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AVAILABILITY AND UTILISATION OF OIL PALM BY-PRODUCTS AND WASTE AS BALI CATTLE FEED IN RIAU PROVINCE

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Abstract

It had been reported that the oil palm by-products and waste have potential to be used as cattle feed. There are about 1.4 million hectares of oil palm plantation and about 109,641 cattle and 1.29 million farmers involved in oil palm industry in Riau Province. However, the oil palm by-products and waste have not yet been commonly used as cattle feed. Therefore, the bionomic, socio-culture and annual reports of 8 regencies of Riau Province were examined to study the cause of low implementation in using the oil palm by-products and waste as Bali cattle feed in Riau Province. The results indicated that the oil palm by-products and waste had not been commonly used as cattle feed due to the technical-economic problems in collecting, processing and distributing the products. This leads to the use of oil palm by-products and waste for non-feed purposes or to be exported out of Riau Province. Therefore, the availability of the oil palm by-products and waste as Bali cattle feed in Riau is still considered unstable.

Key words: Oil Palm by-products-waste, Bali cattle, feed, Riau

Introduction

Oil palm by-product and waste, such as its leaves, frond, bunch trash, palm oil sludge, palm pressed fiber, and palm kernel cake have potential to be used as cattle feed (1). Nutritive value of these products as cattle feed have been reported by many (2, 3, 4, 5, 6, 7, 8).

Some of those products contain anti-nutritive factors that have to be eliminated or treated before they can be used as cattle feed. It has been reported that feeding excess palm kernel cake (PKC) damaged liver and kidney due to the high Cu content of the product (11-55 µg per gram dry matter) (9). This could be prevented by adding Zn (in the form of Zn sulfate) at 500 µg/g PKC (10).

There are about 1.4 million hectares of oil palm plantations, 109,946 cattle and 1.29 million farmers involved in oil palm industry in Riau Province (11). Theoretically, there should be abundant of oil palm by-products and waste that could be used as cattle feed. However, so far, oil palm by-products and waste had not yet been commonly used as cattle feed. Most of the Riau cattle farmers still depend on natural grass to feed their cattle. Therefore, there is low implementation of using oil palm by-product and waste as cattle feed in Riau Province. This is in contrary with the opinion of animal nutritionists and leads to the instability in securing of oil palm by-product and waste as cattle feed in Riau Province.

Based on this information, a research on the bionomics and socio-culture of cattle farming in the Riau Province was conducted to study the cause of the low usage of oil palm by-products and waste as cattle feed. The results of this research were expected to form the basis of the recommendation for a better utilisation of oil palm by-products and waste as cattle feed in Riau Province.
AVAILABILITY AND UTILIZATION OF ORGANIC PRODUCTS
AND WASTE AS FERTILIZER IN RURAL PROVINCES

Y. H. Wang

Introduction

The availability and utilization of organic products and waste as fertilizer in rural provinces have been discussed. The importance of organic farming and the role of waste as a natural resource are highlighted. The potential benefits of integrating organic waste into agricultural practices are also explored.

Key words: Organic products, waste, fertilizer, rural provinces.

One of the benefits of using organic products and waste as fertilizer is the reduction of chemical inputs in agriculture. This practice not only enhances soil health but also contributes to environmental sustainability. The integration of waste into agricultural systems can help reduce waste disposal costs and provide a valuable resource for farmers.

In rural provinces, the availability of organic products and waste can vary depending on local resources and infrastructure. The implementation of effective waste management practices is crucial for maximizing the benefits of using organic waste as fertilizer.

Some challenges in the utilization of organic products and waste as fertilizer include the need for proper management, the variability in waste composition, and the potential for contamination. Investing in education and training for farmers is essential to overcome these challenges.

The potential for profit is another advantage of using organic products and waste as fertilizer. The correct implementation of these practices can lead to increased crop yields and higher-quality produce, which can lead to better market prices.

In conclusion, the utilization of organic products and waste as fertilizer in rural provinces offers numerous benefits, including environmental sustainability, improved soil health, and potential economic gains. Further research and support are needed to promote the widespread adoption of these practices.
Method

The research was conducted between August and November 2009 by examining primary and secondary data/information of bionomics and socio-culture of cattle farming in the Riau Province. Eight regencies were selected in this study; they were the regency of Pelalawan, Bengkalis, Rokan Hilir (Rohil), Kampar, Siak, Rokan Hulu (Rohul), Indragiri Hulu, and Kuantan Singini. The data/information obtained were subjected to descriptive analysis. The configuration among the data/information was also studied.

In this study, the standard of "Animal Unit (AU)" was based on the report of Ishak Manti et al. (12), which was 1 Animal Unit of Bali cattle was similar to the Bali cattle body weight of 250 kg. Then, the digested dry matter requirement was set to be about 3% body weight (about 7.5 kg per AU of Bali cattle).

Data on the production level (in Ton), expected digested dry matter content (Ton), and Feed Potential of oil palm by-product were calculated and recorded. It was assumed that 60% on the oil palm by-products and waste produced was used as Bali cattle feed.

Results and Discussion

Data on the oil palm plantations and cattle populations in the eight regencies is presented in Table 1. There were no correlation between the area under oil palm plantation, oil palm production level, and cattle population among the 8 regencies. The largest area of oil palm plantation is at Pelalawan regency (181,836 ha); the highest oil palm production (2,514,061 Ton/year) and the most dense population of cattle are at Kuantan Singini regency (20,245 ekor).

Diwyanto et al. (1) reported that the weight ratio among oil palm frond (9292 kg), palm sludge (4,704 kg), bunch trash (3,680 kg), pressed fiber (2,880 kg), palm leaves (1,430 kg), and palm kernel cake (560 kg) produced per hectare of oil palm plantation. Liwang (13) reported the composition per 1000 kg (1 ton) of fresh fruit bunch as 250 kg palm oil, 294 kg palm sludge, 35 kg palm kernel cake, 180 kg palm pressed fiber, and 241 kg of other materials. Dry matter content of oil palm byproduct and waste were reported by Mathius et al. (14): 91.20% (bunch trash), 24.08% (palm solid), 91.83% (palm kernel cake), 93.11% (palm pressed fiber), 26.07% (palm frond), and 46.18% (palm leaves). It has been reported that dry matter digestibility of palm sludge was 70%, palm kernel cake was 70%, palm pressed fiber was 40%, palm frond was 60%, and palm leaves was 62% (15, 16, 17).

Based on the findings of these researchers, the production levels of the oil palm by-product and wasted at the 8 regencies were predicted. The results are presented in Table 2.

Table 2 shows that there were a tremendous amount of palm frond, palm solid, bunch trash, palm pressed fiber, palm leaves, and palm kernel cake produced every day. To be utilised as cattle feed, these products still need to be processed with either physical, chemical or biological treatment to ensure elimination of their anti-nutritive factors or to be supplemented with additional nutrients. To be treated, these products have to be collected and transported to the treatment center. Extra effort and infrastructure that are suitable for the Riau Province condition (which is mainly peat soil) are needed. The oil palm by-products and waste must arrived at the treatment centers at quantity and quality that is suitable and economical to be processed.
Table 1. Profile of the 8 regencies of Riau Province

<table>
<thead>
<tr>
<th>No</th>
<th>Regency</th>
<th>Area (km²)</th>
<th>Population</th>
<th>Area of Oil Palm Plantation (ha)</th>
<th>Oil Palm Production (Ton/year)</th>
<th>Cattle Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pelalawan</td>
<td>12,490</td>
<td>276,353</td>
<td>181,836</td>
<td>328,392</td>
<td>2,521</td>
</tr>
<tr>
<td>2</td>
<td>Bengkalis</td>
<td>12,044</td>
<td>738,996</td>
<td>110,006</td>
<td>680,231</td>
<td>7,395</td>
</tr>
<tr>
<td>3</td>
<td>Rokan Hilir</td>
<td>8,961</td>
<td>510,857</td>
<td>80,764</td>
<td>94,823</td>
<td>7,419</td>
</tr>
<tr>
<td>4</td>
<td>Kampar</td>
<td>10,928</td>
<td>615,517</td>
<td>54,275</td>
<td>114,117</td>
<td>11,234</td>
</tr>
<tr>
<td>5</td>
<td>Siak</td>
<td>8,556</td>
<td>318,585</td>
<td>131,876</td>
<td>2,490,582</td>
<td>12,765</td>
</tr>
<tr>
<td>6</td>
<td>Rokan Hulu</td>
<td>7,450</td>
<td></td>
<td>127,808</td>
<td>1,394,134</td>
<td>15,820</td>
</tr>
<tr>
<td>7</td>
<td>Indragiri Hulu</td>
<td>7,676</td>
<td>328,003</td>
<td>17,238</td>
<td>208,482</td>
<td>18,928</td>
</tr>
<tr>
<td>8</td>
<td>Kuantan Singingi</td>
<td>5,295</td>
<td>314,040</td>
<td>174,130</td>
<td>2,514,061</td>
<td>20,245</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>73,402</td>
<td>877,933</td>
<td>1,340,000</td>
<td>13,547,250</td>
<td>96,327</td>
</tr>
</tbody>
</table>

Riau Province: 111,229, 5,070,952, 1,340,000, 13,547,250, 106,941


Table 2. The production level of oil palm by-products and waste

<table>
<thead>
<tr>
<th>No</th>
<th>Regency profile</th>
<th>Palm fruit</th>
<th>Palm frond</th>
<th>Palm sludge</th>
<th>Bunch trash</th>
<th>Palm fiber</th>
<th>Palm leaves</th>
<th>Palm kernel cake</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Production level (Ton)</td>
<td>Digestible dry matter production (Ton)</td>
<td>Feeding Capacity (AU=Animal Unit)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Per year</td>
<td>7,824,82</td>
<td>4,544,265</td>
<td>2,300,498</td>
<td>1,799,709</td>
<td>1,408,468</td>
<td>699,343</td>
<td>273,869</td>
</tr>
<tr>
<td>2</td>
<td>Per day</td>
<td>21,438</td>
<td>12,450</td>
<td>6,303</td>
<td>4,931</td>
<td>3,859</td>
<td>1,916</td>
<td>750</td>
</tr>
<tr>
<td>3</td>
<td>Per year</td>
<td>710,814</td>
<td>387,772</td>
<td>656,534</td>
<td>524,570</td>
<td>200,233</td>
<td>176,046</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Per day</td>
<td>1,947</td>
<td>1,062</td>
<td>1,799</td>
<td>1,437</td>
<td>549</td>
<td>482</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cattle carrying capacity</td>
<td>155,795</td>
<td>84,991</td>
<td>143,898</td>
<td>114,974</td>
<td>4,389</td>
<td>38,585</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Total</td>
<td>542,632 (5.07 times recent population)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This processed oil palm by-product and waste that were suitable for cattle feed, then have to be distributed to the consumers (cattle farmers) who live all over the Riau Province (over 111,229 km²). So far, no person or company has applied to be involved in this activity.

Total of expected feeding capacity of oil palm by-product and waste was 542,632 AU; which is about 5 times or 500% of the present cattle population (106,941 cattle). Therefore, the cattle population in Riau Province may still be increased.
Most of the palm oil factories are located near to the prime transportation facilities (the Provincial road or the river). Based on the data in Table 2, these factories produced about 18,000 Tons of oil palm by-product and waste every day. The accumulation of the oil palm by-product and waste could create environmental problem (1). To avoid this, the palm oil factories use the oil palm by-product or waste as source of energy to operate their turbine and boiler, or export them outside of Riau Province. About 70% of the oil palm plantation products was exported as CPO (11).

Oil Palm plantation in Riau Province is a monoculture plantation. Therefore, the maintenance of the arability of the land is the responsibility of the operator of the plantation (not naturally). The advantage of this system is that the operation can regulate it according to his need or agenda. The disadvantage of this system is that it requires high operational cost.

Oil palm plantations in Riau province comprise of state, private, and farmer plantations. The state and private plantation, which have sufficient capital, can bear the fertilization cost. However, most of the farmer plantations are not able to pay the cost due to their limited capital. This condition leads to poor production performance and the plantations being more susceptible to plant diseases. This in turn leads to unreliable availability of oil palm by-products and waste as cattle feed in Riau province.

Conclusion
It can be conclude that the oil palm by-products and waste have potential to be used as Bali cattle feed in Riau province. However, due to the technical and economical problems in collecting, processing and distributing the by-products, most of the cattle farmers had not yet used them as cattle feed. Most of the by-products were used either as fertilizer, or as source of energy for operating the turbine and boiler in the palm oil factory, or were exported outside the Riau province. Therefore, the availability of oil palm by-products and waste as Bali cattle feed in the Riau province is considered unstable.

References


