ORIGINAL ARTICLE

Traders' preference for goat characteristics in selected markets of Pangasinan, Philippines

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ABSTRACT

Preference for goat characteristics was determined from 42 traders in six markets in Pangasinan, an important trading center for goats in Luzon, the Philippines, and analyzed using a hedonic price model to determine whether these characteristics are important price determinants of goats. This information is important to goat raisers to respond to the needs of the local market, and thus to achieve a better price and higher income in goat raising. Meatiness, size, breed, sex and age (in descending order) were the dominant goat characteristics preferred by traders. Meatiness had the largest positive influence on price, with a price premium of US$6.24 (US$1.00 = PhP 53), whereas the age of the animal had the smallest influence at US$3.72. However, size and meatiness are manifestations of good breeds. Therefore, continued efforts to improve breeds in order to produce good quality goats are imperative to cater to market needs. Different characteristics implied different price premiums. Traders offered a higher price premium for better goat characteristics; thus, the improvement of these characteristics could result in higher returns for goat raisers.

KEYWORDS: goat characteristics, goat marketing, hedonic price model, implicit price, traders' preference.

INTRODUCTION

The contribution of the livestock industry to the development of the Philippine agriculture cannot be overemphasized. The industry has been an important source of milk, meat, draft power and hides. Among livestock, small ruminants, particularly goats, possess inherent characteristics that could provide a comparative advantage in production compared with large ruminants, poultry and swine. From 1990 to 2001, goat production and its value of production have consistently been one of the lowest in the livestock sector. On average, goats shared only 3.6% (PhP 31 047m) of the total value of livestock production (PhP 868 265m) compared with cattle, with 13% (PhP 112 752m) and hog, with 78% contribution (PhP 680 514m). Goat inventory increased from 1980 to 1990 by 3.06% yearly. From 1991 to 2000, the goat population increased faster at 3.7% yearly. Moreover, the value of production increased yearly by 7.7% from 1991 to 2000 and its popularity in the local market has soared. Central Visayas ranked first in terms of national goat inventory, with a 14.83% contribution in 2002, followed closely by the Ilocos region with a 13.49% contribution. Pangasinan is the top producing province in the Ilocos region and it is gaining importance as a trading center for goats.

Several marketing studies on goats have been conducted in the past, but most of these, if not all, were focused on the analysis of the existing goat marketing system. Very little attention was given to examining goats' physical characteristics and consumers' preference in the local market. Although buyers have

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indicated their preference for some quality attributes in goats, these are not well documented. Moreover, there has been no precise estimate to quantify the value of these attributes. The present study has (i) identified the physical attributes of goats preferred by traders; (ii) determined how much price premium traders attach to these characteristics and; (iii) derived implications of the results to current government efforts to upgrade goats.

Knowledge of the goat characteristics that are demanded by traders is important among raisers to respond to the needs of the local market and the industry. Moreover, the information generated from this research will provide input to both raisers and animal scientists in order to improve the characteristics of genetic resources, thus increasing the price of goats in the local market, which could eventually increase the income of raisers.

MATERIALS AND METHODS

Locale of the study

Urdaneta City serves as a trans-shipment point for large livestock, such as carabao and cattle, from Ilocos and Cagayan in Northern Luzon, and Nueva Ecija and Tarlac in Central Luzon, to the National Capitol and Southern Luzon markets. As a gateway to the Northern Luzon markets (where the goat has a very strong niche because of a high demand for goat's meat), Urdaneta has become a fast-growing market center for goats. Goat trading has also gained importance among traders in towns near Urdaneta, such as Villasis, Santa Barbara, Calasiao and Malasique; hence, these places were also selected.

Data collection

There were three methods of data collection employed to gather relevant information as follows:

1 Data from secondary sources and a quick overview of the market to identify the major players in the market.
2 Personal interview with traders using a prepared set of interview schedules.
3 Focus group discussion with other key informants to augment the information derived from (1) and (2).

Selection of trader respondents

A list of goat traders in the selected markets for goats in Pangasinan were sought from the market administrator and local units of the Department of Agriculture in Urdaneta and Calasiao. However, there was no list available because goat traders are not registered. Most of the traders did not occupy permanent stalls in the market; hence, they were not required to register in the local government offices. To identify the respondents and determine the best time for documentation and interview, a quick reconnaissance survey was conducted.

A total of 42 traders were interviewed during the marketing transactions of goats on different days of the week. Only the traders situated in the trading places from 29 January to 9 February 2002 were interviewed. Because the physical attributes of goats were one of the main objects of the investigation, only the buyers of live goats were interviewed. The traders were classified according to the nature of their activities in the market. The respondents consisted of 20 assembler–wholesalers (48%), 12 wholesaler–retailers (29%), three commission agents (7%), four meat retailers (10%) and three institutional buyers (7%). A proportionate sample for each type should have been taken, but this was not possible because of the absence of a list resulting in a purposive enumeration during the interview, which was timed during the actual market transaction. Normally, the transaction period occurred in the early morning, from 04.00 to 08.00 hours.

The assembler–wholesalers and wholesaler–retailers were those who bought a large number of goats from various sources and kept permanent stalls in the market every day. The commission agents went to various places in Pangasinan to look for animals. They received PhP 50–PhP 100 per head as commission. Meat retailers occupied permanent stalls in the market and could sell one head per day during lean periods, or two to three heads per day during peak periods, such as Christmas and New Year. The institutional buyers were restaurant owners who bought live goats to sell them cooked. They owned restaurants or eateries in Urdaneta and Santa Barbara.

Theoretical framework

The consumer demand for goat quality can be estimated following the consumer goods characteristics model developed by Ladd and Suvannunt (1976) and applied by Abansi *et al*. (1991), Kaosa-ard and Juliano (1991) and Tuquero (1991) in rice, Umapathi *et al*. (1994) in cotton, Beach and Carlson (1993) in herbicides and Lenz *et al*. (1994) in milk components, among others. This model describes the price of goods as linear summations of the implicit value of its attributes. This model is based on Lancaster's model of

consumption theory, which considers the properties of the goods, and not the goods itself, as the direct object of utility. Also, it remains consistent with the demand theory of consumer maximizing behavior subject to budget constraint.

Generally, the model could be expressed as

$$P_g = \Sigma X_{gi} P_{gi} \quad (1),$$

where P_g is the price of goat, X_{gi} is the quantity of goat characteristic i and P_{gi} is the implicit price of goat characteristic i.

The price–quantity relationship in the above equation is referred to as the hedonic price function. It describes the quantity of physical characteristics of the goat, the X_{gi} is an important determinant of its own price, P_g. There is no *a priori* rule about the inclusion of quality characteristics (Tabor (1988) as cited in Kaosa-ard and Juliano (1991)) in the model, but the characteristics included should be observable and economically relevant to the buyers.

The first partial derivative of price P_g with respect to the goat's characteristics, $\delta P_g/\delta X_{gi} = b_{gi}$, reveals the traders' implicit bid for the underlying attribute, X_{gi}. In other words, it reveals the marginal bid of traders for every change in the underlying physical quality characteristics of the goat. Alternatively, this captures the relative preference of the traders akin to their price responsiveness with respect to the identified attributes.

Data analysis

The double log form of the hedonic price function was used to estimate the relationship between price and the selected variables. The double logarithmic form is

$$[aP_1X_1^{b1}P_2X_2^{b2} \ldots X_6^{b6}]e$$

$$e^{Pg} = e$$

$$[aP_1X_1^{b1}P_2X_2^{b2} \ldots X_6^{b6}]e$$

$$\text{Ln } e^{Pg} = \text{Ln}[e]$$

$$P_g = aP_1X_1^{b1}P_2X_2^{b2} \ldots P_6X_6^{b6}e \quad \text{1st log}$$

$$\text{Ln}(P_g) = \text{Ln}[aP_1X_1^{b1}P_2X_2^{b2} \ldots P_6X_6^{b6}e] \quad \text{2nd log} \quad (2),$$

where P_g is the price of goat, in pesos per head; P_i is the implicit price of goat characteristic i; X_1 is the breed; 1 if upgraded and 0 if native; X_2 is sex; 1 if male and 0 if female; X_3 is age, in months; X_4 is size, in kg; X_5 is meatiness, estimated as thickness of meat in forequarters, in cm; X_6 is other characteristics; b_i is the regression coefficients; and e is the error term.

The ordinary least-squares regression (OLS) was used to estimate the functions. The OLS estimators provide the best linear unbiased estimates under certain assumptions. The expected value of the estimated parameter approximates the true value of the parameter. The OLS estimators are best in the sense that their variance is the minimum in the class of linear unbiased estimators. In this sense, the OLS estimators are the most efficient in this class.

RESULTS AND DISCUSSION

Physical characteristics of goats preferred by traders

Traders were asked which goat characteristics they preferred when buying goats. Similarly, they were asked to rank these traits. Results showed five dominant characteristics, namely (in descending order), meatiness, size, breed, sex and age (Table 1). Meatiness is defined by well-muscled forequarters, rib and hind areas, and a wide back, particularly in the loin. According to the respondents, goats with well-muscled hindquarters should have a meat thickness of more than 5 cm, whereas those with a meat thickness of less than 5 cm are considered thin.

Traders preferred medium-sized animals with a weight of 12–15 kg because they are easier to sell. The preference for size was similar among buyers in Nigeria (Aduku *et al.* (1991) as cited in Gihad and El-Bedawy (2000)). Small (less than 12 kg) and large (more than 15 kg) animals are least preferred; small animals because they have a low carcass weight, but are charged with the same dressing fee of US$0.94 per head. Generally, the dressing percentage of goats is 43% (The 2003 Goat Farming Committee 2004). As the animal grows, the percentage of fat in the carcass tends to increase and the percentage of bone tends to decrease, whereas the proportion of lean stays about the same (Gipson 1993). In contrast, a large animal is also least preferred because its price is less affordable for consumers.

The choice of breed ranked only third among the characteristics preferred by traders. There were 34 respondents (81%) who preferred upgraded rather than native goats. Upgraded animals are selected because they have a better body conformation as a result of improved growth performance. The majority of the upgraded goats have an Anglo Nubian bloodline. The choice for upgraded goats can be explained further using the results of the studies of Pashaa and

Table 1 Physical characteristics of goats according to traders' rank of preference in Pangasinan, the Philippines, February 2002

Characteristics	Rank†	No. respondents ($n = 42$)	% of respondents	Description of preference
Meatiness	1	35	83	Well-muscled (approximated by thickness of meat in hind area)
Size	2	21	60	Measured by weight
Breed	3	14	33	Upgraded (heavier and meatier in appearance)
Sex	4	7	17	Male (heavier and meatier in appearance)
Age	5	10	24	Younger, which correlates to tenderness
Other	6	41	98	Prominent testicles, large ears, etc.

†Ranking is based on mean values of preference.

Table 2 Estimated hedonic price model for goats

	Coefficients	Standard error	*t*-value	*P*-value	Dollar equivalent
Constant	2.156	0.318	6.783	0.000	NA
Meatiness	0.520†	0.025	8.251	0.000	6.24
Size	0.479†	0.030	7.356	0.000	5.68
Sex	0.415†	0.030	6.289	0.000	4.90
Breed	0.397†	0.023	6.265	0.000	4.71
Age	0.295†	0.042	3.916	0.000	3.72
Other	0.083‡	0.023	1.100	0.279	2.28

†Significant at 1% level. ‡Not significant at 10% level. F = 46.949; R^2, 0.889. NA, not applicable.

Saithanoob (2000), which suggests that the progeny of large breeds grow faster than the progeny of smaller breeds. Moreover, cross-breeding larger with smaller breeds achieves faster growth rates in their progeny. Meanwhile, native goats are preferred for carcass purposes because they are perceived to be tastier than the upgraded goats.

Male goats were preferred by 30 respondents (71%) for various reasons: for the carcass because they are heavier and meatier, and for the preparation of soup among restaurant owners. In contrast, female goats were preferred for breeding purposes and also for the carcass if the purpose was to sell or cook internal organs for *Pinapaitan*, a famous recipe using goats.

Age was ranked fifth. Young goats were preferred because the meat is tender and requires less time in cooking. Under usual management, kids do not store much bodyfat until they are approximately 1 year old. Goats aged from 11–12 months to 2 years have a higher proportion of lean muscle and less bone, but they may not have any more bodyfat than yearlings. Older animals store more bodyfat if nutritional conditions are favorable, but can become thin when feed is limited (Engle & Greaser 1999). Abebe (2000) reported that in some countries, kids are slaughtered at a very young age primarily because consumers traditionally prefer the meat of young animals, which is considered to be of a better quality. Moreover, Abebe (2000) reported that in Ethiopia, most goats are marketed at approximately yearling age.

Although these are the most preferred traits of goats, the origin of the goats and other characteristics were also mentioned. A number of respondents preferred goats from Pangasinan because they believed they are tastier than goats raised in other regions, particularly in Bicol region. Other respondents mentioned the smoothness of the skin and hides, and the absence of horns as their preference.

Hedonic price relationships

The estimated implicit prices for goats are shown in Table 2. Almost all of the characteristics of goats previously discussed were positive determinants of the price of the goat ($P < 0.01$), namely, meatiness, size, sex, breed and age. Other characteristics, such as the size of testicles, large ears and smoothness of skin, were not significant.

Meatiness had the largest positive influence on goat price as indicated by the highest positive coefficient. Goat price increases by 0.52% for every 1% change in meatiness. The meatiness of the animal is defined by a well-muscled body, well-developed quarters and a wide back, which connotes a higher dressing and carcass yield. Thus, buyers have the highest

willingness to pay for this characteristic, at approximately US$6.24.

Similarly, size was a positive determinant of goat price. Apparently, a 1% increase in size could increase the goat price by approximately 0.48%. The price premium attached to a change in size was US$5.68. A change in size of goat from one classification to another, say from small to medium, could provide an added price premium equal to US$5.68.

In addition, in terms of sex as a characteristic, most respondents preferred male to female goats because male goats are heavier and bulkier. According to Raghavan (1988), as cited in Pashaa and Saithanoob (2000), sex differences in weight increase markedly after 16 weeks. Male goats grow faster than female goats ($P < 0.05$). Weekly growth of females slowed to approximately 0.2 kg/head. The inherent growth characteristics of the male compared with the female goat could explain the price differential between male and female goats. Hence, buyers have a sex preference in the goat as a tradable commodity. The price premium attached to male goats is approximately 0.42% on average. All other characteristics the same; male goats could be sold for a higher price than female goats by as much as US$4.90.

Likewise, goat breed exerts a positive effect on the price of goats. Most respondents preferred upgraded goats to native ones because the former appear meatier and heavier than the latter. Price tends to increase by 0.40% for upgraded goats, indicating that buyers are willing to pay a higher price for upgraded goats, of approximately US$4.71.

Age is another positive factor affecting goat prices. The age of the goat indicates tenderness and meatiness. Age is positively related to meatiness. Thus, for every 1% increase in age, goat price could increase by 0.30%. This hedonic relationship suggests that buyers prefer goats of the correct marketable age to have a higher carcass dressing percentage. This supports the conclusion by Abebe (2000) that the dressing percentage of Somali goats is affected by age. Animals slaughtered at a later age had more lean meat and fat ($P < 0.05$). In a similar study in Egypt, marketable goats of 9–12 months old had a higher price and were more preferred by consumers than older goats (Gihad & El-Bedawy 2000). As shown in Table 2, there is a low price premium of approximately US$3.72 in the estimated hedonic price model. Although the price of goats tends to increase with age, it decreases up to a certain age level because of the negative correlation between age and tenderness.

The overall regression model could explain about 89% of the variation in the dependent variable. Moreover, multicollinearity among regressors was not detected, which is consistent with assumptions underlying weakly separable demand functions.

Implications for upgrading

Current efforts in the industry are geared towards upgrading native goats to improve the productivity of the animals. But do upgraded goats possess the desired characteristics of the traders in the local market to warrant continued upgrading efforts?

Meatiness and size are the two most preferred goat characteristics by buyers. Meatiness ranks first and size ranks second. The desired size is medium, with a live weight of approximately 12–15 kg. Native goats are naturally smaller because of their genetic make-up. Based on the 6 year (1993–1999) on-farm experiment of the Small Ruminant Center in the provinces of Tarlac and Nueva Ecija, the average daily gain of native goats is 66 g (Cruz *et al.*, unpubl. data, 1999). Therefore, it would take approximately 6 months for native goats to achieve the desirable size. In comparison, upgraded goats with a bloodline of 75% Anglo Nubian and 25% native, and an average daily gain of 106 g (Cruz *et al.*, unpubl. data, 1999) require only approximately 3 months to attain the desired market size. Therefore, upgrading would result in the attainment of the desired size in a shorter time. In effect, goats would not only be meatier but also younger and more tender.

The added benefits of upgrading were derived and presented in two ways: (i) in terms of the price differential between native and upgraded goats at mature age; and (ii) in terms of the cost reduction for rearing in a shorter time period to attain the desired size.

At the mature age of 6 months, native goats weigh approximately 13.75 kg with a market price of US$22.64, whereas upgraded goats weigh 15.65 kg at US$30.20. Thus, there is a price difference of US$7.55 per head between native and upgraded goats at the mature age of 6 months. With the added cost of US$1.08 for upgrading, a net price difference of US$6.47 per head could be achieved by raising upgraded goats. The cost of upgrading per kid was US$1.08: one buck to service 25 does at three kidding for 2 years (computed at: 75 does for 2 years at 1.5 kidding size = 105 kids born; one buck at US$113.20/105 kids = US$1.08).

Given the same management practices, native goats could reach the desirable weight of 12–15 kg within

6 months of rearing (Cruz *et al.*, unpubl. data, 1999). Whereas, among upgraded goats, only approximately 3 months is required to attain the desirable weight and maintain the tenderness of the carcass because they are slaughtered at a younger age. The decrease in the rearing period from 6 to 3 months reduces the cost of variable inputs such as feed, labor and biologics amounting to US$3.95. (Amount of variable inputs saved in 3 months: feed (US$1.23), labor (US$2.32) and biologics (US$0.40)). This implies that upgrading will not only provide the characteristics desired by the market, but will also provide an added benefit in terms of a higher value of sales or cost savings as a result of a shorter rearing period. Therefore, it is imperative that continuous efforts are made to upgrade native stock to satisfy the market, and hence help boost the goat sector.

Conclusion and recommendations

The results of the study have shown that measured physical attributes of goats can explain the price of goats among the 42 traders, based on a single interview during the second week of February 2002, which is considered a peak period in goat marketing. Among the goat's characteristics, size and meatiness exerted the highest influence on the price.

Traders were willing to pay higher prices for these traits. The highest price premium of US$6.24 was attached to meatiness defined by well-muscled quarters and a wide back in the loin area. Whereas, an increase in size from one level to another could increase the price by US$5.68. Such information is useful as a basis for raisers' production decisions; that is, in order to get better prices for goats they have to produce and offer for sale well-muscled and desirable-sized animals. To attain good quality animals, good management practices should be employed.

Different characteristics of goats imply different price premiums. Traders offer a higher price premium for better goat characteristics; thus, improvement in the quality of goat characteristics could result in higher returns to goat raisers.

Upgraded goats were preferred by more than three-quarters of the respondents. However, the preference for upgraded goats is ranked only third, after meatiness and size. This could mean that buyers of goats preferred well-muscled and good-sized goats, regardless of breed. Nevertheless, size and meatiness are manifestations of good breeds. Therefore, continued efforts to improve breeds in order to produce good quality goats is imperative to cater to the needs of the market. In addition, the added benefit, in terms of a higher value of sales or cost savings resulting from a shorter rearing period, could be achieved through upgrading.

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