

A COMPARISON OF SMALL-SCALE BRAHMAN FARMERS IN LAMPUNG AND EAST JAVA

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ABSTRACT

One approach to increase the beef cattle population in Indonesia is through the distribution of imported Brahman cows to farmer groups in Lampung and East Java. The participating farmers are required to repay two female calves (or the cash equivalent) within five years for each cow provided. Technical support is given to each group, but problems of inadequate feed supply and poor reproductive performance have been reported. A project to investigate these constraints is being conducted in two districts – Tulangbawang Barat in Lampung and Lamongan in East Java. As part of this project a questionnaire survey was undertaken of 61 Brahman producers in Tulangbawang Barat in July 2011 and 136 in Lamongan in February-March 2012. The purpose of the survey was to describe and compare the production characteristics and constraints of farmers in the two districts. The questionnaire focused on farm-household characteristics, cropping patterns, and cattle management practices, especially feeding. Farmers did not differ greatly in their age (40 years), education (6-8 years), family labour availability (4 persons), and farming experience (20-22 years). Farmers in Tulangbawang Barat had access to 1.8 ha on average and their cropping pattern included rice, maize, and cassava (sold to a local factory), whereas those in Lamongan averaged 0.4 ha and planted only rice and maize. This implied greater local availability of crop by-products that could be fed to cattle in Tulangbawang Barat, though farmers had to purchase and transport cassava by-products from the factory. Producers in Tulangbawang owned more Brahman cattle on average (6.3 head) than in Lamongan (3.2 head). Rice straw was only used as cattle feed during the harvest season in Tulangbawang, hence tended to be fresher, while it was fed all year round in Lamongan. The use of cassava by-products such as peelings and excess starch (*onggok*) in Tulangbawang was still not common (18% of farmers), perhaps due to the cost, which was Rp 300/kg and Rp 600/kg, respectively.

Key words: Brahman cattle, smallholders, feed resources, crop by-products.

INTRODUCTION

Indonesia's population is increasing at a rate of 1.5% (BPS, 2011) causing an increasing demand for meat, especially beef. Domestic beef production has been unable to meet the demand, so that importation of steers as well as beef has also risen every year. Indonesia's government has launched a program to achieve self-sufficiency in beef by the year 2014, with the main approach being to improve the productivity of the cattle

population in the country. One of the efforts to achieve this is through the distribution of Brahman cows to farmers. In 2006 this program began with the distribution of 1,836 head of imported Brahman cows to 32 farmer groups in 25 districts of 9 provinces started. In 2007, this increased to 4,000 head distributed to 85 farmer groups across 41 districts of 15 provinces. In 2008, a further 2,000 head were distributed to 40 farmer groups across 19 districts in 8 provinces (Karnaen, 2009). In East Java close to 900 cows were distributed in 2007 throughout 8 districts through a credit scheme that extended for either 3 years or 5 years (Dinas Peternakan Propinsi Jawa Timur, 2009). The participating farmers are required to repay two female calves (or the cash equivalent) within five years for each cow provided. Similarly, in Lampung close to 2,000 head had been distributed up to 2008 and continued in the following years from 2009 to 2011 (Ditjen Peternakan, 2011).

Putro (2010) has reported that raising Brahman cattle under farmers' conditions was not successful. The first calving yielded almost 90% because the farmers had received pregnant cows (5-7 months), but the farmers struggled to get the cows to conceive a second time. The biggest problems appeared to be the low reproduction rate of the cows, high mortality of the calves, and slow growth of young cattle. These problems were probably due to a combination of inadequate nutrition and poor mating and weaning management.

Poppi *et al.* (2004) conducted research on improving the productivity of smallholder cattle farms in the eastern provinces of Indonesia (East Nusa Tenggara, West Nusa Tenggara, South Sulawesi, South-East Sulawesi and East Java). This research has led to the development of an approach for improving the management of cow-calf systems to improve reproduction rates in Bali and Ongole cattle – the so-called Integrated Village Management Scheme (IVMS). The IVMS is based on principles developed in the Northern Australian beef industry (which is largely based on Brahman cattle) adapted to Indonesian smallholder farming systems, namely early weaning (5-6 months compared to 12 months), controlled natural mating for 5 months, and strategic supplementation of the cow around parturition. The same general principles are being applied to Brahman smallholders in a project LPS 2008/038 entitled “Improving reproductive performance of cows and performance of fattening cattle in low input systems of Indonesia and northern Australia”. This project aiming to assess and improve Brahman cow calf and fattening systems in Indonesian villages, in this case East Java and Lampung. A baseline survey has been conducted to characterise Brahman's cattle production in both sites.

The paper aims to describe and compare characteristics of smallholder farmers who raised Brahman cows within two sites, one in Lampung and one in East Java, their production practices and feeding management, and the constraints on feed availability..

MATERIALS AND METHODS

Surveys were conducted within two periods. In July 2011, three villages – were surveyed in Tulangbawang Barat, Lampung – Dayaasri, Murnijaya and Pulung Kencana – all former transmigration villages with mainly Javanese residents. From February to March 2012, two villages were surveyed in Lamongan, East Java – Mojorejo and Nogojatisari. Respondents in the study were 197 farmers rearing Brahman cows as collaborators – 61 farmers in Tulangbawang Barat and 136 farmers in Lamongan. Respondents were interviewed using a structured questionnaire, which included items relating to household and farm characteristics, cattle numbers, the acquisition, use and management of feed resources, and constraints in raising Brahman cattle. Mean values of variables within the two sites were compared using t-tests.

RESULTS AND DISCUSSION

Characteristics of Farm-Household

In general, there were no significant differences in the characteristics of farm households between Tulangbawang Barat and Lamongan, except with regard to the husband's and the wife's education (Table 1). On average, the husband and wife in Tulangbawang Barat had significantly more years of education than those in Lamongan ($P < 0.05$), though the actual difference was small (just over a year). Farmers' characteristics were similar to those of cattle producers in general, including age (averaging 46 and 39 years respectively for husband and wife) and education level (passed elementary school). The average household size was 4.1 persons, suggesting that family labour was available to help manage the cattle operation, though most of the family members were schooling. Farmers' experience in cattle production was slightly less than their experience in farming, but on average they had been dealing with livestock for 17-18 years .

Table 1. Characteristics of farm-household

| | Tulangbawang Barat | Lamongan | P value |
|-----------------------------------|--------------------|----------|---------|
| | Mean | Mean | |
| Number of family member (persons) | 4.13 | 4.09 | 0.815 |
| Husband's age (years) | 45.80 | 46.45 | 0.708 |
| Wife's age (years) | 38.25 | 40.95 | 0.136 |
| Husband's education (years) | 7.95 | 6.67 | 0.019 |
| Wife's education (years) | 7.54 | 6.38 | 0.023 |
| Farming experience (years) | 19.85 | 21.79 | 0.347 |
| Cattle experience (years) | 15.66 | 18.04 | 0.216 |

While most respondents in both sites indicated that farming was their major occupation, 20% of farmers in Lamongan relied mainly on farm or non-farm wage work for their livelihood because the land they managed was not sufficient to support them (Table 2). Farm or non-farm wage work was also the main secondary job for respondents in Lamongan (48%), hence own-account crop and livestock activities were only one source of livelihood for most households. Interestingly, the majority of farmers in Tulangbawang Barat had no secondary job (67%), implying that really rely on farming as their main occupations.

Table 2. Occupation of farmers

| Occupation | Tulangbawang Barat | | Lamongan | |
|-----------------------------|--------------------|------------|-------------------|------------|
| | No. of households | Percentage | No. of households | Percentage |
| Main occupation | | | | |
| Farmer | 49 | 80 | 94 | 69 |
| Farm/non-farm labour | 6 | 10 | 27 | 20 |
| Seller/entrepreneur | 3 | 5 | 8 | 6 |
| Civil servants | 2 | 3 | 5 | 4 |
| Private company staff | 1 | 2 | 2 | 1 |
| Total | 61 | 100 | 136 | 100 |
| Secondary occupation | | | | |
| Farm/non-farm labour | 11 | 18 | 65 | 48 |
| Farmer | 6 | 10 | 37 | 27 |
| Seller/entrepreneur | 3 | 5 | 7 | 5 |
| No other occupation | 41 | 67 | 27 | 20 |
| Total | 61 | 100 | 136 | 100 |

Farm Size and Land Use

Land managed by farmers was divided into paddy land and dryland, and owned and rented land. Farmers in Tulangbawang Barat owned significantly more paddy land and dryland than those in Lamongan ($P < 0.05$) (Table 3). On average, farmers in Tulangbawang Barat managed 1.62 ha compared to 0.98 ha in Lamongan, of which half was paddy land. It

can be seen that some farmers owned up to 3.5 ha of paddy land. Interestingly, farmers in Lamongan had rented three times more dryland than they owned. This opportunity occurred due to the availability of land under teak forest that could be planted with elephant grass to be fed to cattle.

Table 3. Farm size by land type

| Types | Tulangbawang Barat | | | Lamongan | | | P value |
|------------|--------------------|----------|----------|-----------|----------|----------|---------|
| | Mean (ha) | Min (ha) | Max (ha) | Mean (ha) | Min (ha) | Max (ha) | |
| Paddy land | 0.83 | 0.12 | 3.5 | 0.41 | 0.05 | 3.0 | 0.001 |
| Dryland | 0.79 | 0.25 | 2.0 | 0.57 | 0.06 | 2.5 | 0.074 |
| Total | 1.62 | 0.12 | 3.5 | 0.98 | 0.05 | 3.0 | |

The most common crops planted in this land were food crops, such as rice, maize and cassava (Table 4). Most farmers in the two sites had access to a paddy field – 77% and 62% for farmers in Tulangbawang Barat and Lamongan, respectively. Almost all farmers in Tulangbawang Barat planted rice twice a year (96%) and none for three times. In contrast, most farmers in Lamongan planted rice three times in a year (60%) and the rest (38%) planted twice a year. Almost all of the farmers in both sites planted rice in the first planting season or wet season – November to February. In the second planting season, most farmers in Tulangbawang Barat planted maize or cassava (54%) and the rest planted rice. The majority of farmers in Lamongan planted rice during this season (80%). A very few farmers in Lamongan also planted sugarcane in their paddy field, especially fields without irrigation.

Close to 60% of farmers in Tulangbawang Barat and 38% in Lamongan had no access to dryland. Most farmers in Tulangbawang Barat had planted rubber and cassava on their dryland, while farmers in Lamongan had planted a mixture of crops such as maize, green bean, and soybean, along with sugarcane or teak. This indicates that crop by-products from their land could be used as feed sources for their cattle. There is a big factory for producing cassava starch in Tulangbawang Barat, the residue of which (*onggok*) is a very high energy feed source for cattle.

Table 4. Cropping systems in paddy fields and dryland

| Cropping system | Tulangbawang Barat | | Lamongan | |
|---------------------------|--------------------|------------|-------------------|------------|
| | No. of households | Percentage | No. of households | Percentage |
| Have paddy fields | 47 | 77 | 84 | 62 |
| Rice-rice | 20 | 42 | 26 | 31 |
| Rice-maize | 13 | 28 | 5 | 6 |
| Rice-cassava | 12 | 26 | 1 | 1 |
| Rice-fallow | 2 | 4 | 1 | 1 |
| Rice-rice-rice/maize | 0 | 0 | 41 | 49 |
| Rice-rice-tobacco | 0 | 0 | 7 | 8 |
| Sugarcane | 0 | 0 | 2 | 2 |
| Rice-maize-maize | 0 | 0 | 1 | 1 |
| NA | 0 | 0 | 1 | 1 |
| No access to paddy fields | 14 | 23 | 52 | 38 |
| Total | 61 | 100 | 136 | 100 |
| Have dryland | 25 | 41 | 84 | 62 |
| Rice-cassava | 0 | 0 | 1 | 1 |
| Rice-maize/tobacco | 0 | 0 | 8 | 10 |
| Maize-maize/soybean | 0 | 0 | 60 | 71 |
| Sugarcane / teak / rubber | 16 | 64 | 14 | 17 |
| Tobacco-green beans | 0 | 0 | 1 | 1 |
| Cassava | 9 | 36 | 0 | 0 |
| No access to dryland | 36 | 59 | 52 | 38 |
| Total | 61 | 100 | 136 | 100 |

Cattle Owned

On average, farmers in Tulangbawang Barat managed 5.3 cattle, significantly more than the mean of 3.3 cattle for Lamongan ($P < 0.001$, Table 5). These cattle consist of Brahman and Brahman cross. Most of the adults were Brahman cows that had been distributed to the farmers in both sites. The Brahman-cross cattle were the offspring of Brahman cows mated using artificial insemination with Simmental or Limousin semen. Farmers in Tulangbawang Barat averaged close to two adult Brahman cows whereas those in Lamongan had only one adult Brahman cow. The larger size of the cattle operation in Tulangbawang Barat implied that more feed resources were needed to meet the greater demand for cattle feed in this site.

Due to the credit program for distributing the Brahman cattle, it was obvious that most farmers in both sites kept adult Brahman cows. Only a few farmers raised Brahman-cross cows for their cow-calf operation. In contrast, it seemed that most young cattle and calves in both sites were Brahman cross.

Cattle in Tulangbawang Barat were kept in a permanent individual shed, located about 10 m or more from their homes, while in Lamongan cattle were kept in the yard adjacent to the home.

Table 5. Average number of cattle owned by farmers

| Cattle age | Tulangbawang Barat | | | Lamongan | | | P value |
|-------------------|--------------------|-----|-----|----------|-----|-----|---------|
| | Mean | Min | Max | Mean | Min | Max | |
| Adult (> 2 year) | 1.85 | 1 | 3 | 1.19 | 1 | 3 | 0.000 |
| Young (1-2 year) | 1.88 | 1 | 6 | 1.04 | 1 | 2 | 0.000 |
| Calves (< 1 year) | 1.59 | 1 | 3 | 1.03 | 1 | 2 | 0.000 |
| Total | 5.32 | 1 | 6 | 3.26 | 1 | 3 | |

Feeding Management

Farmers in both sites utilised a variety of on-farm feed resources, comprising natural vegetation (including grasses), crop by-products (especially rice straw and maize stover), and others. The most common forage that given to cattle was native grass and elephant grass, mostly during the wet season. Some farmers (38%) in Tulangbawang Barat had planted *Setaria sphacelata* (setaria) as introduced by the local livestock services several years before. None of the farmers in Lamongan has planted setaria, so that it had never been given to the cattle. In general, in Tulangbawang Barat elephant grass had been planted along irrigation channels and terraces and on embankments of the paddy fields or dryland, while that in Lamongan had been planted along terraces of dryland or under teak plantations. A lower proportion of farmers fed forage legumes to their cattle, mainly *Gliricidia* and *Leucaena*. This finding is similar to that of a previous study by Hanifah *et al.* (2010) which found that very few farmers fed forage legumes to their cattle in Probolinggo, Pasuruan, and Malang, East Java.

Table 6 shows that rice straw and maize stover were the most common crop by-products fed to cattle. Rice straw was given by 89% farmers in Tulangbawang Barat and 97% in Lamongan. This was related to the seasonal availability of the different crop by-products as determined by the cropping pattern in each location. Farmers in Tulangbawang Barat brought rice straw from their own and other people's land using bicycle or motorcycle, while some farmers in Lamongan had to by rice straw, especially during the dry season. In Tulangbawang Barat, rice straw was given to cattle mostly in fresh condition during the harvest season as it was obtained from their paddy land and fed directly. This indicated that farmers only fed rice straw during the two harvest seasons , therefore rice

straw was only used for 3-4 months per year. Almost all farmers in Tulangbawang Barat had a storage area for rice straw, so the leftover could be stored in this small plot close to the cattle shed.

Table 6. Types of feed given to cattle

| Types of feed | Tulangbawang Barat (% of households) | Lamongan (% of households) |
|----------------------|---|-------------------------------|
| Forage grasses | | |
| - Native grass | 75 | 95 |
| - Elephant grass | 59 | 65 |
| - Setaria | 38 | 0 |
| Legumes | | |
| - Leucaena (lamtoro) | 10 | 11 |
| - Gliricidia(gamal) | 2 | 16 |
| - Sesbania (turi) | 0 | 1 |
| Crop by-products | | |
| - Rice straw | 89 | 97 |
| - Maize stover | 7 | 28 |
| - Banana peel | 11 | 0 |
| - Cassava peel | 8 | 0 |
| - Rice bran | 61 | 68 |
| - Onggok | 21 | 0 |
| Others | | |
| - Tofu waste | 3 | 4 |
| - Salt | 3 | 54 |
| - Concentrates | 3 | 15 |

On the other hand, most farmers in Lamongan fed dry rice straw to their cattle almost every day. The rice straw had been dried for 1-2 days either in the rice fields or in the yard and they stored it in a small place at the shed. There was always rice straw in storage, kept as a reserve primarily to feed to the cattle during the dry season. The majority of farmers fed rice straw to their cattle all year round. Besides collecting rice straw from their own and other people's land, very often farmers in this site had to buy rice straw from outside the village. The price of rice straw varied with the season. During the harvest season the price was Rp 150,000-200,000 per small truck, while outside the harvest season the price rose to Rp 300,000-350,000 per truck. This small truck can carry about 700-800 kg of rice straw. Compared to a previous study by Hanifah *et al*, (2010), the price of rice straw in this site almost the same with the case of Probolinggo and a much higher than in Malang.

Rice bran was also commonly fed to cattle and mostly after milling the paddy rice, so its price was considered cheap. Some farmers had purchased rice bran when it was cheap, with the average price of Rp 1,500-2,000/kg. Cassava peel and *onggok* were fed to cattle in the Tulangbawang Barat site by 8% and 21% of farmers, respectively, even though this site was a cassava producing area. Anonymous (2005) in Mildayani, (2007) has reported that cassava starch residue (*onggok*) contains is a good source of energy for cattle. The limited use of *onggok* as cattle feed could be due to the price of Rp 600/kg and because it has to be bought and transported from the nearest factory. The price for cassava peel of Rp 300/kg is considered expensive by farmers. Under the situation of a very dry season in which no green forage or rice straw is available, farmers have to buy cassava peel to maintain their cattle. It may be worthwhile to consider developing a partnership between farmers and the cassava factory to get access to *onggok* in return for composted cattle manure. The cassava factory get cassava tube from other farmers and the manure as fertilizer could be given to this cassava farmers to achieve higher cassava yield.

Almost all farmers in both sites fed forage grasses and rice straw to their cattle, but the sources varied (Table 7). Most farmers collected the feed by themselves, but in Lamongan only a minority of farmers sourced their rice straw and forage grasses exclusively from their own fields (7%). In contrast, a higher proportion of farmers in Tulangbawang sourced this feed from their own land (30%). This reflected the fact that farmers in Lamongan had limited land compared to those in Tulangbawang Barat. Most farmers in both sites (62% in Tulangbawang Barat and 76% in Lamongan) collected the feed, whether from their own or others' fields.

Tabel 8. Sources of forage grasses and rice straw

| categories | Tulangbawang Barat | | Lamongan | |
|---|--------------------|------------|----------------|------------|
| | No. of farmers | Percentage | No. of farmers | Percentage |
| By themselves from own land | 18 | 30 | 10 | 7 |
| By themselves from other people's land | 20 | 32 | 41 | 30 |
| By themselves from own land, other people's land | 18 | 30 | 62 | 46 |
| By themselves from own land, other people's land, buy | 5 | 8 | 21 | 15 |
| By themselves from other people's land, buy | 0 | 0 | 2 | 2 |
| Total | 61 | 100 | 136 | 100 |

CONCLUSION

The Brahman smallholders in this study were no different from Javanese cattle smallholders in general. Farmers in the two study sites did not differ greatly in their age (40 years), education (6-8 years), family labour availability (4 persons), and farming experience (20-22 years). On average, they had nearly two decades of experience raising cattle. Hence in both sites they had adapted reasonably well to rearing Brahman cattle and in most cases were able to pay back their credit within the five years. Nevertheless, there were important differences in resource-availability between the two sites, resulting in different constraints and outcomes, particularly with regard to meeting the higher feed requirements of the Brahmans.

Farmers in Tulangbawang Barat had access to 1.8 ha on average and their cropping pattern included rice, maize, and cassava (sold to a local factory), whereas those in Lamongan averaged only 0.4 ha and planted only rice and maize; they were also more dependent on farm and non-farm wage work to supplement their farm income. The larger holdings in Tulangbawang Barat implied greater local production and availability of crop by-products that could be fed to cattle, though farmers still had to purchase and transport cassava by-products from the factory.

Given their larger land base, producers in Tulangbawang owned more Brahman cattle on average (6.3 head) than in Lamongan (3.2 head). Rice straw was mainly used as cattle feed during the harvest season in Tulangbawang, hence it tended to be fresher, while it was stored and fed all-year-round in Lamongan and presumably was of lower quality. The use of cassava by-products such as peelings and excess starch (*onggok*) in Tulangbawang was still not common (18% of farmers), probably due to the cost. Further research is needed to see if more cost-effective ways can be found to utilise the energy-rich cassava by-products in this site.

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