

# The Potential Side Product of the Oil Palm Plant as Animal Feed in Aceh Tamiang District, the Province of Aceh

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## ABSTRACT

The province of Aceh is one of the provinces that prioritizes the development of palm oil commodities for the plantation sector. In the development of oil palm, the secondary products that can be produced are in the form of oil palm fronds. One of the problems faced in the development of cattle is the availability of feed, especially in the dry season, the lack of knowledge of the farmers about the benefits of palm oil by-products. Meanwhile, consumers' demand for meat from time to time continues to increase along with population growth, economic development, awareness of nutrition, and education level. The method used in this study is a survey method consisting of primary data and secondary data. The results of the study for local cattle using palm frond silage can increase cattle body weight by 0.34 kg/head/day and 0.99 kg/head/day for Brahman cattle in Aceh Tamiang district. It showed that the potential of palm oil by-products has a great chance as a source of cattle feed in the hope of increasing population and meat production to meet consumer needs.

**Keywords:** *potential, animal feed, oil palm fronds, cattle*

## 1. INTRODUCTION

One of the priority programs the Aceh's Government in achieving food self-sufficiency is meat self-sufficiency, namely increasing the population of ruminants. The demand for meat increases from year to year. One form of livestock business that has great potential to be developed is beef cattle [1]. One of the causes of the failure to achieve the national beef self-sufficiency program is dependent on imported components of feed ingredients that make up the ration which is increasingly expensive and the availability of limited and unsustainable local feed amounts [2] and insufficient cattle population. Beef production is closely related to the availability of quality feed [3].

The provision of quality feed is closely related to land as a place for forage cultivation. There are challenges in developing ruminants, there is the availability of land as a source of forage for livestock. Existing agricultural land tends to experience shrinkage [4-5]. One alternative that can be done is by providing by-products from plantation crops derived from oil palm plants. [6] state that animal feed needs can be met by utilizing vegetation and industrial by-

products of oil palm plantations. The results of research by [7] showed that forage production under oil palm stands at the age of 3 and 6 years was 13,168 kg/ha and 6,380 kg/ha. Provision of feed sourced from oil palm fronds with the addition of concentrate significantly increases the PBBH of cows between 0.45 - 0.66 kg/head/day [8] and can improve farmers' welfare by increasing farmer income [9].

Aceh Tamiang Regency is one of the areas with great potential to become a center for oil palm development in Aceh Province which has a strategic location

directly adjacent to North Sumatra Province. Based on the availability of land, livestock, and human resources, Aceh Tamiang Regency has the potential to provide beef cattle to meet the needs of meat, but in reality, this market need has not been fulfilled optimally because of its low production capacity in terms of various limitations, including (a) availability feed especially during the dry season, (b) traditional management of beef cattle breeding, (c) farmer institutions that have not functioned optimally and (d)

a shift in the function of arable land as a source of ruminant feed. Farmers try to anticipate this by increasing land capacity such as planting superior grass, utilizing waste, and implementing crop patterns that can provide forage in the dry season [10]. Furthermore, [11] added that local cattle are able to consume high-fiber feed such as fresh forage and concentrate in large quantities, this feed material can be provided by oil palm plantations and by-products of oil palm plantations can be used as ruminant animal feed. According to the Indonesian [12], in principle, the development of integration of livestock into plantation crop farming is to cultivate livestock without reducing plant productivity and activity. In fact, it is hoped that this integration can increase crop productivity as well as livestock production. So that the integration of livestock and plants aims to achieve a mutually beneficial synergy (mutualism synergy) which in turn helps reduce production costs. Writing this paper aims to see the potential that exists in Aceh Tamiang District in providing oil palm by-products as animal feed.

## **2. MATERIALS AND METHODS**

### *2.1 Location and time of research*

The research was conducted from January to December 2018 in the District of Aceh Tamiang, Province of Aceh.

### *2.2 Types and Data Collection*

Determining the location of the research was carried out purposively with the consideration that some of the farmers in Aceh Tamiang District had used by-products of the plantation in the form of oil palm trees. The data analysis method used in this research is descriptive-analytical. This method is done by collecting the data from various sources, then compiling and analyzing it into information to explain [13]. The data obtained from the Animal Husbandry Government Office, Food and Horticulture Government Office, The Central Bureau of Statistics in the form of livestock population data and data on the area and production of oil palm plantations will then be calculated on the number of livestock units. Other supporting data relating to this research is obtained from study reports or studies and other literature sources.

### *2.3 Observed variables*

The observed variables include variables

The population of beef cattle in the sub-district in Aceh Tamiang district uses the livestock unit calculation. Data on beef cattle population was obtained from the Animal Husbandry Government Office of Aceh Tamiang district in 2018. Data on beef

cattle population is calculated based on the level of production (weaning, off weaning, young, adult, and imported beef cattle) that estimated value is based on the [14]. [14] states that the level 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 with an age > 1 year old has a composition of 25.85% of the population; (c) Young cows/ heifers with age 2-4 years have a composition of 18.15% of the population; (4) Adult cows age > 4 years old have a composition of 26.89% of the population; and (5) Imported cattle have a composition of 9.81%. Furthermore, the beef cattle population based on age was converted into Animal Units (AU) using the [15]. The unit value of beef cattle according to [15] is 0.25 AU for calves (weaning and off weaning), 0.6 AU (young cows) and 1.00 (adult cows and imported) as well as Production Per District and Production Per District oil palm trees [16]

## **3. RESULTS AND DISCUSSION**

### *3.1 Supporting Environment Potency*

Administratively, Aceh Tamiang District consists of 12 sub-districts, 213 villages, and 705 hamlets. Its geographic position lies in 97043'41,51' - 98014'45,41''EL dan 03053'18,81''- 040 32'56,76'' NA. The average temperature is 26°C with 80% humidity. [17] states that the ideal conditions for beef cattle farming are at 100 —270C and 60% - 80% humidity, hence this district is suitable for beef cattle development. Aceh Tamiang district is one of the potential areas in Aceh province for beef cattle development for its large agricultural land that consists of 16.238,00 ha farmland, 17.798,25 ha rain-fed area, 44.172 ha community estate crop, and 296,00 ha grazing area [16].

### *3.2 Beef Cattle Farming Conditions*

The cattle population in Aceh Tamiang District is 30141,75 LU that is managed under traditional in general. Farmers rely greatly on nature as the source of feed such as native grass from the grazing areas although few farmers add concentrate feed. Hence, cattle productivity in this district has been generally low. Quality feed availability is one of the main constraints in Aceh Tamiang to improve cattle productivity. Meanwhile, cattle play a significant role in Aceh Tamiang community as a ready to cash commodity and as a flexible saving. The importance of cattle for Aceh Tamiang people is shown by the relatively high cattle population in this district compared to another region in the province. Livestock population in an area reflects several dimensions such

as cattle development performance, adaptability of the animal to the local agro-ecology conditions, community acceptance and preference towards certain livestock, and significance of the animal in supporting the community economy.

[18] suggests that an intensive system for cattle farming is better than a semi-intensive system as it

eases farmers to look after the cattle and handier waste management for further use. Meanwhile, local cattle have a great potency as a source of meat as they have been adapted to high local temperature, able to utilize low quality feed with good reproduction performance. These potencies of local cattle can be optimized by management improvement.

**Table 1.** Cattle population based on age and conversion to livestock unit (LU)

Sub-district	Beef cattle population (head) <sup>1</sup>	Weaning cattle population (head) <sup>2</sup>	Weaned cattle population (head) <sup>2</sup>	Young cattle population (head) <sup>2</sup>	Mature cattle population (head) <sup>2</sup>	Imported cattle population (head) <sup>2</sup>	Beef cattle population (LU) <sup>3</sup>
Tamiang Hulu	2289,00	441,78	591,71	415,45	615,51	224,55	1347,71
Bandar Pusaka	971,00	187,40	251,00	176,24	261,10	95,26	571,70
Kejuruan Muda	6108,00	1178,84	1578,92	1108,60	1642,44	599,19	3596,24
Tenggulun	5134,00	990,86	1327,14	931,82	1380,33	503,65	3022,77
Rantau	3999,00	771,81	1033,74	752,82	1075,33	392,30	2354,51
Kota Kuala Simpang	27,00	5,2	6,98	4,90	7,26	2,65	15,90
Seruway	8378,00	1616,95	2165,71	1520,61	2252,84	821,88	4932,76
Bendahara	2956,00	570,51	764,13	536,51	794,87	289,98	1740,42
Banda Mulia	2585,00	498,91	668,22	469,18	695,1	253,59	1521,98
Karang Baru	5033,00	971,37	1301,03	913,49	1353,37	493,74	2963,30
Sekerak	411,00	79,32	106,24	74,60	110,52	40,32	241,99
Minyak Payed	3288,00	634,58	849,95	596,77	884,14	322,55	1935,89
Total	51194,00	9880,44	13233,65	9291,71	13766,07	5022,13	30141,75

Note: <sup>1)</sup> [16]; <sup>2)</sup> [14]; <sup>3)</sup> [15]

### 3.3 Conditions and Potency of Oil Palm Plantation

Oil palm plantation in Indonesia covers an area of 11,3 million ha with 14.898 ton/year production in average [19]. This gives a great potency to assist cattle development for feed source by using two approaches on: (1) utilizing weed and improved pasture as land cover in the plantation, and (2) utilizing by-product of oil palm processing [20] such as palm oil fronds, leaves, sludge and cake [21] as alternative cattle feed to substitute grass [22]. The feed formulation for cattle fattening and breeding using these oil palm by-products can be 45-65% fronds, 10-30% cake, dan 20-35% non-oil palm feed source [23] or 30-60% fronds, 38-70% cake, and 32% non-oil palm feed source [24]. Oil palm fronds from 1, ha land can supply one cattle [25-26], yet depend on the plantation and cattle age [27].

[28] cattle grazing under oil palm plantation system is favorable for plantation under five years old. Oil palm fronds are available throughout the year accompanying the fruit bunch harvest 1-2 fronds/tree/harvest. In this system, the frond production can reach 40-50 fronds/tree/year in an average weight of 4,5 kg/frond [29]. According to

[30], one ha oil palm plantation can produce 2,3-ton dry matter from the fresh frond. Nutrient content of oil palm fronds consists of 97,39 dry matter, 3,96% ash, 2,23% crude protein, 47,00% crude fiber, 3,04% crude fat, 76,09 % NDF, 57,56% ADF, 18,51% hemicellulose, 14,23% lignin, and 43,00% cellulose. Meanwhile oil palm fronds consist of leaves and midrib with nutritive value of N, K, P, Mg, Ca and S of 2,05%, 0,88%, 0,13%, 0,23%, 0,36% and 0,17% respectively and in the midrib of 0,37%,1,49%, 0,07%, 0,19%, 0,21% and 0,18% respectively [31]. Meanwhile, the lignin content of oil palm fronds reaches 20% of the dry biomass [32]. Young oil palm leaves is one of the preferable feed by cattle [33].

A number of previous research have been conducted on the utilization of oil palm leaves and fronds to substitute grass 100% on cattle and sheep. The results show that it provided a similar effect to grass-feeding when supplemented with mineral S and P and cassava leaves [34-35]. Meanwhile, provision of frond silage + concentrate was able to increase daily live weight gain of 0,34 kg/cattle/day [36] and 0,99 kg/cattle/day at Brahman cattle [37].

Figure 1 shows oil palm production in Aceh Province where five districts hold the highest

production including Nagan Raya (24,62 %), Aceh Singkil (17,88%), Aceh Tamiang (9,12%), Subussalam (7,20%) dan Aceh Timur (7,11%). These figures indicate that the district has a potency for further beef

cattle development. This shows that the district has great potential in the development of oil palm plants, seeing that all districts have oil palm plantations.

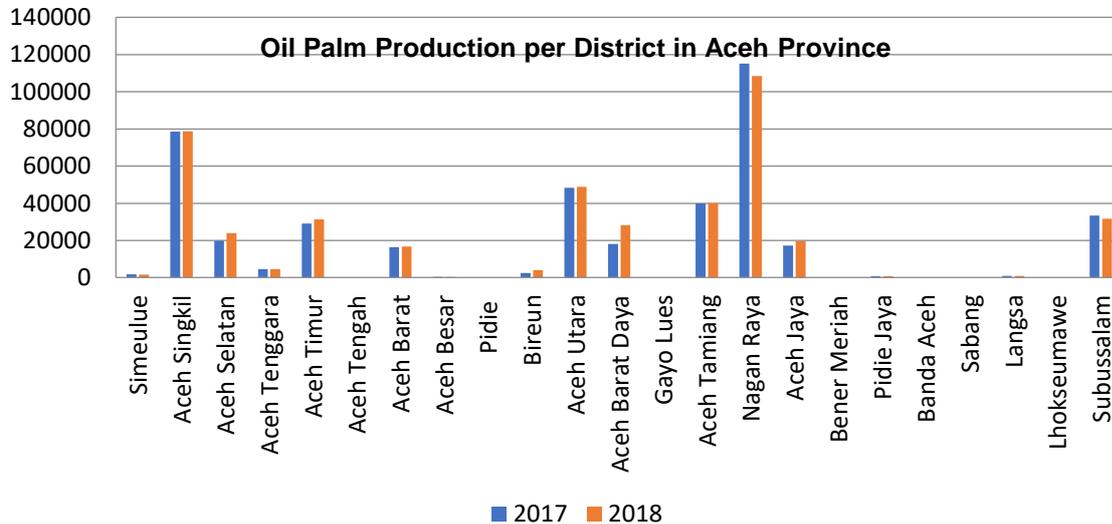


Figure 1: Oil palm production in Aceh Province

Oil palm production per district of Aceh Tamiang District. It can be seen that the sub-district of Kuala Simpang City has great potential for oil palm plantations, followed by Tamiang Hulu, Seruway, and Tenggulun. [38] explain that oil palm plantation development can reduce income inequality between groups of people and reduce economic inequality between districts/cities; creating economic multiplier effects and improving the welfare of rural communities, and exports of palm oil derivative products (CPO) can stimulate regional economic growth. The level of welfare felt by rural communities has had an impact on the development of plantations in the area, especially oil palm.

### 3.4 The potency of Human Resource as Supporting Factor

Human resource development is one of the key factors in supporting beef cattle development. This is because the quality of human resources determines the performance and output of beef cattle development in that region. A large portion of the Aceh Tamiang population relies on agriculture as the source of income. There are 130 farmer group associations with 466 field extension workers distributed evenly in 11 sub-district extension centers. These extension workers are expected to support beef cattle development through the introduction of innovation such as innovation of reproduction, feed and feeding management, housing, marketing, and group

organization. Moreover, Aceh Tamiang also has a Livestock Office that can assist in the processes of human capacity development such as increasing farmer skills and knowledge to improve their cattle farming enterprises. Another important human resource is veterinarian and paramedic staff related to reproduction technology development. There are 5 veterinarians and 11 para-medic veterinaries in Aceh Tamiang. With this situation, another supporting staff like an inseminator is required to support an artificial insemination program for beef cattle.

## 4. CONCLUSION

The results of the study for local cattle using palm frond silage can increase cattle body weight by 0.34 kg/head/day and 0.99 kg/head/day for Brahman cattle in Aceh Tamiang district. It showed that the potential of palm oil by-products has a great chance as a source of cattle feed in the hope of increasing population and meat production to meet consumer needs.

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