Integration Systems Of Cattle With Palm Oil Estate In East Kalimantan Province, Indonesia

by Akas Pinaringan Sujalu

Submission date: 15-Jan-2024 01:55AM (UTC-0500)
Submission ID: 2271232298
File name: theijes-C13012225.pdf (213.08K)
Word count: 3190
Character count: 17082

The International Journal of Engineering and Science (IJES)
|| Volume || 13 || Issue || 1 || Pages || PP 22-25 || 2024 ||
ISSN (e): 2319 – 1813 ISSN (p): 2319 – 1805

Integration Systems Of Cattle With Palm Oil Estate In East Kalimantan Province, Indonesia

Akas Pinaringan Sujalu[1], Abdul Patah[1] and Akas Yekti Pulihasih[2]
[1]*Facuty of Agriculture, University of 17 Agustus 1945 Samarinda, East Kalimantan, Indonesia 75124*
[2]*Faculty of Health, Nahdlatul Ulama Surabaya University, Est Java, Indonesia*

----------ABSTRACT----------
Integration of cattle with oil palm is a potential crop-livestock farming system to be developed in Indonesia because it is supported by an oil palm plantation area of around 7 million hectares and good adaptability of cattle. SISKA eases the work of harvesters in collecting fresh fruit bunches (FFB) thereby increasing the work ability of harvesters from 10 ha to 15 ha. Cattle produce manure that has the potential to be used as compost (fertiliser) to reduce the use of chemical fertilisers and production costs. Palm oil plantation by-products (fronds, leaves, grass, solid, palm kernel cake) can be utilised for animal feed. The potential development of cattle in East Kalimantan integrated with oil palm with the assumption of two cattle per hectare, so that 615,176 cow can be developed for the current producing oil palm land area of 307,588 hectares. The development of an integration programme of oil palm with cattle in East Kalimantan has a very prospective opportunity and potential, especially when viewed from the aspect of the area of oil palm plants and the demand, needs and availability of cattle that continue to increase.
Keywords: *Palm oil waste, palm oil industry waste, Integration, Oil Palm Plantation, Cattle*

Date of Submission: 01-01-2024 Date of acceptance: 10-01-2024

I. INTRODUCTION

Cattle farming around oil palm plantations started in the form of free grazing to utilise the availability of forage in the form of weeds at the bottom of oil palm plants. Cattle fattening can reduce weed growth by up to 77%, thereby saving weed control costs in oil palm plantations. Beef cattle farming or fattening of beef cattle can be carried out in cages fed with grass taken from the oil palm plantation and chopped oil palm fronds. At this stage, farmers will earn income from cattle sales and reduce costs for weed control in oil palm plantations.

In accordance with the Letter of the Ministry of State-Owned Enterprises (BUMN) No. S-50/D1.MBU/2012 dated 22 February 2012 on Cattle Farming Integration Patterns in Oil Palm Plantations and Letter of the Minister of BUMN No. S-240/MBU/2012 dated 09 May 2012 regarding the Assignment of the Implementation of the Oil Palm Cattle Integration Programme called the BUMN Sasa or SISKA programme. The Minister of BUMN has an extraordinary target, requiring all palm oil PTPNs to raise cattle by setting a target of 100,000 cattle in 10 palm oil PTPNs.

BUMN need about 200,000 calves each year. The calves will be brought to Sumatra to be placed into oil palm plantations. The Indonesian government wants the 100,000-Cattle programme to be extended to eastern Indonesia. The Ministry of Agriculture noted that palm oil - cattle integration until 2012 existed in 19 areas spread across the 12 provinces. In general, each district is targeted to contribute an additional 10,000 cattle. In 2020, 12500 cattle have been realised, spread across PTPN III, V, VI and IX. To monitor the progress of these activities, the Ministry of BUMN - PTPN collaborates with the Research and Development of Animal Husbandry and the Directorate General of Animal Health of the Ministry of Agriculture as technical assistants. The development pattern of oil palm - cattle integration is directed 70% for fattening and 30% breeding / breeding. BUMN need about 200,000 calves each year. The calves will be brought to Sumatra to be placed into oil palm plantations. The Indonesian government wants the 100,000-Cattle programme to be extended to eastern Indonesia. The Ministry of Agriculture noted that palm oil - cattle integration until 2012 existed in 19 areas spread across the 12 provinces. In general, each district is targeted to contribute an additional 10,000 cattle. In 2020, 12500 cattle have been realised, spread across PTPN III, V, VI and IX. To monitor the progress of these activities, the Ministry of BUMN - PTPN collaborates with the Research and Development of Animal Husbandry and the Directorate General of Animal Health of the Ministry of Agriculture as technical assistants. The development pattern of oil palm - cattle integration is directed 70% for fattening and 30% breeding / breeding.

II. MATERIALS AND METHODS

This study used the results of the analysis of palm oil processing waste products presented by Mathius et al (2005), as follows:.

Table 1. Estimated Support Capacity of Palm Oil Waste and Palm Oil Industry Waste (Ha)

No	Biomassa	Fresh (kg)	Dry (%)	Dry (kg)
1	leaves without sticks	1.430	46.18	658.0
2	Fronds	6.282	26.07	1.640
3	squeezed fibre (coir)	2.880	93.11	2.681
4	sludge (solid)	4.704	24.07	1.132
5	Palm kernel meal	569	91.83	514.0

Source: General Guidelines for Integration of Crops and Ruminants, (2012) with the assumption that 1 Ha, 130 trees, 1 tree can provide 22 fronds per year, 1 frond, weight 2.2 kg (only 1/3 part is utilised), leaf weight per frond 0.5 kg. Every 1,000 kg of FFB produces: 250 kg of palm oil, 294 of palm sludge, 180 kg of pressed fibre and 35 kg of palm meal.

III. RESULT AND DISCUSSION

1. Result

Table 2. Estimation of waste from oil palm plantation and palm oil processing

No	Livestock Feed Ingredients	Analysis hectare year[-1]	Sum of Dry Weight
1	Frond Leaf	23 leaf x 7 kg x 18.083,52	36%
2	Palm kernel meal (PKM)	22 ton FFB x 2.3% PKM x 470.58	93%
3	Palm Sludge	22 ton FFB x 5% sludge x 264.88	24.08
Total		18.818.9	

Source: The capacity of cattle in 1 ancak (15 ha) from the components of fronds, leaves, and grass is 23 units of adult cattle. A scale of 1 Cattle without taking labour costs into account gives an R/C of 2.37; NPV of Rp.2,241,00; and IRR of 37.3%. The scale of 3 Cattles with labour costs taken into account gave an R/C of 2.46; NPV of Rp.7,324,000 and IRR of 39%; furthermore, the scale of 6 Cattles + 1 male showed a commercial enterprise with an R/C of 3.13; NPV of Rp.22,425,000 and IRR > 50%.

2. Discussion

The main and by-products of oil palm plantations (sa′ diyah, 2013) are as follows:
- Main products of oil palm: Crude Palm Oil (CPO) and Kernel Oil (PKO)
- Palm oil processing by-products:
Palm Press Fibre (PPF): palm fruit fibre is the residue of palm fruit juice,
Palm Sludge (PS): palm sludge is the liquid left over from palm oil processing,
Palm Kernel Cake (PKC): palm kernel cake is the residue of palm kernel extraction.
- Oil palm plantation products:
Oil Palm Fronds (OPF): palm fronds.
Empty Fruits Bunch (EFB): empty fruit bunches or castrated bunches.
- Plantation land products: Intercrop forage products (HAT)

Crop-livestock integration systems combine crop farming systems with livestock farming systems in a synergistic manner to form a system that is effective, efficient and environmentally friendly. With such integration, new centres of livestock growth will be created where livestock commodities may be the sole or only supporting livestock commodities (mix faming). Broadly speaking, integration related to the livestock production system is divided into two systems, namely:

a. A solely livestock-based production system where around 90% of the feed ingredients are generated from the onfarm, while the income from non-livestock activities is less than 10%.

b. Mixed farming system where livestock utilise feed from crop residues.

Integrated crop-livestock systems are characterised by interdependence between crop and livestock activities (resource driven) with the aim of optimal recycling of locally available nutrient resources (Low External Input Agriculture System or LEIAS). Less integrated systems are characterised by crop and livestock activities that utilise each other, but are not dependent on each other (demand driven) because they are supported by external inputs (High External Input Agriculture System or HEIAS) (Directorate General of Livestock, 2010). On the other hand, production costs have increased due to higher fertiliser prices, higher labour costs and higher supply of fresh fruit bunches (FFB) to the mill, which has resulted in lower selling prices. Diversification of oil palm plantation businesses that are integrated with other businesses needs to be done to reduce the volatility of price changes. One of them is the integration of oil palm plantations with cattle farms.

2.a. Integration of Cattle and Oil Palm

The integration of cattle with oil palm that can be done by farmers generally fills the niche of integrated or semi-commercial farming systems. This is because integration can only be done by farmers who own oil palm land and cattle. In terms of control of production capital, farmers implementing cattle and oil palm integration are relatively better off than subsistence farmers. Farmers who own/maintain plantations can integrate their plantations as their main source of income with cattle assisted through soft credit by plantation companies (for plasma farmers) or through government programmes (smallholders). The abundant plantation crop waste can be used as feed for the cattle, while the cattle can provide labour and organic fertiliser for the crops. Through the above pattern, the efficiency of the plantation business increases through the reduction of chemical fertilisers because they have been substituted by organic fertilisers that can be processed from Cattle dung and transportation costs become cheaper because they can use cattle as labour, especially from hard-to-reach plantation locations. Thus, the problem of waste, both from cattle and from farms/factories can be resolved.

2.b. Cattle-Palm Oil Integration System (SISKA)

According to Ruswendi et al (2009), feeding 1.3 kg/head/day of solid feed (dried palm mud) and 1.5 kg/head/day of palm fronds showed that the productivity of fattened Bali cattle was almost 2 times better than Bali cattle fed only with forage, which showed a daily weight gain (PBBH) of 0.267 kg/head/day versus 0.139 kg/head/day, respectively. This is reinforced by Sudaryono et al (2009), that PO cattle fed 5 kg/head/day of solid feed and forage have a weight gain of 0.378 kg/head/day higher than cattle consuming forage feed alone (0.199 kg/head/day), in addition to labour efficiency in finding forage feed reaching 50%.

The results of research conducted by BPTP Palangkaraya in 2005 with a sample of 25 Madura cattle (10 fattening cattle) with a loose-cannon system and additional palm "solid" feed, showed an average weight gain of 800 gr / head / day compared to the control only increased by 3.3 grams / head / day.

President Director of PTPN VI Iskandar Sulaeman said that BUMN Sasa or allowing by-products of oil palm plantations to become animal feed, even palm meal can replace soybeans which are generally used to make conventional cattle feed. For cattle feed, it can save around Rp 1,800-2,800 per kilogram. Conventional feed costs around Rp 3,000-4,000 per kilogram, while feed processed from palm oil waste costs only Ro 1,200 per kilogram.

Until 2013, PTPN VI developed this palm-Cattle integration on its 2,000 hectares of oil palm land in Muhajirin Village, Muarojambi District, Jambi, with a total of 2,000 Cattles. About 400 of these Cattles are productive females. The current oil palm land area is around 8.9-9 million hectares. Therefore, if oil palm-cattle integration is properly implemented, the total land area of 9 million hectares means that the cattle population in Indonesia could reach 18 million cow. If this happens, there will be no need for imports.

2.c. BUMN Programme SASA or SISKA in East Kalimantan

The development of an integration programme between oil palm and cattle in East Kalimantan has very prospective opportunities and potential, especially when viewed from the aspect of the extent of oil palm plantations and the increasing demand, needs and availability of cattle. Especially with the priority development programme of One Million Hectares of Oil Palm, this business activity is certainly very open to the community, in order to improve welfare.

In this integration pattern, oil palm plants are the main component, while livestock are a complementary component. Palm oil waste can be utilised by livestock as feed including palm fronds, palm mud and palm kernel cake. Some research results state that palm fronds contain 1.9 % protein, 0.5% fat and 17.4% lignin. The combination of fruit fibre (25%), BIS (15%) and palm sludge (10%) with a total contribution of 50% can be used for cattle.

Besides utilising oil palm waste, integrated cattle can eat weeds around the oil palm plantation. Leguminous or cover crops can produce forage equivalent to 5-7 ton. Oil palm cover crops can be utilised as forage, such as *Callopogonium mucunoides, Centrocema pubescent, Pueraria javanica, Psophocarpus palustris, Callopogonnium caerulium* and *Muchuma cochinensisc*.

Some of the research results that have been conducted show:

1. The adoption rate of palm oil waste utilisation in Brahman cross cattle with intensive rearing system is relatively slow,
2. Palm oil sludge (solid decanter) and palm kernel cake have great potential as local feed sources considering their nutritional content is adequate, abundant, and continuity is guaranteed,
3. The main problem of introducing palm sludge to farmers is that the location of the palm sludge producing plant is relatively far from where they live, and Cattles need to adapt to eating solid (must be trained first).

4. The main problem with the introduction of beef cattle rearing technology in oil palm plantation areas is the additional time to look after the cattle because the cattle business is fully the responsibility of the head of the family.

2.d. Institutional Support for the SISKA Programme

The Ministry of Agriculture will optimise the SKA that can be utilised for upstream, cultivation and downstream agribusiness businesses for food crops, horticulture, plantations and livestock commodities. The credit scheme can be utilised in combination with other sources of financing such as KKP, Taskin Agribusiness Credit, Venture Capital, BUMN Profit, Commercial Credit from Banks such as Small Business Credit from BNI, Bank Danamon, BII, Bank Mandiri, BCA Credit, Small and Micro Entrepreneur Credit (KPKM) from Bank Niaga, Working Capital credit from Bank Agro Niaga, and the utilisation of rural MFIs. SKA of Rp. 12.4 trillion is at commercial interest rates as a commitment by banks to agribusiness development. The Department is proposing a 5% government subsidy on interest.

For 2021, the BANSOS package for livestock procurement was funded through the APBN DIPA of the Livestock Sub-Sector and no livestock procurement was allocated in the DIPA of the Plantation Sub-Sector. Meanwhile, packages for the procurement of frond choppers, biogas equipment, improvement of farmers' skills and other equipment are provided through the APBN of the Plantation sub-sector. The cost of socialisation, supervision and other operations at the provincial level is provided through the APBN sub-sector of Plantation, while at the district level it is expected to be sourced from APBN funds at the provincial level, APBD and or farmers' self-help and other possible sources of funds.

To succeed the Government's programme, especially in the agricultural equipment industry programme, PT MBI supports and succeeds by providing palm frond crushing machines that will be used for livestock forage feed. Available model 1000 S (Shreader) for 35-50 Cattles with a capacity (output) of 1.5 to 2 tonnes per day, this tool is driven by a 10.5 hp yanmar diesel. For the MPC 2500 S model, with a capacity of 4 to 5 tonnes per day can meet the needs of 150 - 300 cow.

IV. CONCLUSION

Efforts to utilise oil palm plantation waste to increase livestock productivity will be more easily achieved through partnerships with the private sector (oil palm plantations) and the government, either in the form of plasma-core or in the form of rolling cattle assistance for fattening, provision of credit for livestock production, and free solid assistance. In addition, a gaduh or profit-sharing system can be implemented with people who own cattle but do not have oil palm plantations. The potential for cattle development in East Kalimantan integrated with oil palm with the assumption of two cattle per hectare, at least 615,176 cow can be developed for the current producing oil palm area of 307,588 hectares. The oil palm-cattle integration programme can support the beef self-sufficiency programme in East Kalimantan and even nationally. In addition, this programme can be used to meet the energy needs of communities around the plantation with biogas technology.

REFFERENCE

[1]. Anonymous. 2005. Prospects and Directions of Cattle Agribusiness Development. Jakarta - Department of Agriculture.
[2]. Batubara, A., I. Kasup, A. A. Kesma. A. Irfan, H. Simanjuntak and Harahap. 1999. Study on the Integration of Beef Cattle Fattening in Oil Palm Plantation.
[3]. Daim, Chamidun. 2003. Partnership Development and Funding Support in Plantation Sector. IPB. Bogor.
[4]. Plantation Service of West Sumatra Province. 2013.Annual Report of Plantation Service of West Sumatra Province in 2013. Padang.
[5]. Directorate General of Plantation. 2011. Plantation Statistics 2009-2011. Secretariat of Directorate General of Plantation.
[6]. Directorate of Animal Feed. 2012. General Guidelines for Crop-Ruminant Integration in 2012. Jakarta.
[7]. Livestock Service Office of East Kalimantan Province (2019). Spurring Beef Production. Retrieved from Spurring Beef Production website: https://peternakan.Kalimantan Timurprov.go.id/articles/spurring-beef-production
[8]. Edwina, S., & Maharani, E. (2014). Study of the Characteristics and Knowledge Level of Farmers about the Cattle and Oil Palm Integration System (Siska) in Pangkalan Sub-district
[9]. Ishak, A. (2010). Potential development of smallholder cattle and oil palm integration system in bengkulu province, 1-9.
[10]. Lembaga Usaha wantani Malaysia (2007). Livestock-Ruminant Integration. http://iklancentre.com/usahawantani. (14 January 2008)
[11]. Matondang, R. H., & Talib, C. (2015). Integrated Bali Cattle Development Model Under Oil Palm Plantation. Indonesian Bulletin of Animal and Veterinary Sciences, 25(3), 147-157. https://doi.org/10.14334/wartazoa.v25i3.1159
[12]. Rostini, T., Djaya, S., & Adawiyah, R. (2020). Analysis of Forage Vegetation in Cattle and Oil Palm Integration and Non-integration Areas. Indonesian Journal of Animal Science, 15(2), 155-161. https://doi.org/10.31186/jspi.id.15.2.155-161
[13]. Sani, L. A., Munadi, L. M., Antus, M. R. Y., & Hadini, M. A. P. H. A. (2021). Potential of Bali Cattle Business Integrated with Oil Palm Plantation in Wiwirano District, North Konawe Regency. 3(1), 1-8.
[14]. Sitompul, D. (2003). Design of plantation development with Balinese cattle integrated business system. Proceedings of the National Workshop on Oil Palm-Cattle Integration System, 81-87.

Integration Systems Of Cattle With Palm Oil Estate In East Kalimantan Province, Indonesia

ORIGINALITY REPORT

4%	4%	4%	0%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

5%

★ F R L Silalahi, A Rauf, C Hanum, D Siahaan. "Potential of beef and biogas from integration of beef cattle-oil palm in Indonesia", IOP Conference Series: Earth and Environmental Science, 2020

Publication

Exclude quotes	Off	Exclude matches	< 3%
Exclude bibliography	Off		