ECONOMICS OF SURGE FEEDING OF CATTLE*1

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ABSTRACT

A research on surge feeding of cows by using tree legume was conducted in east Java as a collaborative project between Indonesia and ACIAR of Australia. Under controlled station environment at Grati Station 40 pregnant Ongole Cross cows were allotted into two groups, the control and surge feeding group. The legume leaves were fed 15 kg/head/day during last 1 month of pregnancy up to three months after calving. The extra profit gained by surge feeding was Rp.143.677 per cow per calving cycle. The extra return for calves kept up to 6 months old was Rp.264.859 per calf. The impact of surge feeding on economic performance of cow and calf is dependent on the body growth, calving rate and the extra feed cost.

(Key Words: Surge Feeding, Tree Legume Leaves.)


EKOMET SIStEM PAKAN STRATEGIK PADA TERNAK SAPI INDUK

INTISARI

Penelitian tentang sistem pakan strategik pada ternak sapi induk dengan memanfaatkan daun leguminosa pohon telah dilakukan di stasion Jawa Timur (Grati) sebagai suatu proyek kolaborasi antara Pemerintah Indonesia dan Australia. Di bawah manajemen lingkungan yang terkontrol, 40 ekor sapi induk jenis PO dikelompokkan sebagai kelompok kontrol dan kelompok perlakuan. Daun leguminosa pohon diberikan kepada kelompok perlakuan sebanyak 15 kg/ekor/hari selama satu bulan sebelum melahirkan sampai saat-saat anak sapi disapih (3 bulan). Ekstra keuntungan yang dihasilkan oleh kelompok perlakuan adalah rerata Rp.143.677 per ekor per siklus kelahiran, sedangkan bagi bulan yang dipelihara sampai umur 6 bulan menghasilkan ekstra Rp.264.859 per ekor jika dibandingkan dengan kelompok kontrol. Dampak sistem pakan strategik terhadap keuntungan kinerja ekonomi ternak sapi tergantung atas pertumbuhan berat badan, tingkat kelahiran dan nilai ekstra daun leguminosa pohon yang dipakai.

(Kata Kunci: Sistem Pakan Strategik, Daun Leguminosa pohon.)

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Introduction

Cattle in Indonesia are one of major livestock in meat production and a dominant village household because of its value as farmer's asset. The major cattle producing areas are East Java, Nusa Tenggara, Sulawesi and Central Java (Anonymous, 1993). In Java island, cut and carry is the most dominant production system, in other areas free range and grazing is the principal management system (Anonymous, 1993).

Results showed by monitoring survey data that reproduction of cattle was lower than expected (Hardjowidodo, et al., 1980; Soehartoyo, 1993). The low productivity was highly related to poor body condition, low quality feed and poor mating management (Putu, et al. 1992; Anonymous, 1992; Anonymous, 1995). Therefore, program to improve cattle productivity and reproductivity is important (Miest et al. 1970).

In east Java, cattle is a major component of farm of the crop dominated farm system which produces manure, drought, calf, and meat. In this context the Research Institute for Animal Production (RIAP) of Indonesia and ACIAR of Australia collaboratively has developed research project on nutrition and Reproduction of cattle. The location of research is East Java and characterized by dry tropical condition and dry seasons with annual rainfall about 1500 mm. Feed supply seasonally produces a zigzag type of body growth and nutritional stress especially in cows reproduction. To reduce this nutritional stress supplementation will be required at specific moment. In this case, the locally available supplement is tree legume leaves. The objective is to improve calving rate, calf quality by means of surge feeding of tree legume leaves supplementation. This technology opens new opportunity to improve farm income.

In this paper, economic study directed to analyzing the extra return of surge feeding.

Materials and Methods

The research was conducted on station in East Java. Forty Ongole cows were used and randomly allotted into two groups (the control group and treatment). The common forage to all Animal was grass (40 kg/head/day). All Animals received the same management and feed except tree legume leaves. The tree legume leaves were given strategically to treated group, 15 kg/head/day and fed during the last month of pregnancy (1 month before parturition) and continued until 3 month after parturition or at which calves were weaned.

A systematic step to analyze the extra margin produced by the difference between surge feeding and control is described in Figure 1.

The economic model to assess the extra return of surge feeding is as follows. If $x_k$ is defined as the extra return from breeding cow, then $x_k$ may be estimated by a partial budgeting technique.

$$x_k = \frac{365}{W_r - (W_r - W_r) - (P_r - P_r)}$$

extra return from a breeding cow cp to weaning (3 months after calving)

$W_r = \text{extra weight gain of cow in surge feeding group just after calving and 3}$
months after.

\(W_c = \text{same as above for control group}\)

\(P_r = \text{price per kg body live weight at farm}\)

\(Q = \text{total quantity (kg) of tree legume leaves given during experiment (last 1 month of pregnancy up to 3 months after calving)}\)

\(E = \text{extra labour cost for surge feeding}\)

\(P_c = \text{price of calf per head at weaning age (3 months) for surge feeding at farm level.}\)

\(P_1 = \text{same as above for control group}\)

\(C.I_1 = \text{calving interval for surge feeding (C.I.) and control (C.I.)}\)

For each (extra return for calf produced up to 6 months of age) can be estimated as

\[\alpha R = \frac{365}{P_1} \times \frac{365}{C.I.} \times \frac{P_c}{C.I.} \times Q \times P_r \times E\]

\(P_1 = \text{price of calf at 6 month for surge feeding group}\)

\(P_c = \text{price of calf at 6 month for control group}\)

\(C.I. = \text{calving interval for surge feeding (C.I.) and control (C.I.)}\)

\(Q = \text{quantity of tree legume leaves given (kg) during 6 month}\)

\(P_r = \text{price per kg of tree legume leaves}\)

\(E = \text{extra labour cost for surge feeding}\)

Results and Discussion

The results of the research are presented in Table 1 and 2. The summary data on cows' production parameters are tabulated in Table 1 (up to 90 days after parturition at which calves were weaned). Table 2 summarizes data on calves growing period for 6 months. Based on the results, model of benefit analysis (extra return) for cows and calves were conducted. Table 1 provides data to estimate the extra for breeding cows. Therefore

\[\alpha R = (0.79 + 27.10) \times \frac{4590}{(1800 + 40)} + (2000 + 9.84) \times \frac{345.500}{0.86}
\]

\[= 134,100 + 72,400 + 81,577 \]

\[= 288,077\]

The figure however, shows the extra return of Rp 143,677 per cow farmer's labour and management if surge feeding was practiced during 1 calving. The extra return however was a result of feeding tree legume leaves to cows. If calf is kept up to 6 month old (another after weaning) then the extra return produced by raising calves up to 6 month of age is

\[\alpha R = (0.650.609 \times 0.94 - 402.598 \times 0.86)
\]

\[= 264,829\]

Because the extra returns of cows and of calves kept up to 6 month old required and extra supplement of tree legumes leaves, therefore the adoption of surge feeding was related to tree legume bank establishment and improvement in feeding system.

Conclusion

Under station controlled environment and management, surge feeding showed a significant extra returns for farmer's labour and management. Therefore by maintaining a small increase in cow bodyweight has an economic impact on cow reproduction and calf body growth. By establishing tree legume bank as fences around farmer's house, along land boundary, at shading in tree crops will enrich the
Figure 1. Model for extra margin analysis.
### Table 1. Cow's production parameters and price data

<table>
<thead>
<tr>
<th>Description</th>
<th>Control</th>
<th>Surge Feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calving interval (days)</td>
<td>426 ± 31.30</td>
<td>399 ± 23.38</td>
</tr>
<tr>
<td>Calf predue/year (head)</td>
<td>0.46</td>
<td>0.34 (9.30%)</td>
</tr>
<tr>
<td>Cow body weight difference (difference at the beginning of pregnancy and 90 days after) (kg)</td>
<td>-27.1</td>
<td></td>
</tr>
<tr>
<td>Estimated price of calf at 3 month old (Rp)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>369,060</td>
<td>365,800</td>
</tr>
<tr>
<td>Female</td>
<td>327,500</td>
<td>433,100</td>
</tr>
<tr>
<td>Average</td>
<td>348,500</td>
<td>410,050</td>
</tr>
<tr>
<td>Tree legume leaves Rp/kg</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Labour wage Rp/day</td>
<td></td>
<td>3,500</td>
</tr>
<tr>
<td>Live weight price Rp/kg live weight +</td>
<td></td>
<td>4,500</td>
</tr>
</tbody>
</table>

1 US dollar = Rp2,900 in 1997

### Table 2. Calf body weight

<table>
<thead>
<tr>
<th>Description</th>
<th>Control</th>
<th>Surge Feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth weight (kg)</td>
<td>23.5</td>
<td>21.9</td>
</tr>
<tr>
<td>At 108 days (kg)</td>
<td>59.5</td>
<td>87.0</td>
</tr>
<tr>
<td>Price Estimated (Rp)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>375,000</td>
<td>650,000</td>
</tr>
<tr>
<td>Female</td>
<td>450,500</td>
<td>-</td>
</tr>
<tr>
<td>Average</td>
<td>462,500</td>
<td>650,000</td>
</tr>
</tbody>
</table>

Source: Komardadin et al. 1996 (unpublished)

Synergistic farming system which sustains and stabilizes land use and environment. The complexity of the system satisfies farmer's needs and sustainable traditional farming requirement.

The surge feeding and the bank establishment will support farmer's multiple objectives related to income, employment and adjustment to risk. For further tree legume development it requires policy to improve resource management interval to farming system.

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References
