Development Potential of Integrated Farming System
(Local Cattle - Food Crops)

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Abstract. Local cattle farming as an income source for farmers in rural areas is mostly developed traditionally. The local cattle farm continues, even though it is a side business, but is a mainstay in supporting national beef needs. The problem is whether integration of local cattle and food crops have the potential to be developed by farmers. The research was conducted to determine the potential integration of local cattle local and corn in North Bolaang Mongondow Regency. A survey method using a purposive sampling selected 60 farmers from Sangkub District where farmers practiced an integrated cattle-crops farming. Data were subjected to proximate and feasibility analysis. The results showed that the total cattle owned by respondents was 209. The feed consisted of grass and corn waste, with an average consumption of 5.33 and 11.15 kg/head/day, respectively. A proximate analysis of waste corn reported 86.48% dry material, 7.36% crude protein, 1.84% fat, 28.95% crude fiber, 9.10% ash and 68.18% carbohydrate. Respondents' income from cattle farming in Bintauna and Sangkub Districts were Rp. 151,000,000 vs. Rp. 169,900,000, production costs were Rp. 101,150,625 vs. Rp. 107,298,593.8, and RC ratio was 1.49 vs. 1.58. In conclusion, corn waste consumption was greater (67.66%) than the grass. RC ratio value >1 indicated that cattle farming was feasible. The corn-cattle farming integration system can minimize environmental pollution because it enables the concept of LEISA (Low External Input Sustainability Agriculture).

Key words: integration, local cattle, food crops, low external input sustainability agriculture

Introduction

Local cattle farming as a source of income for farmers in rural areas is mostly developed traditionally. The local cattle farming persists even though it is a side business and becomes a mainstay in supporting national beef demand. Beef demand tends to increase due to the growing population, income and even public education in general.
Local cattle is a commodity that plays a role in rural agribusiness. These cattle also act as biological and economical chains in farming systems and are integrated with other farms. Local cattle farmers utilize food crops as sustainable feed to reduce feed cost. On the other hand, cattle waste can be used as organic fertilizer to improve soil fertility (Hanafi, 2016). Local cattle can produce 10 kg of solid waste per day which is processed to 3 kg of organic fertilizer. According to Muis (2015), one adult cattle can produce 12–15 kg/day of solid waste and 3–5 liters/day urine. It shows that local cattle farms are mutually symbiotic with food crops. According to Lakitan and Gofar (2013), compost is an option to support the increase of rice plant productivity.

The term ‘farming integration’ is better known as Integrated Farming System, which is very productive and profitable (Channabasavanna et al., 2009). Since 1977, the integration system has been claimed to reduce land degradation and productivity compared to conventional crop systems. Furthermore, the management of the integrated farming system can increase farmers’ income.

The problem is whether local cattle farms integrated with food crops are potentially developed by farmers. Integrating local cattle and food crops by rural farmers can occur naturally and is traditional. This research was conducted to determine the potential extent of developing the integration of local cattle and food crops in the rural.

Materials and Methods

This research was conducted in the North Bolaang Mongondow Regency. The research materials were local cattle, feed, and corn waste. Local cattle were stated from the total cattle owned by farmers as samples. Cattle feed is forage consumed, i.e. grass and corn waste. Corn waste is fresh corn straw consumed by local cattle. A survey was conducted with a purposive sampling to determine the research locations, i.e. Bintauna and Sangkub Districts where local farmers were developing an integrated local cattle-corn plant farming. A simple random sampling selected 60 farmers. Data were subjected to a descriptive, proximate analysis and feasibility analysis.

Results and Discussion

Local cattle in the research area were used as savings to be sold at any time for the farmers household. Local cattle as a business provided an added value in the farming system, which was managed by farmers. The results showed that local cattle were traditionally developed which allowed cattle to graze on agricultural land and moved from one field to another. Grass that grows on agricultural land is used as local cattle feed. On the other hand, some farmers who developed corn plants as a source of income, also use fresh corn waste as feed. Total respondents, total cattle owned and feed consumption (grass and corn waste), according to research results are presented Table 1.

Table 1 shows that feed consumed by local cattle was not as recommended (30 kg/head/day). According to Elly et al. (2018), this condition causes low cattle productivity. This research was supported by Nurdiati et al. (2012), Susanti et al. (2013), Sitindaon (2013), and Saragi (2014), that cattle productivity in several regions in Indonesia depends on feed.

The utilization of fresh corn waste as feed can be improved, considering that North Bolaang Mongondow Regency is one of the corn development centre as a source of income. Sangkub District develops corn plants by utilizing land up to 300 ha. Proximate analysis results (Institute for Industrial Research and Standardization, 2018) reported that corn waste contained 86.48% dry matter, 7.36% crude protein, 1.84% fat, 28.95% crude fiber, 9.10 % ash content and 68.18% carbohydrates.

It indicated that the concept of integration of local cattle and corn plants traditionally has been applied to farmers who are members of
Table 1. Number of respondents, number of local cattle, consumption for grass and fresh corn waste

<table>
<thead>
<tr>
<th>Description</th>
<th>Bintauna</th>
<th>Sangkub</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents (farmers)</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Number of local cattle (head)</td>
<td>128</td>
<td>81</td>
</tr>
<tr>
<td>Consumption of feed (kg/cattle/day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass</td>
<td>5.17</td>
<td>5.50</td>
</tr>
<tr>
<td>Fresh corn waste</td>
<td>10.93</td>
<td>11.37</td>
</tr>
</tbody>
</table>

Figure 1. The concept of local cattle-food crops integration

The results of the study showed that local cattle waste was grounded and processed into solid and liquid organic fertilizer. This activity was conducted by some farmers who were also the members of a formal institution in the community (Suprianto, 2016) which allows farmers’ collaboration to improve bargaining power and share knowledge.

The results showed the respondents’ income from selling cattle in Bintauna District was Rp. 151,000,000. The total production cost which included labor costs and feed costs (grass and corn waste) was Rp 101,150,625; therefore, the profit gained was Rp 49,849,375 and the RC ratio was 1.49. The respondent’s income in Sangkub District was Rp. 169,900,000, and the total production cost was Rp 107,298,593.80; therefore, the profit was Rp. 62,601,406.25 and RC ratio was 1.58. The indication of developing an integrated local cattle and corn farming was supported by Elly (2008) and Elly et al. (2008). The concept of cattle-plants integration has been proposed by several researchers (Walia and Kaur, 2013, Forero and Gonzalo, 2013, Swarnam et al., 2014, Munandar et al., 2015, Ezeaku et al., 2015, and Wahyuni, 2015). The result indicated that the concept of integration of local cattle and food crops is simply formulated in Figure 1.

Figure 1 shows an uninterrupted flow of resources where food crop waste can be used as an input for beef cattle. Organic fertilizers are used to increase soil fertility, and all activities lead to environment-friendly and sustainable activities. The concept shows a zero waste concept which means there is no waste that is not utilized.

The integration system of local cattle and corn with the zero waste approach according to Wulandari (2014) is an improvement of the intensification system that has developed in the community. The zero waste farming model is an agricultural model that prevents wasting residuals (Sunanto and Nasrullah, 2012). Therefore, farmers who apply the LEISA (Low External Input Sustainability Agriculture) concept can minimize production costs (Erlina and Anggreini, 2014).
Conclusions
Corn waste consumption was greater (67.66%) that grass consumption. RC ratio value >1 indicated that cattle farming was feasible. The corn-cattle integrated farming system can minimize environmental pollution because it applies the concept of LEISA (Low External Input Sustainability Agriculture).

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References


