), a percentage of 12.4 and

Table 1. Characterization of Agricultural by-product Feed

No.	Types of Agricultural by-product	Crop Production (Tons/yr)*	By-product Production (Tons/yr)	Digestibility	By-product Production (DDM/Tons)
(a)	(b)	(c)	(d)	(e)	(f)
1	Padi Sawah	-	(c)	0,14	(d) x (e)
2	Jagung	-	(c) x 2	0,15	(d) x (e)
3	Kedelai	-	(c) x 2	0,165	(d) x (e)
4	Kacang Hijau	-	(c) x 2	0,137	(d) x (e)
5	Kacang Tanah	-	(c) x 2	0,137	(d) x (e)
6	Ubi Jalar	-	(c) / 5	0,135	(d) x (e)
7	Ubi Kayu	-	(c) / 3	0,135	(d) x (e)
Total					Total.1

Source: [12]

Note: * = Condition of the research area (Secondary Data)

development of ruminants must of course take into account the availability of feed to meet the needs of life, including the condition of the area that is able to provide convenience to the fulfillment of facilities and infrastructure as well as ease of marketing production [31]. Yusriani [32] states that all of the supporting factors that exist do not affect individually but will interact with each other, so that appropriate policies can be taken in determining the development of a commodity based on regional potential. System policy development is oriented to rules that have been mutually agreed upon from various existing policies [33, 34]. The utilization of agricultural waste into animal feeds will encourage the development agribusiness in an integrated manner in an integrated production system with agriculture. Therefore, the excavation and exploration of local animal feed ingredients are essential to do. The community farmers consider utilizing agricultural waste as a source of forage feed because it takes into account the low price and abundant availability during the harvest season [35]. Also, things to consider in utilizing waste include chemical composition of feed ingredients, processing, preparation of rations, and livestock needs [36].

an area of 512 ha of grassland and Jambo Aye sub-district with a total by-products production of 376.653 (DDM tons /year), the percentage is 6.59 and the area of grassland is 106 ha which can accommodate the population of cattle and buffalo in North Aceh district. Other sub-districts in North Aceh District still have potential with by-products originating from plantations and other by-products. The processing of natural resources which initially only emphasized the aspect of production has been addressed by including the processing of by-products or wastes into something that has a use value.

Table 2 Potential total production of food crops (DMD ton/year) in north Aceh Regency, 2018

Sub District	Rice	Maize	Soybean	Greenbean	Peanut	Sweet potatoes	Cassava	Total Waste Production (DMD ton/yr)	%
Sawang	497.995	1.097	21.945	0	478.404	6.132	0	527.649	9.23
Nisam	296.012	31.826	28.311	251.806	0	3.504	0	359.905	6.29
Nisam Antara	0	3.950	11.347	340.308	1.114	10.519	810.675	63.633	1.11
Banda Baro	98.903	6.376	15.339	0	0	1.753	0	122.372	2.14
KutaMakmur	228.818	30.409	0	82.474	102.202	5.257	0	264.670	4.63
SimpangKramat	83.557	15.005	9.235	0	0	0	0	107.797	1.89
SyamtaliraBayu	303.236	6.336	8.934	209.884	0	7.003	0	325.721	5.70
GeureudongPase	34.574	12.686	0	84.392	93.434	1.751	0.00	49.190	0.86
MeurahMulia	264.680	303.9	0	0	0	6.131	0	271.116	4.74
MatangKuli	164.962	0	2.768	0	0	0	0	167.731	2.93
PayaBakong	58.230	41.505	9.174	0	0	0	0	108.911	1.90
PirakTimu	103.175	452.4	11.864	158.372	0	5.254	1.219	122.124	2.14
Cot Girek	93.370	9.508.5	100.65	41.374	43.840	1.751	0	104.816	1.83
Tanah Jambo Aye	337.248	7.107.9	9.386	0	44.936	17.546	5.319	376.653	6.59
Langkahan	208.305	28.285	0	0	544.164	7.881	0	245.016	4.28
Seunoddon	100.766	0	0	0	0	1.752	0	102.519	1.79
Baktiya	701.692	0	0	0	0	8.774	405	710.871	12.4
Baktiya Barat	222.370	0	3.652	0	0	874.8	0	226.897	3.97
Lhoksukon	311.261	1.506	9.621	0	422.234	13.141	1.629	337.582	5.90
Tanah Luas	189.043	21.681	3.391	0	523.34	35.918	1.220	251.778	4.40
Nibong	109.995	1.962	0	0	0	2.626	0	114.583	2.00
Samudera	164.157	1.808	0	0	49.046	4.380	1.221	171.617	3.00
Syamtalira Aron	90.607	150	0	0	0	1.750	0	92.507	1.62
Tanah Pasir	73.309	0	347.16	0	0	2.625	406.35	76.688	1.34
Lapang	67.090	0	0	0	0	0	0	67.090	1.17
Muarabatu	273.295	4.019	0	80.83	46.58	0	2.844	280.286	4.90
Dewantara	68.612	0	0	0	46.58	0	0	68.659	1.20
Total	5.145	261.530	145.420	1.249	3.508	146.332	15.077	5.718	100

Source: [11] and [12]

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