

Increased of farmer's income through use cassava as main ingredient of beef cattle concentrate feed in Playen Subdistrict, Gunungkidul, Yogyakarta

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Abstract. Feeding concentrates to beef cattle is not widely practiced in Indonesia and live weight gain (LWG) and income from sale of cattle can be low. This study analyzed the increase of beef cattle farmer's income through the use of cassava as a main ingredient of a concentrate feed. Fifty Ongole (PO) bulls, aged 12 -18 months, were used in this study. They were divided randomly into five feed treatments and each treatment consisted of 10 cattle. The control treatment (T0) was the current feeding system by farmers. Treatment one (T1) used concentrate supplementation at 1% of live weight (W)/day with composition 50% cassava, 25% copra meal, 25% palm oil cake and treatment 3 (T3) was the same concentrate fed at 2% W/d. Treatments two (T2) and four (T4) used a concentrate mix of 50% cassava, 25% copra meal, 25% soybean skin fed at 1%W/d (T2) and 2%W/d (T4). Cattle were fed for 12 weeks (April to July 2018) in Banaran Village and Bleberan Village in Playen Subdistrict, Gunungkidul Regency, Yogyakarta. The increase in income from the use of cassava-based concentrates was analyzed using the Partial Budget, based on feed costs and LWG of the cattle. The increase of farmer's income per animal over the control was Rp. 751,500.00, Rp. 1,323,000.00, Rp. 810,000.00 and Rp. 1,017,000.00 for T1, T2, T3 and T4 respectively. It was concluded that concentrate supplementation at 1%W/d with composition 50% cassava, 25% copra meal, 25% soybean skin gave the highest increase in income per head

1. Introduction

Self-sufficiency in beef production is one of the goals of the Indonesian government. However, Indonesian beef production is mostly supplied by smallholder farmers and unable to meet domestic demand. Approximately 16.59 million beef cattle are raised in Indonesia [1]. The most common problem in smallholder farmers in Indonesia is low growth rates due to lack of feed and/or poor diet formulation. Farmers formulate ration on cost not on meeting energy and protein requirements.

Cassava (and its by-products) and tree legumes are available to smallholder cattle farmers and could be fed in combination to meet the energy and protein requirements of growing bulls. Number of cassava grower tend to increase especially in area where option to grow other crops is limited such as some area

in Yogyakarta. Gunungkidul one of the districts in Yogyakarta is well known as cassava producer's area which has production about 750,000 tons/year (85.88%) of the total cassava production of 873,362 tons in Yogyakarta Provinces [2]. Other feed sources that available in addition to cassava and cassava by-product are native grass, cultivated grasses, rice straw, corn stover and others crop residue. Farmers usually obtain the grass by cut and carry, fresh rice straw is bought at a low price of 300 IDR/kg while price of gaplek powder to around 1,500 IDR/kg. Gunungkidul is also known as a district with high cattle population area where 148,586 head out of 306,691 head inhabitants in this district [2]. Therefore, it is important to evaluate sources of feed that available locally to develop low cost cattle ration that meet the nutrients (indikator and protein) requirements. The hypothesis is supplementation of gaplek, copra meal and palm kernel cake or soybean hulls in the diets will increase liveweight gain of Ongole bull at a very low cost.

2. Material and Methods

2.1 Material

Fifty Ongole bull will be used in this experiment with initial body weight around 200 kg at 8 to 18 months old. The cattle belong to cooperative smallholder farmer in Banaran and Bleberan villages. Negotiations with cattle owner liase by head of farmer group to ensure that farmers are willing to participate as either control or treatment once the allocation has been made. The cattle are provided to be used in this experiment with the condition that the project will pay for feed, medication and recorder. For the control farmers, there will be some money as reward at the beginning or end of the experiment, so they will stay interested and not be jealous. All bulls will then receive an identification number (INDIKATOR) that must be attached to the animal at all times (neck collar). Refer to *Appendix 1*. All bull will be treated with ivermectin to control internal and external parasite prior to commencement of the experiment. Other animal health treatments can be treated as required at each site. All animal health treatments will be recorded in the log book.

2.2 Methods

The Bleberan village purposively allocated for soybean hulls treatment diets and for current feeding system (CFS), while Banaran village allocated for palm kernel cake treatment diets. The site in Bleberan village will be divided into three site block or group, whereas Banaran village will be divided into two site block or group. The soybean hulls treatments diets and CFS will be allocated randomly into the three site block within Bleberan village, while palm kernel cake treatments diets will be allocated randomly into the two block within Banaran village. Therefore, there will be 9 bulls/group or site block within Bleberan village and 10 bulls/group or site block within Banaran village. So total number of bull will be used in this experiment is 47 heads. The animal in each site block will be allocated randomly into the treatments diet for each village. The dietary treatments will be: T0: Current Feeding System (CFS); T1: CFS + 1% w/d supplement (50% dried cassava + 25% copra meal + 25% palm kernel cake); T2: CFS + 1% w/d supplement (50% dried cassava + 25% copra meal + 25% soybean hulls); T3: CFS + 2% w/d supplement (50% dried cassava + 25% copra meal + 25% palm kernel cake); T4: CFS + 2% w/d supplement (50% dried cassava + 25% copra meal + 25% soybean hulls).

2.2.1. General. Current feeding system is a common feed provide by farmer to the cattle. Current feeding system mainly consist of native grass, cultivated grass, agricultural waste (corn stover, peanut straw), forbs and tree leaf. The CFS will be fed twice a day, one in the morning and the second one will be in the afternoon. The CFS will be offered *ad libitum*. Copra meal, palm kernel cake and soybean hulls will be purchased from Bantul and transported to the site. The daily amount of copra meal, palm kernel cake and soybean hulls will be divided into two lot and will be offered early morning following CFS feeding and early evening. Gaplek will be sourced from local market and transported to the site. The daily amount of gaplek will be divided into two lot and will be offered early morning following CFS feeding and early evening. Palm kernel cake or soybean hulls will be mixed with gaplek and copra meal

prior to offer. Mineral block will be provided in feeding trough Fresh water will be offered in a 15 L bucket twice a day. First offer will be provided following morning feeding and second after afternoon feeding. Bull allow to drink to satiety which indicate that the bull not return to the bucket for at least 10 minutes for each drinking time. Bucket of water will be provided all day to make sure the water needs is fulfilled. Liveweight gain will be recorded by weighing the bull every 3 weeks. The bull will be free from feed and water access overnight starting from 22:00 h up to the completion of weighing time for each animal. Scale will be charged and battery indikator in monitor showed that battery in full condition prior to use. Standard weight will be used prior to animal weighing as a recheck to scale accuracy. The scale will be tared to zero before animals get into the crush. The weigh will be recorded when animal already standing properly on the scale platform and not leaning against rails.

2.2.2. *Statistic.* Feed costs. Feed costs can be known from multiplying the amount of feed given multiplied by the price of feed such as forage and concentrate. Prices of livestock. The price of livestock based on the buying and selling prices of livestock during live. Income changes are analyzed using a partial budget. Changes in feed costs represent the difference in the cost of feed between treatment and control, while changes in income represent the difference in income between treatment and control. Use of a partial budget analysis framework for lost revenues, additional total costs, additional revenue, and reduced total costs.

3. Results and Discussion

Total costs, Cattle rearing businesses require sacrifice or costs for growing cattle weight. The average total cost that must be spent during maintenance can be seen in Table 1.

Table 1. Average Total Cost

	Treatment				
	T0	T1	T2	T3	T4
Average Total Cost (IDR/12week)	IDR 47,570.00	IDR 772,103.94	IDR 976,385.44	IDR 1,601,626.72	IDR 1,693,342.88

In Table 1. Shows the average total cost of cattle recorders. The average total cost of control treatment was IDR 47,570.00 / 12week, treatment T1 IDR 772,103.94 / 12week, treatment T2 IDR 976,385.44 / 12week, treatment T3 IDR 1,601,626.72 / 12week, and the average total cost of T4 treatment was IDR 1,693,342.88 / 12week. T4 treatment cows spend the highest costs compared to control treatments. The cost of feed released is different, so it will affect the income earned [3].

Revenue are calculated by calculating weight gain multiplied by the price of live weight/kg of IDR 45,000/kg. The average acceptance of each cow can be seen in Table 2.

Table 2. Average Total Revenue

	Treatment				
	T0	T1	T2	T3	T4
Average Total Revenue (IDR)	IDR 1,777,500.00	IDR 2,529,000.00	IDR 3,100,500.00	IDR 2,587,500.00	IDR 2,794,500.00

The average cattle revenue of the control treatment was IDR 1,777,500.00/head. The highest revenue of cattle T2 treatment is the highest, which is equal to IDR 3,100,500.00/head. Financially, the revenue from the maintenance effort is more cattle treatment.

Income is a business activity that deducts costs incurred with the proceeds of sales obtained. Income from research results can be seen in table 3.

Table 3. Average Total Income

Parameter	Treatment				
	T0	T1	T2	T3	T4
Average Total Cost (IDR)	IDR 47,570.00	IDR 772,103.94	IDR 976,385.44	IDR 1,601,626.72	IDR 1,693,342.88
Average Total Revenue (IDR)	IDR 1,777,500.00	IDR 2,529,000.00	IDR 3,100,500.00	IDR 2,587,500.00	IDR 2,794,500.00
Average Total Income (IDR)	IDR 1,729,930.00	IDR 1,756,896.06	IDR 2,124,114.56	IDR 985,873.28	IDR 1,101,157.12

In Table 3. the T2 treatment group is able to provide the highest income, which is equal to IDR 2,124,114.56/12week.

4. Conclusion

It was concluded that concentrate supplementation at 1%W/d with composition 50% cassava, 25% copra meal, 25% soybean skin gave the highest increase in income per head.

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