

FACTORS AFFECTING BEEF BREED PROFITABILITY IN CENTRAL QUEENSLAND

W. O. McCARTHY*

Summary

A survey -of a random sample of beef cattle properties in Central Queensland was undertaken to determine relative financial performance of British and Zebu cross breed herds. Major productivity differences were in age of marketing and mortality rate. On an "average" property, this represented a difference in net income of about \$2,300 per year in favour of Zebus. Alternative management policies to increase profit are suggested.

I. INTRODUCTION

A major problem area for primary industry in Australia is to increase productivity to ensure a stable and prosperous farming community and as a contribution towards general economic growth. As far as the beef cattle industry in Queensland is concerned, one possibility is the development of strains of cattle capable of improved performance in the difficult environment. Hence, investigations have been carried out by workers including Alexander and Chester (1956), Sullivan and Willis (1958), Stubbs and Mayer (1966) and Norman (1967) concerning the comparative performance of British and Zebu† type cattle. However, all were concerned with physical aspects such as calving percentage, weight gain and carcase grade. No attempt was made to explore the financial implications of such findings and consequently assess relative profitability at the individual property level.

The purpose of this paper is to report the results of a study undertaken with such objectives in view.

II. METHOD

The study consisted of two parts. First, a survey was undertaken of 14 pairs of randomly selected beef cattle properties in Central Queensland to collect productivity data. Each pair was as similar as possible in terms of such factors as stage of development, carrying capacity and breeding and selling policies. However, one of each pair carried only British breed cattle and the 'other only Zebu cross breed for at the least the previous five years. Findings of the survey were reported by McCarthy and Hamilton (1964).

Next, on each of the 28 properties records were kept over the period 1962 to 1966. These included the following of the 1962 and 1963 calf crops through

*Department of Agriculture, University of Queensland, Brisbaane, Queensland.

†In this paper, the terms British and Zebu refer to cattle of *Bos taurus* and *Bos indicus* origin respectively.

to slaughter and recording management and other costs. Cattle sale prices and weights and grades were also obtained. Two hypothetical average size properties (one British, one Zebu) were set up. The British property was based on the survey data supported by Census and Statistics information (Anon 1968) and a survey of Keating (1967). For the Zebu cross property, it was assumed that the hypothetical British property carried Zebu cross breed cattle. The relative profitability and the financial consequences of changes in productivity indices were assessed.

III. RESULTS AND DISCUSSION

(a) Productivity and Financial Indices

Productivity factors which were assumed to have an influence on profitability include stocking rate, reproduction rate, stock losses, age of marketing of fat stock, working life of bulls and breeders and labour requirements. Information was collected on these factors. However, the only statistically significant differences were in age of marketing of fat stock and mortality rate. Zebu steers were marketed on average at 34 months compared to 40 months for British breed steers. Annual mortalities as a percentage of herd numbers averaged 2.6 per cent in Zebu herds compared with 3.4 per cent in British herds. The Zebu group attributed most losses to plant poisoning and dry seasons compared with cattle ticks (*Boophilus microplus*), predation by dingoes and calving losses for the British group.

Sale prices for bullocks, cull cows, heifers and cull bulls did not differ significantly between the two groups. The comparison was made after adjusting individual prices to allow for long term price trends over the survey period. Dressed weights of slaughtered stock and per cent first grade meat were also tested statistically for significant differences but none were found.

The only cost difference was for dipping. Here, annual per head costs on British properties averaged 64 cents compared with 43 cents for Zebu properties.

(b) Profitability of "Average" Hypothetical Properties

The hypothetical British property was 12,220 ac (4945 ha) in size and carried 890 head of beef cattle including 260 breeding cows. Seventy one per cent of breeding cows calved annually and mortality rate was 3.4 per cent. Steers were marketed fat in year 4 and cull heifers were sold in year 3.

For the Zebu cross property, total stock remained the same but the composition of the herd changed because steers were marketed earlier. For example breeding cows increased by 25 to 285. Calving percentage remained at 71 per cent, but deaths fell to 2.5 per cent and steers were sold in year 3. The costs and returns for both properties are included in Table 1.

The Zebu herd had a turnover ratio (No. marketed annually to total stock) of 20.6 per cent compared with 17.6 per cent for the British herd. This means that the former sells 12 more bullocks, 7 more cull cows and 7 more surplus heifers, resulting in an increase in gross income of 16.3 per cent from \$13,911 to \$16,179. Further small economies accrue to the Zebu herd because of lower dipping costs although these are offset by increased transport charges for stock sold. Other conceived differences such as a larger investment in fencing on the Zebu property were not apparent in the survey data and hence are not reflected in costs.

TABLE 1
Annual income and expenditure "average" British and Zebu properties.

		British property		Zebu property	
(i)	<i>Income</i>	No.	\$	No.	\$
	Bullocks	83	8,350	95	9,557
	Cull cows	43	3,087	50	3,590
	Surplus heifers	31	2,474	38	3,032
			13,911		16,179
(ii)	<i>Expenditure</i>				
	Labour		1,455		1,455
	Materials		2,103		2,103
	Dipping		547		386
	Services		914		1,062
	Overheads		2,384		2,384
			7,403		7,390
(iii)	Net income (i) — (ii)		6,508		8,789
(iv)	Per cent return on capital*		4.7		7.1

*Net income plus mortgage repayment less wage of management for owner, expressed as a per cent of total capital invested in the property.

Net income (income — expenditure) thus differs by \$2,281. If net income is adjusted to allow a wage of management for the owner and mortgage repayment charges are not taken into account (i.e. it is assumed the property is unencumbered), the per cent return on capital is 4.7 per cent when running British cattle and 7.1 per cent for Zebus.

It is suggested that this difference is relatively large and represents a significant source of productivity increase in the cattle industry in the survey locality. However, in view of comments by workers such as MacFarland (1968) and Phillips (1969) concerning forage utilization by various types of cattle, it would be unwise to generalize from the survey findings.

(c) Strategies for Increasing Profitability

On a property with British cattle, efforts could be made to reduce deaths but these are relatively small in any case and, even if reduced significantly, do not markedly alter the number of cattle available for sale. Thus for a 1,000 head herd, lowering the death rate by 1 per cent (the average difference between the British and Zebu survey properties) only results in an additional seven steers for sale per annum.

On the basis of this study, other alternatives include lowering the age of marketing or increasing the branding percentage. Economic theory indicates that the alternative adopted should be the one which gives greatest additional net revenue. The uncertainty inherent in comparing say the likelihood of obtaining a 5 per cent increase in brandings with a 5 per cent increase in turnover ratio can be allowed for by incorporating subjective probabilities into the analysis.

If it is considered that raising branding percentage offers greatest scope for

increases in productivity, the relationship between gross revenue and branding percentage can be expressed as a simple equation and the financial consequences of a given rise in branding percentage estimated. For example, using such an equation it was found for the British property that for gross revenue to increase by \$1,000 branding percentage must rise by 4.75. Thus to equal Zebu gross revenue of \$16,179, branding percentage on the British property must rise from 7.1 per cent to 8.18 per cent.

Such equations can be set up and manipulated so that any parameter of particular interest can be determined. Thus the revenue implications of raising productivity indices can be estimated and compared. After allowing for uncertainty, management policies can be framed accordingly.

A further alternative sometimes suggested was confirmed by the survey data. This is the possibility of concentrating sales in high price periods of the year. Monthly price data were collected for bullocks, cows, heifers and yearlings for the period 1960 to 1966. In general, prices were higher in the second half of the calendar year than the first. January to June prices were statistically significantly lower ($P < 0.05$) than July to December prices and February to July prices were significantly lower ($P < 0.01$) than those in August to January. However, additional costs accrue as cattle are held longer in any year. The implications for management are complex and are being investigated further.

IV. ACKNOWLEDGMENTS

The project is being supported financially by the Australian Meat Research Committee. Graduate student Mr. J. Rodgers set up the gross revenue equations.

V. REFERENCES

- ALEXANDER, G. I., and CHESTER, R. D. (1956). *Qd J. agric. Sci.* 13: 69.
ANON (1968). Commonwealth Bureau of Census and Statistics. Canberra. Bull. No. 3—Queensland.
KEATING, C. (1967). *Q. Rev. agric. Econ.*, Canberra 20: 192.
MCCARTHY, W. O., and HAMILTON, C. P. (1964). *Trop. Agric., Trin.* 41: 293.
MACFARLAND, W. V. (1968). *Aust. J. Sci.* 31: 20.
NORMAN, M. J. T. (1967), *Aust. J. exp. Agric. Anim. Husb.* 7: 217.
PHILLIPS, R. W. (1969). *Proc. Wild. Conf. Anim. Prod.* 2: 15.
STUBBS, W., and MAYER, B. (1966). *Qd agric. J.* 92: 580.
SULLIVAN, J. J., and WILLIS, L. A. (1958). *Qd agric. J.* 84: 167.