

## The invasion of crossbred cattle: Stakeholders' Perspectives in Central Java, Indonesia

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### Abstract

This study aims to investigate stakeholders' perspectives about impacts of cattle crossbreeding in the lowlands, wet uplands and dry uplands in Yogyakarta, Central Java, Indonesia. The information was gathered with secondary data analysis, 11 farmer group discussions and individual interviews with 122 farmers, 14 inseminators, 2 veterinarians, 10 cattle traders, and 35 food sellers (*bakso* and *rendang*). Crossbreeding was triggered by government policy. Farmers keeping crossbreds had higher education level, a more prestigious job in the non-agricultural sector and were wealthier than farmers keeping local cattle. Cattle had multiple functions. The major reason for keeping cattle was saving or insurance against urgent cash needs, then manure and draught power. Almost all crossbred cattle farmers did not consider draught power as a reason for keeping cattle. Local cattle in the dry uplands were still used for draught power. In the wet uplands, the main reason to choose crossbreds was their higher daily gain, whereas in the lowlands and dry uplands, it was their higher sale price. According to cattle traders, crossbreds got twice higher sale price than local cattle. Farmers have become fanatic in acquiring crossbreds. The preferred breed was the Simmental X Peranakan Ongole (PO) because of the shiny red coat, yellow lips and unselective feeding habits. Also, inseminators said that the highest demand was for Simmental semen. The PO cattle were the last choice; with as main motive for keeping PO limited capital availability. Farmers' opinion about the performance was that crossbreds showed better daily gain, but no better fertility and disease resistance. Almost all crossbreds suffered *cascado* disease, although farmers saw this not as a problem. Experienced *bakso* (meat balls) sellers preferred meat from local cattle because this resulted in higher numbers and more compact *bakso*. To apply crossbreeding further, stakeholders should consider the benefits and consequences.

*Key words: stakeholder, perspective, cattle, crossbreeding*

### Introduction

In developing countries, crossbreeding has become a standard approach to increase livestock productivity. Crossbreeding has the objective to combine desirable characteristics and to exploit hybrid vigour or heterosis (Udo, 1994). In addition, it was found that under good management conditions, crossbreds could result in increased gain and productivity (Said *et al.*, 2003). The results from crossbreeding programs vary from one country or region to another, because of genotype and environment interactions (Syrstad, 1990).

Crossbreeding, most of the time, is done haphazardly, which results in genetic erosion of well adapted local breeds. About 30% of the world's breeds are at risk of extinction. Previous studies investigated the impacts of cattle crossbreeding at animal level in Yogyakarta Province (Sumadi *et al.*, 2003). As could be expected, crossbred

cattle have better performances, especially higher daily gain. However, studies which compare local and crossbred cattle at farm level or at regional level are relatively scarce. In Indonesia there are some indications that food sellers prefer to use meat from local animals. The objective of this research is to investigate the impact of cattle crossbreeding from multi stakeholders' perspectives in the three agro-ecological zones in Yogyakarta province-Indonesia and to describe the change in cattle functions through answering the research questions mentioned below:

1. What are farmers' perceptions on cattle crossbreeding?
2. What is the change in cattle functions due to the shift from local to crossbred cattle?
3. What are other stakeholders' perspectives on cattle crossbreeding?
4. What are perceptions of food sellers on differences in meat quality from local and crossbred animals?

### Material and Methods

The research was conducted in Yogyakarta province, which is located in the southern part of Central Java, between 7°32'-8°12' south latitude and between 110°-110°50' east meridian. The area covers about 3,186 km<sup>2</sup> with a population density of 980 per km<sup>2</sup>. About 42% of the population lives in rural areas (Pemda DIY, 2005). Yogyakarta province is divided into 4 regencies; Bantul, Sleman, Gunung Kidul and Kulon Progo. For field research, the area was divided, based on geographical division, into 2 strata: uplands (> 500m a.s.l) and lowlands (<100 m a.s.l). The methodologies used were secondary data analyses, discussion with 11 farmers' groups and individual interviews guided by a semi-structured questionnaire with 122 farmers, 2 veterinarians, 14 inseminators, 10 cattle traders and 35 food sellers (25 *bakso* and 15 *rendang* sellers).

### Results and Discussion

Farmers have varied backgrounds as shown in Table 1.

Table 1. Mean and standard deviation (SD) of age (y), family size (n), experience (y), time spent (hours/day), cattle kept (n), cultivated land (ha) of farmers interviewed in the six farming systems

Parameters	Lowlands		Lowlands		Wet Uplands		Wet Uplands		Dry Uplands		Dry Uplands	
	& Local		& Crossbred		& Local		& Crossbred		& Local		& Crossbred	
n	7		30		15		25		36		9	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	41.3 <sup>a</sup>	8.6	47.8 <sup>a</sup>	15.5	52.6 <sup>a</sup>	13.5	44.9 <sup>a</sup>	13.8	52.1 <sup>a</sup>	10.1	53.9 <sup>a</sup>	14.7
Family Size	3.4 <sup>a</sup>	1.6	4.7 <sup>a</sup>	1.6	5.1 <sup>a</sup>	2.4	3.8 <sup>a</sup>	1.8	4.4 <sup>a</sup>	1.9	3.7 <sup>a</sup>	1.4
Experience	5.7 <sup>a</sup>	4.5	11.6 <sup>b</sup>	14.2	15.3 <sup>b</sup>	14.9	12.8 <sup>b</sup>	14.4	24.1 <sup>c</sup>	14.5	21.8 <sup>c</sup>	15.2
Time Spent	3.3 <sup>a</sup>	1.6	2.5 <sup>b</sup>	1.4	2.8 <sup>b</sup>	1.2	3.3 <sup>a</sup>	1.3	3.4 <sup>a</sup>	1.4	4.1 <sup>c</sup>	1.5
Cattle kept	2.5 <sup>a</sup>	0.9	2.3 <sup>a</sup>	1.3	1.4 <sup>b</sup>	0.6	1.8 <sup>b</sup>	0.8	1.5 <sup>b</sup>	0.7	2.1 <sup>a</sup>	1.1
Land cultivated	0.7 <sup>a</sup>	1.1	0.4 <sup>b</sup>	0.4	0.5 <sup>b</sup>	1.2	0.4 <sup>b</sup>	0.9	0.9 <sup>a</sup>	1.2	2.1 <sup>c</sup>	2

Means in the same row with different superscripts are significantly different ( $P < 0.05$ )

Majority of farmers in the lowlands kept crossbred cattle. Farmers in the dry uplands and in the wet uplands kept fewer cattle (1.7 heads) than in the lowlands (2.4

heads) due to their limited feed availability and their limited capital. Farmers in the lowlands and the wet uplands had less cultivated land (0.5 ha) due to a higher population density. In addition, farmers in the dry uplands spent more time (1.25 h longer) each day on cattle activities. The extra time is needed because the farmers in the uplands collect the forage in hilly areas which can only be reached by foot. Farmers with crossbred cattle feed more concentrates which is less time consuming. The age of farmers on average was higher in the dry uplands (53 years) than in the wet uplands (49 years) and the lowlands (45 years) so they had longer experience (23 years) in keeping cattle. The education level of farmers was higher in the lowlands (Senior High School) and the wet uplands (Senior High School) than in the dry uplands (Elementary School). Crossbred farmers had higher education level, a more prestigious job and were wealthier than local farmers.

Farmers' opinion about differences in crossbred and local cattle performances is shown in Table 2. Farmers were of the opinion that crossbred cattle grew better than local cattle. While about fertility performance, the farmers' opinions were widely spread. For the resistance to disease, majority of the farmers thought that there was not much difference between local and crossbred cattle, though most crossbred cattle suffered from *cascado* disease. This disease caused a skin lesion which decreased the quality of the hides. Farmers did not consider this as a problem because this disease is not a primary death reason and they did not invite the vet because of the additional costs.

Table 2. Distribution of the farmers' opinions when comparing performances of crossbred with local cattle (n=64) (%)

	Growth (%)	Fertility (%)	Resistance to disease (%)
Better	90.6	26.6	10.9
Average	9.4	23.4	64.1
Worse	0	35.9	25.1
No idea	0	14.1	0

Cattle in small mixed farming systems have multiple functions. The main aim of keeping cattle was saving or insurance against urgent cash needs for all farmers, whether they kept crossbred or local cattle. The second reason was manure. The third reason was draught power. A shift from local cattle to crossbred cattle caused a change in the functions of cattle, in particular draught power. The change in draught power function also differed regionally. Cattle were not used for draught power in the lowlands. Here, cattle were replaced totally by tractor and *pick up* car. About 80% farmers in the lowlands and wet uplands, and 40% in the dry uplands did not consider draught power as their objective to keep cattle.

Most farmers in the lowlands and the dry uplands kept crossbred cattle because of the higher sale price, while farmers in the wet uplands kept crossbred cattle because of the higher weight gains as shown in Table 3. Most farmers in the dry uplands kept local cattle because of their limited capital; they could not afford to buy crossbreds or to use expensive semen from crossbred cattle. Simpo (Simmental X PO) cattle were the favourite breed of farmers because they have a shiny red coat, yellow lips and higher appetite. Limpo (Limousin X PO) cattle were the second preferred breed as they have more rough hair, less shiny skin and black lips (see Table 4). PO was the last choice. Some farmers were very fanatic in their preference towards crossbred cattle.

Table 3. The distribution of breed preference by farmers (n=122) (%)

Breed/priority <sup>1</sup>	1	2	3	Not considered
Simmental	76.2 <sup>a</sup>	3.3 <sup>a</sup>	-	20.5 <sup>a</sup>
Limousin	3.3 <sup>b</sup>	27.9 <sup>b</sup>	1.6 <sup>a</sup>	67.2 <sup>b</sup>
Brahman	1.6 <sup>c</sup>	11.5 <sup>c</sup>	14.8 <sup>b</sup>	72.1 <sup>c</sup>
PO	14.8 <sup>d</sup>	0.8 <sup>d</sup>	12.3 <sup>b</sup>	72.1 <sup>d</sup>

Different superscripts at the same column indicate significant differences ( $P < 0.05$ ) between the breeds  
<sup>1</sup>: 1= the highest priority, 2= the second priority, 3= the third priority, and nc= not considered

Experienced *bakso* sellers (more than 10 years experience) were able to differentiate the meat qualities from crossbred and local cattle. They can differentiate colour, tenderness and texture based on their long experience. They stated that meat from crossbred cattle is more tender and brighter. *Bakso* sellers stated that local cattle meat is better for making *bakso* due to better texture. *Rendang* sellers failed to differentiate between the meat qualities of crossbred and local cattle.

Table 4. The age, experience and distribution of identification in meat qualities differences for *bakso* sellers.

Age (years)		Experience (years)		Colour (%)		Texture (%)		Taste (%)		Tenderness (%)	
Mean	SD	Mean	SD	1	2	1	2	1	2	1	2
38.9	7.6	12.8	6.5	68 <sup>a</sup>	32 <sup>b</sup>	48 <sup>a</sup>	52 <sup>a</sup>	56 <sup>a</sup>	44 <sup>a</sup>	64 <sup>a</sup>	36 <sup>b</sup>

Different superscripts at the same row indicate significant differences ( $P < 0.05$ )  
 1= able to differentiate and 2= not able to differentiate

Local cattle have some strong points such as well adapted to poor nutrition and disease problems (Thomas *et al.*, 2002), but several threats forced the reduction of the local cattle population. The most dangerous threat is the attitude from most stakeholders, not only the government and cattle traders, but also the farmers themselves as shown in table 5. Farmers' decision to keep crossbred or local cattle was much influenced by their perspectives, background, and resources. Other stakeholders involved were government, scientists, inseminators, veterinarians, cattle traders, food sellers, and industry.

The SWOT table below shows that keeping crossbred cattle fits with the government objective to improve meat production because crossbred cattle have higher body weight gain. Hadi and Ilham (2002) found an average daily gain of 0.9 kg for *Simpo*, 1.2 kg for *Limpo* and 0.4 kg for PO cattle. Keeping crossbred cattle is booming business because of the attractive sale price of crossbreds. Most farmers considered the saving or insurance cash need as their first priority and farmers can get more money when a crossbred animal is sold. Hadi and Ilham (2002) found that based on financial analysis with 3 cows for 8 years in Central Java, a fattening farm with crossbred cattle (PO and Simmental) semen could reach a Net Present Value (present value of revenues minus present value of expenses) Rp 15,000,000 and with a Benefit Cost Ratio: 1.15 on bank interest of 18%. Hadi & Ilham (2000) found that the NPV was negative for a breeding farm with 3 cows: -19.000.000 Rupiah with BCR 0.73.

Table 5. SWOT Analysis for Crossbred and Local cattle keeping in smallholder farming in Yogyakarta Province

Crossbred cattle		Local Cattle	
Strengths	Weaknesses	Strengths	Weaknesses
Higher weight gain	Less resistance	Stronger resistance	Lower weight gain
Attractive skin colour and yellow lips	Worse adaptability	Good adaptability	Non attractive skin colour
Farmers feel proud to keep Non selective feeders	High capital	Less capital	not preferred by the farmers
	Higher feed requirement	Draught animals More fertile Lower feed requirement	Selective feeders
Opportunities	Threats	Opportunities	Threats
Higher sale price	Uncontrolled inbreeding	<i>Bakso</i> sellers preference	Lower sale price
Preferred by the cattle traders			Farmers are fanatic to get Simmental cattle Decreasing population because of crossbreeding

A first possible solution to the problem of the vast disappearance of local cattle is starting a campaign to promote the qualities of local cattle, seeing the conditions in the geographical zones. Such a campaign can be a way to influence the stakeholders' perspectives, mainly the government as policy maker and the farmers as the main actors in the field. There is another solution to increase meat production which is almost forgotten: selection within local cattle (FAO, 1982). A third possible solution is varying regional policies instead of one national policy for keeping crossbred cattle. In the dry uplands, local cattle can be kept due to limited forage availability and the draught power function. Keeping local cattle in the dry uplands could also provide local cows for replacement in other regions.

### Conclusions

The varied background of farmers influences the change in cattle production systems. Farmers decide which cattle type they will keep crossbred or local cattle without changing their first motive of keeping cattle which is the capital asset function (saving or insurance). It can be concluded that farmers preferred to keep *Simpo* instead of other breeds not only because of economical reasons such as a higher sale price but also due to the attractive appearance. The sale price was not only influenced by performances but also by psychological effects such as the shiny red coat of *Simpo*. The crossbreeding practiced seems to follow a fashionable trend and is implemented haphazardly. Crossbreeding needs control from regional and or national policy makers due to the negative effects such as inbreeding and endangering local cattle. It is very difficult to find a proper solution which will fit all stakeholders and will not only benefit one stakeholder group such as government with its main objective to increase meat production. However, the long term effects should be considered. Valuable traits are already found in the local cattle, what we need are innovations to expose those valuable traits for the small mixed farming systems in Yogyakarta Province.

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