DEVELOPMENT OF SUSTAINABLE LIVESTOCK-CROP INTEGRATION PRODUCTION SYSTEMS

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Introduction

Recently, Malaysia spent more than RM 10 billion for importing food items mostly from animals and feed grains origins. Malaysia has sufficient resources for the production of food items derived from plantation sector, agricultural by-products and agro-based industries. These resources can be integrated to develop a sustainable livestock-crop production systems. Efficient and sustainable production systems must be developed through utilisation of available and regenerated resources locally. Regenerated resources such as agriculture products, forestry and livestock can be produced optimally through integrated production systems. Studies on cattle, sheep and goat integration under oil palm and rubber plantations have shown remarkable results (Chen and Dahlan, 1996, Wattanachant et al. 1997). Other species of livestock such deer and poultry should be introduced to plantation area (Dahlan, 1996) . These integrated production systems should be improved and sustained for more efficient agriculture especially food production systems. The livestock-crop integrated production system (LICRO) is believed not only to be the most efficient agricultural production system but also the future direction for the livestock production in Malaysia. The objectives of this research were to develop sustainable livestock production system through optimising the use of suitable livestock species, land and manpower and development of environmental friendly eco-systems for livestock-crops production and agro-tourism.

Materials and Methods

Systems approach used in this research project was multi-disciplinary, input-output relationship and dynamic situation in the complex systems. The main resources and/or components such as plantation crops, agricultural land usage, manpower utilisation, feed resources and livestock species were integrated into new production systems named "LICRO" and were evaluated synergistically. The techniques employed in LICRO systems were *in situ* experimentation, livestock management strategies, feed resources evaluation, multi-level validations, modelling and simulation, information network, products processing and marketing strategies. Main experimentations were evaluation of livestock-crops management strategies, feed resources evaluation and processing, and suitability of livestock species (cattle, sheep, goat, buffalo, deer, poultry species and wildlife). Research in development of technology in livestock products processing, agriculture by-products feed processing were conducted. Marketing and socio-economic studies were included in the evaluation of the production system.

Results and Discussion

Results showed that cattle-oil palm integration is a successful programme. Cattle especially beef cattle will be the main livestock project proposed for the country. Integration of cattle with oil palm plantations should be introduced in matured plantations. This production system will contribute significant return to investment to the livestock and plantation sectors (Dahlan, 1996). Suitable types or breeds of cattle need to be identified and introduced to oil palm plantations. Other species of livestock showing promising results when integrated with oil palm plantations are deer (Dahlan, 1998) and buffalo (Dahlan and Shamsul, 1997). Deer can be integrated with higher stocking rate than cattle. The rusa deer *(Cervus timorensis)* can be stocked about 8 to 10 heads/ha in mature oil palm plantations. Buffalo is very suitable for draught in power oil palm plantations especially for carrying oil palm fresh fruit bunch, with optimal load around 1,560 kg for 600 kg buffalo (Dahlan and Shamsul, 1997). Integration of wildlife herbivores, such as deer *(Cervus timoreensis, C. unicolor and Axis axis),* kijang *(Muntiacus muntjak),* mousedeer *(Tragulus javanicus),* porcupine *(Hystrix brachyura)* and avian species (jungle fowl and pheasant) with acacia plantation *(Acacia mangium)* under agroforestry systems creates suitable and sustainable "Bio-park" environment and conservation of fauna and flora (Dahlan, 1998). Oil palm frond (OPF) was found to be the most suitable forage source for the LICRO systems (Dahlan, 1996). OPF is abundantly available and its quality is sufficient for fibre feed supplementation in LICRO systems (Dahlan, 1996). OPF can be used as fresh chopped materials, silage and pelleted compound feed (Dahlan, 1996).

Conclusions

LICRO system is the most sustainable production system for ruminants and perhaps some wildlife species such as deer, mousedeer and jungle fowl in the country. The results showed that the plantation sector and farmers have accepted the concept of LICRO systems and is being adopted in most of oil palm plantation in Malaysia. Beef cattle is the most suitable ruminant to be integrated with oil palm plantations. Deer is also suitable new livestock species to be farmed in this country through adopting LICRO system. BIO-park is an additional contribution of LICRO systems towards recreation and environmental conservation. Oil palm frond (OPF) is the main fibre feed source for supplementary feed in the LICRO systems.

References

Chen, C.P. and Dahlan, I. 1996. Tree spacing and livestock production. In. The 1st. Intl. Symposium on Integration of livestock to oil palm production. MSAP-FAO Publ. Pg. 35-49.

Dahlan, I. 1996. Oil palm by-products: Its utilization and contribution to livestock industry. Proc. PORIM International Palm Oil Congr. Planery paper. p. 269-274.

Dahlan, I. 1998. Management and feeding of mousedeer (Tragulus spp.) in captivity and bio-parks. Proc. Symposium series 2, the 8th. World Conference on Animal Production, Seoul, Korea. p. 476- 484.

Dahlan, I. and Shamsul, B.M.T. 1997. Buffalo draught power for oil palm plantations. *Buffalo Bulletin.* 16 (3): 64- 67.

Wattanachant, C., Dahlan, I. and Rajion, M.A.1997. Sheep-oil palm integration: body composition of Dorset x Malin sheep. *Mal. J. Anim. Sc.* 3(2): 22-27.

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