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Sustainable Design of Oil Palm-Beef Cattle Integration in Pelalawan Regency Riau Indonesia

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ABSTRACT Pelalawan regency in Riau has wide oil palm plantation with area 334.603 hectare in 2012 which it is potential for developing oil palm livestock integration system. High rate of beef cattle population growth 21.5% still had not enough to meet meat consumption of people in Pelalawan Regency (BPS Kab. Pelalawan, 2012). Oil palm plantation in Pelalawan regency supply a lot of feed ingredient such as oil palm frond (OPF) and leaf, forage cover crops and some waste from oil palm processing. There are some problems in oil palm-beef cattle integration. Beef cattle production in oil palm plantation suspected of giving negative effect on oil palm product because of decline in oil palm productivity. This review give a solution with sustainable design of the integration. Sustainable design for oil palm-beef cattle integration related to all aspect for production include controlled grazing, feed supplement biotechnology, health and reproduction management, oil palm plant management, fertilizer management, weed land controlling and oil palm harvest management. Sustainable design of the integration could be analyzed by SWOT analysis to a comprehensive solution for some problem which was caused by integration and to get an optimum advantage from potential of the integration. In conclusion, sustainable design would be able to maintaine the integration system continously.

Keywords: Sustainable design, Oil palm, Beef cattle, Integration, Pelalawan.

Introduction

Beef cattle population growth in Pelalawan 1.5% still had not enough to meet meat consumption of people in Pelalawan Regency in 2012. Therefore beef population should be increased more and it need alternative feed ingredient source from oil palm plantation and processing. Pelalawan has oil palm plantation areas 334.603 hectare which was estimated produce oil palm frond (OPF) 1.744.620 kg dry matter/ha/year and oil palm leaf 220.168,8 kg dry matter/ha/year as feed forage. Other side, there is potential under growth vegetation of oi palm plantation which provide biomass for feed depend on age of oil palm plantation. Integration system between oil palm and beef cattle production is an alternative for feed ingredient supply. The system create mutualism symbiosis, interdependent relation, change low palatability of forage cover crop in oil palm to potential feed forage sources. Integration system use more space in oil palm plantation for beef cattle production (Wattanachant *et al.*, 1997). There are a lot of assessment of the integration at different sites but they had not been completed

by a design for sustainable integration system. Currently, there is an assumption about negative effect of cattle grazing in oil palm plantation such as plant damage, soil compaction, root growth pressure and drainage damage of oil palm plantation. It was caused by uncontrolled grazing. Therefore, oil palm and beef cattle integration system need a design which able to be maintained at certain rate and level or production is sustainable design.

Grazing Management in Oil Palm Plantation

Traditionally, grazing system for beef cattle is directly place a cattle to palm oil plantation without controlling. It caused some problem such as soil compaction, drainage damage and oil palm plant damage (Chung *et al.* 1995). Controlled grazing create effective integration for weed controlling to 20 species of weed, thus it reduce weeding land cost to 30% – 60 % (Chen *et al.* 1991). Controlled grazing could be conducted by scheduled rotation system. It increase efficiency forage consumption by cattle, decrease negative effect on environment and increase beef cattle production return. Controlled grazing need supporting data about availability and quality of forage, animal consumption capacity, carrying capacity and continuously grazing activity (Mueller and Green, 1995). In Malaysia, controlled grazing was manufactured with portable fence (with or without electricity) to keep animal stay in scheduled rotation grazing location (Gopinathan, 1998).

Feed Forage Introduction in Oil Palm Plantation

Improvement of forage quality from oil palm plantation could be conducted by introduction of new species of forage which has shade tolerance and high production ability (Horne, 1994). Under growth forage has highest production in 2 year old oil palm plantation (4-5 ton dry matter/ha/year). It will decrease to 0.1 ton dry matter/ha/year in 10 years old oil palm plantation (Chen *et al.* 1991). New forage introduction would be selected as age of oil palm plantation with some criterias: shade tolerance, soil compaction resistances, faster growth, highly regrowth, high production and containing good quality of nutrient. Species of forage and leguminosa have shade tolerance in more 5 years old oil palm including *Axonopus compressus*, *B. miliformis*, *Ischaemum aristatum*, *L.timorense*, *Ottochloa nodosum*, *P.conyugatum*, *Stenotaphrum secundatum*, *Calopogonium caeruleum*, *Desmodium heterophyllum*, *D.intortum*, *D.ovalifolium*, *Flemingia congesta* dan *Mimosa pudica* (Crowder and Cheda, 1982).

Social Perception Assesment

Cattle rearing in palm oil plantations until now made an issue between negative effects and the benefits. Integration cattle in palm oil plantation throuht out many reason such as cheaper invest than vehicle, labour efficiency, no value depreciation, doesnt need fuel to operated, cheap maintenance operational and eco-friendly (Puslitbangnak, 2008). More assesment of factors influencing integration cattle in palm oil plantations required to explain the benefits from this system. There are many factors influence the integration system like income factor, consumption/ cost production, number of family/ labour, intensity of extension, origin area, level of education (Riswani *et al.*, 2012) and also palm oil plantations area and age of the plants, number of cattle. Good explanation

about benefits from adopted integration cattle in palm oil plantations highly expected to assure people/ company to adoption cattle and palm oil integrated system.

Sustainable Design of Oil Palm-Beef Cattle Integration

Sustainable design related to all aspect both of oil palm and beef cattle production (Figure 1). Sustainable design is a concept for the integration system which able to be maintained at certain rate and level or production. Oil palm plantaion will give a supply for feed ingredient which it is continuous availability as beef cattle requirement. Beef catle production will give some advantage for oil palm production include organic fertilizer (solid or liquid), weeding land management, transportation for oil palm harvest. Information system and networking support the sustainable design by definite and accurate data fom beef cattle and oil palm production. There are some disadvantage of the integration which could be solved by some opportunity and strength values of integration (Figure.2). the connction between strength, opportunity, weakness and threat values of the integration should be completed by information network technology.

Conclusion

Sustainable design for oil palm-beef cattle integration is a design of oil palm and beef cattle production system which has advantage for both and able to be maintained at certain rate or level of production. Sustainable design need some factor technology include in controlled grazing, feed technology process, reproduction technology application, animal healt management, feed supplement biotechnology, plant disease manajement and plant harvest management. They related each other and need an information system between them.

References

- BPS Kabupaten Pelalawan, 2012. Pelalawan Dalam Angka. Pelalawan.
- Chen, C.P., H.K. Wong, and I. Dahlan. 1991. Herbivores and plantation. p. 71-81. *In* Recent Advances on the Nutrition of Herbivores.Selangor-Malaysia.MSAP.
- Chung, G.F., Mohd Basri Wahid and Ariffin Darus. 1995. Recent development in plant protection of Malaysian oil palm industry (1990 – 1995). PORIM National Oil Palm Conference, Kuala Lumpur, 11-12 July 1995. pp. 107 – 126.
- Crowder, L. V., H. R. Cheda. 1982. Tropical Grassland Husbandry. Longman Group. New York.
- Gopinathan, N. 1998. Cattle management in oil palm – ESPEK,s experience. PORIM National Seminar on Livestock and Crop Integration in Oil Palm. Kluang, Johor, 12 – 14 May 1998. pp 78 – 88.
- Horne, P. M. 1994. Agroforestry Plantation System : Sustainable Forage and Animal In Rubber and Oil Palm Plantation. Paper Presenten To ACIAR-Sponsored Symposium “Agroforestry and Animal Producton For Human Welfare” At 7th Animal Science Congress of Australian-Asia Animal Production System Societies, Bali –Indonesia, July 11-16.
- Mueller, J.P., and James T. Green, Jr. 1995.Controlled Grazing. <http://www.caf.wvu.edu/~forage/controlgrazenc/fctrl.htm> [January, 2014]

Pusat Penelitian dan Pengembangan Peternakan. 2008. Konsep Pedoman System Integrasi Sapi di Perkebunan Kelapa Sawit. Badan Penelitian dan Pengembangan Pertanian. Departemen Pertanian.

Riswani, Andy Mulyana and Yunita. 2012. Analysis of Factors Influencing Plasma Farmer to Adopt Cattle and Palm Oil Integrated System In South Sumatra, Indonesia. *2nd International Conference on Biotechnology and Environment Management. IPCBEE vol. 42 (2):6-9.*

Wattanachant, C., I. Dahlan, A. Zulkifli and M.A. Rajion. 1997. Sheep-Oil Palm Integration: Growth Performance of Dorset x Malin and Dorset x Siamese Long Tail Sheep. *Pertanika J. Trop. Agric. Sci. Vol. 20 No. 2/3: 169-173.*

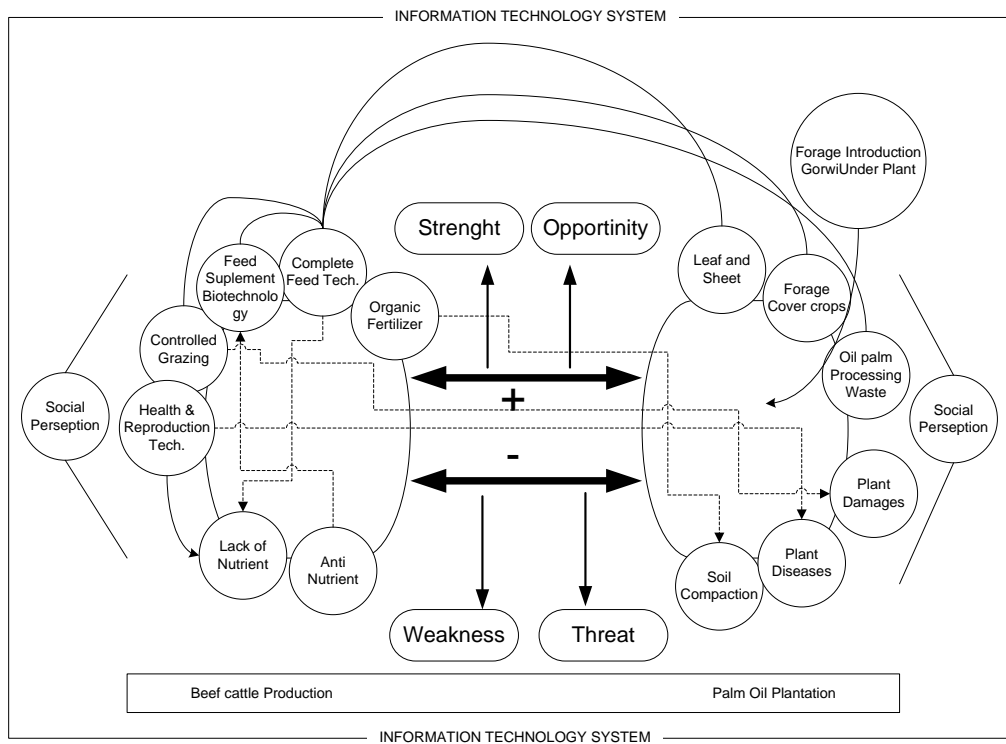


Figure 1. Sustainable Design for Integration between oil palm and beef cattle production in Pelalawan Regency, Riau

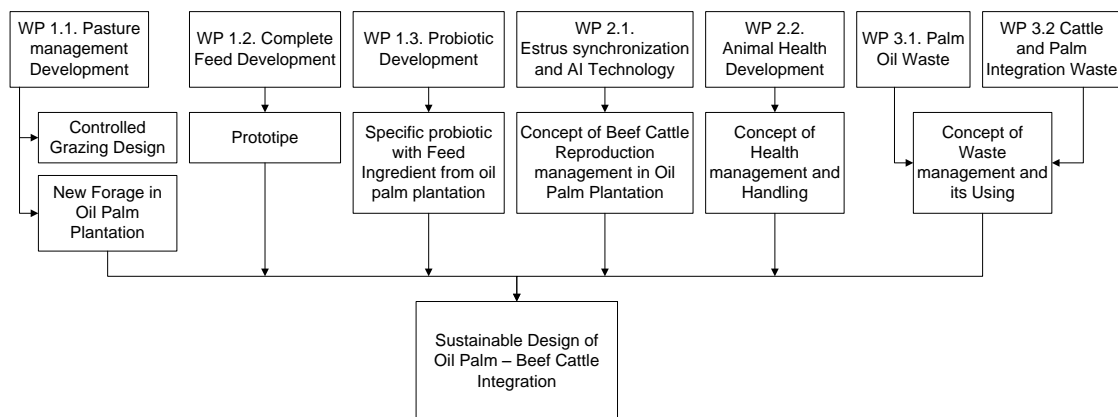


Figure 2. Work package to create Sustainable Design of Integration Oil palm and Beef Cattle in Pelalawan Regency Riau Indonesia.