Integration of Cattle-coconut Farming in South Minahasa Regency

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Abstract

Coconut plantation is a source of income of South Minahasa community. Land under coconut plantation is utilized for the development of cattle farming in an integrated cattle-coconut plantation system. System integration is maintained in cattle under coconut trees, the land planted with forage and cattle waste used as fertilizer. While non-integration system is the land under a coconut tree is used for forage and cattle waste is used as fertilizer. The problem is how the benefits of system integrated cattle-coconut. The objective of this study was to analyze the benefits of system integrated cattle-coconut. District and Subdistrict purposively determined by consideration of having the largest cattle population. Number of respondents consisted of 86 of farmers are determined based on the ownership of at least 2 cattle and had to sell cattle. Data analysis was using descriptive analysis. Coconut lands are managed either by owners or tenants amounted to 10 935 trees (an average of 165.68 trees per respondent). Coconut land for grazing cattle borrowed amount to 2250 trees (an average of 112.50 trees per respondent). The results showed that the average farmer earned income non integrated system of Rp 16,583,767.54 per year. The average income earned on the system integration of Rp 21,658,525.52 per year. In conclusion, cattle-coconut plantation integration system provides benefits such as availability of feed resources under coconut, improve soil fertility and as an alternative source of income.

Keywords: cattle, coconut, integrated

Introduction

Coconut is one of the agricultural commodities that dominate in South Minahasa regency. Coconut is a source of income of most people in the region and it is

sold in the form of copra. According to Supadi and Nurmanaf (2006), coconut as a strategic commodity has a social role, cultural and economic life of society. Land under coconut farmers utilized for the development of beef cattle. Waste of food crops is a source of feed, whereas cattle manure used for soil fertility improvement under a coconut tree. This farming system is known as crop-livestock integration.

System of crop-livestock integration has many advantages such as availability of food resources, reduce the cost of weed control, improved soil fertility, increase crop yields and principal divides the risk of loss (Mansyur *et al.*, 2009). These benefits can increase the productivity of land is higher, thus providing greater benefits for the farmer. Integrated of farming is effort related, mutually supportive, mutually reinforcing and mutually beneficial (synergistic). Ramrao (2006) concluded that the integrated farming system is the most profitable.

According Channabasavanna *et al.* (2009) that the Integrated Farming System are very productive and profitable. Since 1977, the integrated farming system has been claimed to reduce land degradation and productivity compared with conventional rice-based system. Integrated livestock farming is the development of the livestock resource use that can reduce the risk of having the principles of sustainability efforts (Soedjana, 2007). In this case, Rajasekaran *et al.* (1991) introduced a system of natural resource management for sustainable agricultural development.

The problem of cattle farming in South Minahasa is that the cattle is traditionally maintained by grazing system that tied under the coconut trees and move around. Based on these problems, this study aimed to analyze profitability of the cattle–coconut integration farming in South Minahasa.

Materials and Methods

The research was conducted in South Minahasa Regency using the survey method. The Minahasa Regency was purposively selected for the study as the Regency was a centre for coconut production and cattle farming in North Sulawesi. The districts in South Minahasa was determined by purposive sampling; Sinonsayang and Tenga districs were the districts with the largest cattle population (BPS South Minahasa, 2011). Peasant farmers in every village of the sample was restricted to coconut farmers who owned at least 2 (two) heads of cattle and had to sell cattle. There were as many as 86 respondents. The type of data used were cross section and time series data. The data collection techniques were by interviews with cattle farmers and direct observation in the field. The collected data were analysed using descriptive analysis method.

Results and Discussion

The results showed that in South Minahasa the number of coconut trees owned

by farmer ranged between 30 - 1000 trees for a total of 13.185 trees. Coconut lands were managed either by owners or tenants that amounted to 10.935 trees, or an average of 165.68 trees per farmer. Meanwhile the borrowed land for cattle grazing was managed by the tenants and coconut trees numbered 2250 or an average of 112.50 trees per farmer. Coconuts was processed into copra. Coconut production per tree was about 20-40 pieces. To produce 100 kg of copra, 400-450 coconuts were required depending on the size of the coconuts. The copra prices prevailing in the study area ranged from Rp 570.000 to Rp 980.000 per 100 kg copra. The price would be different when the farmers sold the copra to the coconut oil factory which greatly affected the income of the farmer.

Cattle sales made in the "blantik" market in the village Ongkaw; the trader who arrived at the site was a farmer and sold the cattle to other farmer. The price of cattle depends upon the price of beef which is about Rp 50.000-Rp 70.000 per kg. Income from livestock enterprises that consume waste and grass that are not qualified. If the land under coconut trees used to grow quality grass then the income would be higher. Land use under the coconut to serve as a cover crop forage. According to Rahim (2006), cover crops is an act of conservation at the time instead of the growing season.

The average land area for maize cultivation was 0.9 ha and the planting of corn was in a 1-3 year period. Most of the farmers' cattle (66 respondents or 76,74%) planted corn under coconut trees with an area of 0,71 ha on average. The number of respondents who grew corn instead of under the coconut trees as much as 20 respondents (23,26%) with an area of dry land on average 0.87 ha. The income of the farmer from the three farms which were not integrated can be seen in Table 1.

In Table 1, it turns out that the average income earned per respondent of Rp 15.899.081,29 per year. This income is obtained by the system of diversification of farming systems. According to Rota and Sperandini (2010) that the system consists of components of plant diversification and free-living animals at the same time. In this case, the integration of crops and livestock is primarily to minimize risk and resource recycling.

Table 1. Average relative export, relative import and relative trade advantage for selected meat and meat preparation sectors in Malaysi

Sources of Income	Amount (Rp/Year)	Average (Rp/Year/Respondent)	%
Coconut Farming	871,987,077.30	10,137,896.25	63.77
Cattle Farming	64,174,413.10	746,214.11	4.69
Corn Farming	206,180,500.00	2,397,447.67	15.08
Labor of Cattle	225,107,000.00	2,617,523.26	16.46
Total Income	1,367,448,990.40	15,899,081.29	100

The integrated production process showed that land under coconut trees could be used for fodder crops (forage or legume). Dolev and Kimhi (2010), land area is a determinant factor of the viability of agriculture. One Ha of land under coconut trees covering an area of 0,8 ha planted with forage grass seed needs of 16,000 cuttings. The average land area owned, managed and borrowed by farmers according to the results of this study was 0.71 ha of grass cuttings Brachiaria mutica requiring as many as 11,360 cuttings. Technological innovation in the animal feed crop-livestock Integration Systems Waste-Free (SITT-BL) according to Haryanto (2009) provides an exciting opportunity to clean green and agricultural development. Grasses that can be generated as much as 85.2 tons / year is equivalent to 6.67 AU/year, with cut and carry system.

If the land under coconut trees planted forage then the respondent may obtain income from these forages. If the grass produced can be sold to other farmers then the respondent will earn income of Rp 35.328.093.00 per year per respondent.

Cattle manure in the study area was only allowed on agricultural lands and not used as compost. In an integrated production process then all the existing waste utilized by the principle of zero waste. In this case, no waste is wasted and the manure can be processed to generate income for farmers and their families. Inefficient use of inputs according to Asche *et al* (2008) may worsen the environmental impact. Fleckinger and Glachant (2011) suggested that each manufacturer must collect and process-related waste products.

Some research indicates that a cattle can produce as much as 10 kg of faeces per cattle per day. Impurities can be processed into compost by 3 kg. If the price of compost is assumed to be Rp 3.000 per kg in a day then the revenue that the amount of Rp 9.000. The average of ownership of 3.4 cattle will produce 10.2 kg of compost for the revenue obtained is Rp 11.169.000/year. Compost can be expressed as an alternative income for farmers who had only left the plantation lands or in the yard. Another advantage is the compost can be used by farmers to substitute artificial fertilizer prices higher. The benefits of compost is to improve

Tabel 2. Farmer Income on Integration Cattle-Coconut Farming in South Minahasa Regency

Sources of Income	Amount (Rp/Year)	Average (Rp/Year/Respondent)	%
Coconut Farming	871,987,077.30	10,137,896.25	16.90
Cattle Farming	64,174,413.10	746,214.11	1.25
Forage Farming	3,038,215,998.00	35,328,093.00	58.88
Compost Business	960,534,000.00	11,169,000.00	18.61
Labor of Cattle	225,107,000.00	2,617,523.26	4.36
Total Income	5,160,018,488.40	59,998,725.62	100

soil fertility owned by farmers in the study area. Organic fertilizer / compost derived from mixed Chromalaena and manure can replace about 50% of chemical fertilizers (Urea and SP-36) (Abdullah and Puspitasari, 2007). Provision of organic materials from manure and crop residues can improve soil physical properties (Prasetyo and Suriadikarta, 2006). The income of farmers as a respondent in an integrated cattle-coconut farming can be seen in Table 2.

As shown in Table 2, the average income of the farmer obtained an integrated farming system was Rp 59.998.725,62 per year. This income was greater than the farming of cattle-coconut that is not integrated. According Salendu and Elly (2011) that sustainable livestock development in North Sulawesi could be implemented by developing models of coconut-cattle integration. Rota and Sperandini (2010) suggested that the high integration of crops and livestock are often considered as a step forward. Ahmed et al (2011) states that the pattern of integrated farming is the best farming system in terms of resources, efficiency, productivity, production and food supply.

Conclusion

Based on the research results it could be concluded that the income received by farmers with cattle-coconut integration system was greater than that with the non-integration system. Cattle-coconut integration system provides benefits such as availability of feed resources under coconut, improve soil fertility and as an alternative source of income.

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