ECONOMICS OF SURGE FEEDING OF CATTLE[1]

M. Sabrani[2]

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 alloted 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 given 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.264.850 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.)

EKONOMI 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 bakalan yang dipelihara sampai umur 6 bulan menghasilkan ekstra Rp.264.850 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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[2] Scientist at research Intitute for Animal Production, Bogor.

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, 1995). 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 (Hardjosoebroto, *et al.* 1980; Soehartoyo, 1991). The low reproductivity 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 (Plass *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 a research project on Nutrition and Reproduction of cattle. The location of research is East Java and characterized by dry tropical condition and dry rainy seasons with annual rainfall about 2100 mm. Feed supply seasonally produces a zigzag type of body growth and nutritional stress especially in cow 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 returns of surge feeding.

Materials and Methods

The research was conducted on station in East Jawa. Fourty Ongole cows were used and randomly alloted 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 parturation) and continued until 3 month after parturation 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 αR_1 is defined as the extra returns from breeding cow, then R_1 may be estimated by a partial budgeting technique.

$$\alpha R_1 = (W_s - W_c)P_1 - QP_2 - E + (P_s \frac{365}{C.I._s} - P_c \frac{365}{C.I._c})$$

αR_1 = extra return from a breeding cow up to weaning (3 months after calving)

W_s = extra weight gain of cow in surge feeding group just after calving and 3

months after.

W_c = same as above for control group

P_1 = price per kg body live weight at farm gate

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

P_2 = price per kg tree legumes leaves

E = extra labour cost for surge feeding

P_a = price of calf per head at weaning age (3 months) for surge feeding at farm level.

P_c = same as above for control group

$C.1$ = calving interval for surge feeding $(C.1_s)$ and control $(C.1_c)$

For αR_2 (extra return for calf produced up to 6 months of age) can be estimated as

$$\alpha R_2 = (P_a1 \frac{365}{C.1_s} - P^1_c \frac{365}{C.1_c}) - Q^1 P_2 - E$$

P_a1 = price of calf at 6 month for surge feeding group

P_c = same as above for control group

$C.1$ = calving interval for surge feeding $(C.1_s)$ and control $(C.1_c)$

Q^1 = quantity of tree legume leaves given (kg) during 6 month

P_2 = price per kg of tree legume leaves

E = 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 cow's production parameters are tabulated in Table 1 (up to 90 days after parturation 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

$$\alpha R_1 = (2.70 + 27.10) \text{ Rp}4500 - (1800(\text{Rp } 40))$$
$$+ (\text{Rp}401,050 \times 0.94 - \text{Rp } 343,500 \times 0.86)$$
$$= \text{Rp } 134,100 - \text{Rp } 72,000 + \text{Rp } 81,577$$
$$= \text{Rp } 143,677$$

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

$$\alpha R_2 = (\text{Rp } 650.000 \times 0,94 - \text{Rp } 402,500 \times 0.86)$$
$$= \text{Rp } 264,850$$

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 or 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, as shading in tree crops will enrich the
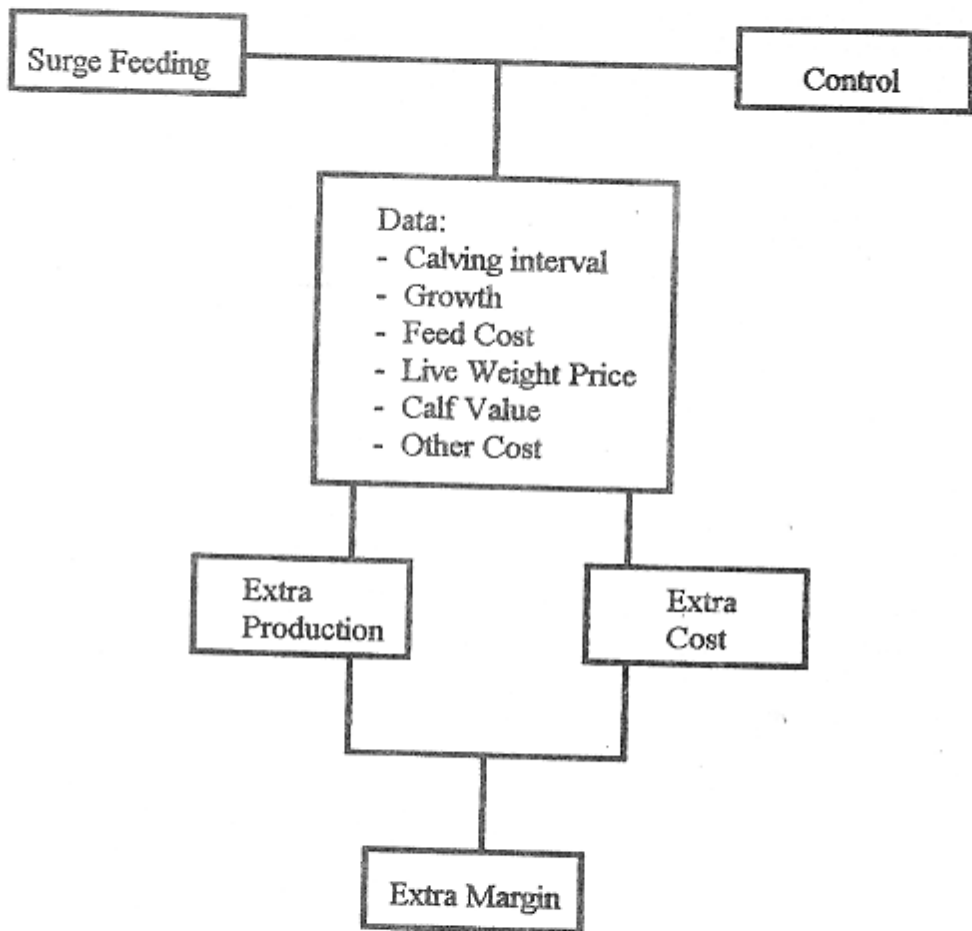
Figure 1. Model for extra margin analysis.

Table 1. Cow's production parameters and price data

Description	Control	Surge Feeding
Calving interval (days)	426 ± 31.30	390 ± 23.38
Calf produced/year (head)	0.86	0.94 (9.30%)
Cow body weight difference (difference at the beginning of pregnancy and 90 days after (kg)	-27.1	
Estimated price of calf at 3 month old (Rp)		
Male	360,000	368,800
Female	327,500	433,100
Average	343,500	410,050
Tree legume leaves Rp/kg		40
Labour wage Rp/day		3,500
Live weight price Rp/kg live weight +		4,500

1 US dollar = Rp2,900 in 1997

Table 2. Calf body weight

Description	Control	Surge Feeding
Birth weight (kg)	23.5	21.9
At 168 days (kg)	59.5	87.0
Price Estimated (Rp)		
Male	375,000	650,000
Female	430,500	-
Average	402,500	650,000

Source: Komaruddin *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 internal to farming system.

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