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## Integration and Integrated Systems: Enhancing Potential Impacts with Ruminants in Oil Palm Plantations\*

DEVENDRA, C

130A Jalan Awan Jawa, Taman Yari, 58200 Kuala Lumpur

*Integration and integrated systems are discussed in the context of enhancing productivity with the inclusion of ruminants in oil palm plantations. The development of these important systems is justified by the need for more efficient integrated natural resource management (NRM), inadequate animal protein supplies to meet human requirements, value addition to the oil palm crop, sustainable development, and conspicuous economic impacts. The latter is highlighted by demonstrable increased productivity of animals and meat offtakes; increased yield and measures of 0.49-3.52 tonnes of FFB per hectare per year; increased income by about 30 per cent; savings in weeding costs by about 47-60 per cent, equivalent to RM21-62 per hectare per year; and an internal rate of return of 19 per cent based on actual field data. Potential increased offtakes and even higher income also exists with the integration of goats. The fact remains that the extent of integration is very small and only 2.2 per cent of the land under oil palm is used for integration presently. The reasons are largely associated with poor awareness of the potential of integrated systems; resistance by the crop-oriented plantation sector; inadequate understanding of technology availability and application; high prices for crude palm oil; unattractive investment climate; weak inter-agency collaboration; and absence of policies to encourage the development of integrated systems. Overcoming the constraints and promoting wider adoption of the systems are linked directly with the need for a coherent policy on integration; increased awareness; increased inter-agency coordination; collaboration and resource use; defining a national breeding policy for cattle and germplasm use; much needed increased participation by the private sector; and a stimulus package of incentives. These and other aspects constitute the challenges for the future.*

**Keywords:** Oil palm, ruminants, sustainability, integrated systems, forages, ruminant-oil palm interactions, carbon sequestration, economic impacts, constraints, opportunities.