The profitability of beef production under semi-extensive conditions

H.J. Meaker
Stock Owners Co-operative Co. Ltd., Dundee

The profitability of semi-extensive beef production is discussed on the basis of information collected over a 4-year period from 23 farmers from northern Natal who participated in the mail-in record system. Throughout the analysis, the performance of the group average was compared with that of the top third beef farmers. The need to optimize rather than maximize and the impact of efficiency have been demonstrated for various production and economic measurements. Economic norms that were used and discussed included nett farm income per R100 capital investment and gross margin per animal unit. The need for more emphasis on financial management by both the animal science adviser and the farmer is discussed in view of the fact that interest costs have now become the single largest item of expenditure in farming.
S. Afr. J. Anim. Sci. 1986, 16: 113 – 117

Die winsgewendheid van semi-ekstensiewe vleisbeesboerdery is bespreek aan die hand van inligting wat ingesamel is oor 'n 4-jaar tydperk. Hierdie inligting is ontvang van 23 boere in noord Natal wat deelgeneem het aan die posrekordskema. Die prestasies van die groepgemiddelde is deurgaans vergelyk met dié van die boonste derde vleisbeesboere. Verskeie produksie- en ekonomiese bepalings is bespreek in die lig van doeltreffendheid en die behoefte om optimaal eerder as maksimaal te produseer. Ekonomiese maatstawwe wat gebruik en bespreek is, het netto boerdery-inkomste per R100 kapitale belegging en bruto marge per grootvee-eenheid ingesluit. Die behoefte aan groter beklemtoning van finansiële beplanning deur die raadgewende veekundige asook die boer word bespreek. Dit is veral belangrik in die lig van die feit dat rente tans die grootste enkele koste in boerdery is.
S.-Afr. Tydskr. Veek. 1986, 16: 113 – 117

Keywords: Beef production, profitability, efficiency, production, economic measures

Presented at the Symposium on 'The scientist serving animal production' at the 25th Annual Congress of the South African Society of Animal Production, Transkei, 15 – 17 April, 1986

H.J. Meaker
Stock Owners Co-operative Co. Ltd., P.O. Box 199, Dundee, 3000 Republic of South Africa

Hardly a day goes by without mention being made of the unenviable position of the South African farmer. Information obtained from the Abstract of Agricultural Statistics (1986) on agriculture speaks for itself. From 1975 to 1984 the producer prices for all combined products (field crops, horticultural and animal products) increased by 179,6%, while over the same period the prices of all the farming requisites (all input costs excluding labour and interest costs) increased by 292,9%. This enormous increase in costs is best illustrated in Figure 1 which shows the consistent rise that has taken place in all farming requisites from 1968 to 1985. Furthermore, thinking back to 1970, a popular 46 kw tractor cost approximately R3 000, diesel 3c – 4c/l and the weighted average for all grades of beef approximately 40c/kg. Today the same size tractor costs R42 000 (inclusive of tax) — a whopping 80% increase per year, whereas diesel to the farmer costs 58c – 60c/l and the average beef price is approximately 270c/kg.

Why has all this happened? In short — during the late 1960s and the 1970s interest rates started to fall lower than the rates of inflation. The sharp operator realized that there was more money to be made out of speculating (property) and this prompted him to borrow as much as he could. Land increased in price and in many cases well beyond its economic productive capacity. By this time government was gradually allowing more money to be printed which finally led to a so-

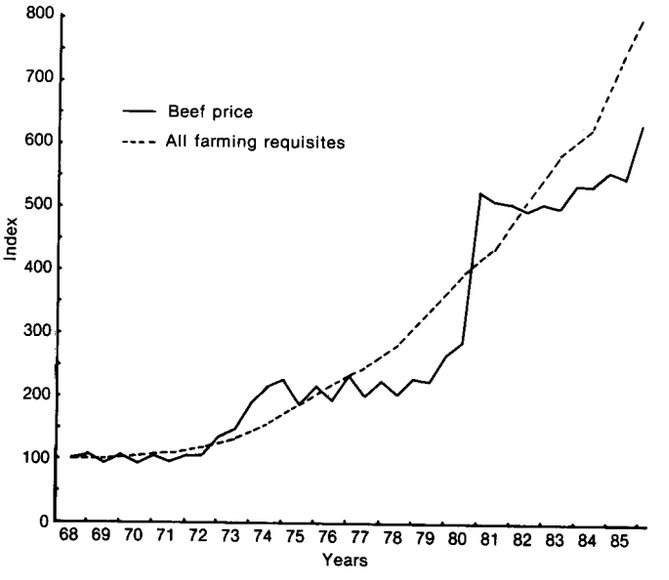

Figure 1 Relationship between average weighted beef price at urban markets and cost of all farming requisites (1968 = 100).

called money supply explosion taking place when, in 1984 the growth in the money supply was nearly 40% compared to 5% for the USA. The excess liquidity thus created, resulted in many farmers losing their senses and no longer were they saving and investing for the future, thereby putting a break on run-away expenditure. Rather, they were buying more and more which obviously led to higher inflation. Furthermore, loans were made available by lenders primarily based on the increased value of assets (farm land). To add to the inflationary spiral, the rand started to depreciate against the major currencies of the world, thereby increasing the cost of all imported goods. This had a very detrimental effect on agriculture and ultimately on the farmer, because this industry is heavily dependent on imports. To make matters worse, a country-wide drought has, and is being experienced which, it is claimed, may be the worst drought in living memory. To survive, farmers were compelled to borrow more money.

It should be emphasized that in no way is it implied in this article that only the farmer is to be blamed for his predicament, because it is generally accepted that most of the above problems originated with government. Irrespective of who was responsible, all this has resulted in the total farming debt increasing from R1 384 million (end 1970) to approximately R11 000 million at the end of December 1985 (Abstract of Agricultural Statistics, 1986).

In view of the relatively high land prices, low carrying capacity of the natural veld, unpredictable rainfall and high production costs, it is generally accepted that the return on investment in a commercial beef venture is low. Therefore, the objective of this article is to illustrate what the effect of inflation has been on the profitability of semi-extensive beef production in northern Natal and to make suggestions on how to improve the profitability.

Economic analysis

The mail-in records for 23 farmers from northern Natal, for the period 1981/82 – 1984/85 (4 years), were analysed (Table 1). Although Table 1 is self-explanatory, the following need to be emphasized before interpreting any of the results. Although depreciation of fixed improvements and on equipment was calculated at 4% and 20% respectively, all the values used (land, improvements, equipment and livestock) were updated every year using market-related information. Although the size of the group never remained constant, the records of the same 23 participants were used for the analysis over the 4-year period. No interest charges were included in the analysis because this would confound the results as interest costs may vary from zero (all own capital) to a situation where most of the capital is borrowed. The 23 farmers represent some 44 300 ha of farmland and 11 660 beef animal units (AU, approximately 17 500 beef cattle of all ages), thereby ensuring that meaningful conclusions can be made from the data. Whilst it is accepted that nett farm income (NFI) per R100 capital invested is the most important yardstick for measuring profitability on any farm, it should be noted that all the enterprises contribute towards NFI. Therefore, because it is the objective of this paper to highlight the profitability of beef production, gross margin per AU was used as the basis for calculating the top third farmers. Northern Natal can be regarded as a mixed farming area. However, during the 4 years of this study beef has been the single most important enterprise. For example, in 1984/85 beef accounted for 44,3% of total income, followed by maize 27,0%, dairy 9,3%, sheep 7,9%, and wattle bark and timber 6,7% whilst a few smaller enterprises accounted for the remaining 4,8%.

All farming operations

Before discussing the profitability of beef production *per se*, an economic assessment will be made of the remainder of the data in Table 1 which reflect the farming operations in its entirety over the past 4 years. The importance of NFI to the profitability of farming *per se* has already been emphasized. Rightly, the question may therefore be asked, what did the top third farmers do to record a NFI of R9,55 per R100 capital invested while the average for the group was R6,31 (Table 1). If it is assumed that profitability can be improved by increasing turn-over and/or by decreasing costs, it is obvious from these results that the total farm income per ha

Table 1 An assessment of the production cost of beef for the period 1981/82 – 1984/85 for 23 farmers in northern Natal

Average	1981/82	1982/83	1983/84	1984/85	Top third 1984/85	Index 1981/82 = 100
Farm size (ha)	1802	1818	1872	1926	1634	106,9
Total capital investment (R)	813845	913073	952273	1051041	911740	129,1
Total capital investment/ha (R)	451,63	502,24	508,69	545,71	557,98	120,8
Number of beef (AU)	452	462	468	507	453	112,2
Income beef as percentage of total income (%)	53,0	51,2	35,2	44,3	49,6	83,6
Total equipment costs/ha (R)	17,27	16,42	16,29	20,42	16,02	118,2
Total labour costs/ha (R)	8,50	8,99	10,43	10,84	9,12	127,5
Total variable costs/ha (R)	32,27	41,21	42,92	46,78	47,28	145,0
Total farm income/ha (R)	78,25	78,60	110,26	114,01	126,29	145,7
Total farm expenses/ha (R)	58,80	67,71	70,65	78,91	73,18	134,2
Nett farm income/ha (R)	18,49	8,44	38,90	34,45	53,31	186,3
Nett farm income per R100 capital investment (R)	4,09	1,68	7,65	6,31	9,55	154,3
Ha veld + feed crop/AU	2,76	2,75	2,83	2,71	2,73	98,2
Beef cattle (R/AU)						
Total gross income	165,37	158,30	154,94	191,82	226,16	116,0
Total feed costs	37,84	48,77	51,38	44,65	33,09	118,0
Total other variable costs	10,56	23,53	22,40	24,52	11,54	232,2
Gross margin	116,97	86,00	81,16	122,65	181,53	104,9

was higher for the top third farmers (R126,29) than the group average (R114,01), while total farm expenses per ha were lower (R73,18) than the group average (R78,91). Furthermore, the top third farmers were more efficient as regards total equipment costs per ha and total labour costs per ha (Table 1). It would therefore appear that these farmers either made better use of available equipment and/or rather repaired older equipment before resorting to the purchase of new and very expensive machinery.

Notwithstanding the effect of inflation on total farm expenses per ha over the 4-year period (increase of 34,2%), the average farmer was able to increase total farm income per ha by 45,7% and NFI per ha by 86,3% over the same period (Table 1). This must certainly be rated as a major achievement and must be ascribed to improved efficiency on behalf of the farmer and the inputs made by the advisers.

The consistent increase in farm size and number of beef AU over the 4-year period is in keeping with the proverbial expression that is so popular amongst many extensive beef producers, viz. 'the bigger the better'. However, it is interesting to note that the average farm size for the top third farmers was 292 ha smaller than the group average for 1984/85 while at the same time these farmers had 54 beef AU less. Therefore, it may be concluded that these farmers were more efficient in that they made more money with fewer animals and on smaller land. Or put in another way, what animals they had were of a better quality and/or were used more productively (Table 1).

Beef enterprise

Whilst total gross income for the average beef farmer increased by 16% over the 4-year period, the gross margin per AU increased by only 4,9% (Table 1). Therefore, the average farmer was not able to contain costs during this period because feed and other variable costs increased more rapidly than income. In fact, the gross margin per AU decreased consistently over the first 3 years of the investigation. However, it would appear that 1984/85 brought about a complete change. Not only did total gross income increase by 23,8% over the past year, but the average beef farmer in this group was able to decrease his feed and other variable costs by 6,2%. This resulted in the gross margin per AU increasing by 51,1% (Table 1). The devastating effect of inflation on a national basis and over a much longer period, is clearly illustrated in Figure 1 where the average weighted beef price is compared with the cost of all farming requisites.

Although it may be argued that the increase in gross income from beef was primarily due to an increase in the price of beef, the fact that the average beef farmer was able to decrease costs (especially feed costs), may be regarded as a major achievement. Possible reasons for the decrease in feed costs are probably one or a combination of the following: a cutback on on-farm feedlotting; better use of available roughages (maize residue, rested veld, hay and silage); and cutting down on winter feed costs by adapting the calving season to coincide with that time of the year when green grass is available.

The effect of improved efficiency in beef production is emphasized when the gross margin per AU for the top third farmers is compared with the group average (48% higher). Their gross income for beef was R34,34 higher while feed and other variable costs were R11,56 and R12,98 lower than the group average (Table 1). This sound performance by the top third farmers has prompted further analyses of the data in an attempt to identify factors that have contributed to this marked difference in gross margin per AU.

Reproductive rate

Although calving percentage *per se* was not calculated in this investigation because of the difficulty experienced with the financial year ending at the end of August of each year, the number of calves weaned and on hand as at the end of August was expressed as a percentage of the total herd. This may be regarded as a measure of calving rate. It is obvious then from Table 2 that the top third beef farmers produced approximately 35% more calves than the group average (12,34% of herd for top third vs 9,13% of herd for group average). This is in agreement with what has been stated by many scientists and advisers, viz. that the profitability of beef production is greatly dependent on calving rate (Lamond, 1970; Grosskopf, 1976; Venter & Maree, 1979). In fact, Venter & Luitingh (1980) indicated that productivity and profitability in the beef herd could increase by as much as 50% through improved reproduction management. On the other hand, Lishman, Paterson & Beghin (1984) in their investigation, found that this statement held good under extensive ranching conditions but that it was not necessarily the case under more intensive conditions.

Table 2 Average mortality rate, gross margin per ha feed crop, ha feed crop per AU and composition of herd for 23 farmers and the top third farmers in this group in northern Natal for 1984/85

	Average	Top third
Mortality rate (%)	1,67	1,30
Gross margin per ha feed crop (R)	2041,79	6951,11
Ha feed crop per AU	0,06	0,03
Oxen 2 years and older (%)	12,18	9,43
Oxen 1 – 2 years (%)	9,30	10,08
Calves (%)	9,13	12,34
Heifers 1 – 2 years (%)	8,29	7,18
Heifers over 2 years (%)	10,08	8,43
Cows (%)	49,08	50,76
Bulls (%)	1,95	1,78

Intensification

Whilst the per capita consumption of red meat has declined from 40,6 kg in 1955/56 to 30,9 kg in 1984/85, the total consumption of red meat over the same period has increased from 612 000 tonnes to 1 014 000 tonnes. This increase in the total consumption is directly related to the growth in population (from 14,7 million in 1955 to 26,7 million in 1984, Abstract of Agricultural Statistics, 1986). Therefore, it seems obvious that as the population increases, the demand for food will increase and hence more red meat will have to be produced. Man will therefore be forced to use all the arable areas for the direct production of human food, non-arable areas will be used for pasture production in such a way that the productivity of this land is above that of the natural vegetation. This process of increasing production per unit area of land is referred to as intensification (Booysen, 1980). This approach to meet the requirements of man in this country have been dealt with by Harwin & Lombard (1974), Lishman (1980), Venter & Luitingh (1980) and Meissner & Naude (1982).

It seems ironic therefore to report that in this study the top third beef farmers appeared to be more extensive compared with the group average. In fact, the top third farmers cultivated 50% less land per AU for the production of feed

crops (including pastures). This resulted in the top third farmers recording a gross margin per ha feed crop of just less than R7 000 compared to just over R2 000 for the group average (Table 2).

Much research has been done by Meaker (1978, 1984) on the effect of nutrition on the reproductive rate of the pregnant and lactating beef cow, in an attempt to optimize reproductive rate through strategic feeding, and this investigation has emphasized the importance of winter nutritional management. For example, many producers, especially those selling weaners, tend to calve their cows during late winter when the grazing conditions, both quantitatively and qualitatively, are at their worst. This practice necessitates the feeding of feed crops over a much longer period than would be the case should cows calve down approximately 1 month prior to the onset of the normal spring/summer rains (Meaker, 1984). Furthermore, another practice commonly found amongst beef producers is that of maintaining a too high stocking rate, resulting in his rangeland becoming denuded by autumn, which again necessitates the feeding of conserved feed crops over a much longer period. Therefore, the importance of containing costs through the optimum use of feed crops, cannot be over-emphasized. In view of the results recorded in this study, cognizance should be taken of a study by Lishman, *et al.* (1984) who found that in Sourveld areas it will probably not be profitable to improve calving rates by additional short-term feeding during winter. These authors emphasized the need to optimize rather than maximize rates of reproduction when they compared various production situations.

Herd composition

Often the question is asked — which practices are most profitable in beef cattle farming? Of course, quite a number of practices can be followed — anything from breeding and selling weaners (or older oxen) to speculating. Van Wyk & Kruger (1968) compiled estimates for 10 different production systems and came to the conclusion that breeding and selling weaners were the least profitable. More recently, Grosskopf (1985) reported that marketing oxen at the age of 2,5 years was considerably more profitable than selling weaners. No trend as regards production practice was evident in this study, because both the top third beef farmers and the group average had 59% breeding stock (cows and heifers over 2 years) in their herds (Table 2). The percentage breeding stock in a herd, commonly referred to as herd composition, is affected by calving rate and age at marketing. It follows then that the earlier the age at marketing (selling weaners) the higher the percentage breeding stock in the herd and vice versa.

Mortality

A report by SASAP in 1981 to the 'Committee of enquiry into the red meat industry' revealed that mortality rates in South Africa ranged from 5% to 10% for adult beef cattle and up to 20% for calves from birth to weaning. Although these figures seem alarmingly high for the country, the mortality rates on an AU basis in this study were 1,67% and 1,30% for the group average and top third beef farmers, respectively (Table 2). This difference may seem small but nevertheless emphasizes the measure of efficiency of production by the top third farmers and which has contributed to the improved gross margin per AU.

There are obviously many more factors that would have a beneficial effect on the profitability of beef production under semi-extensive conditions. These have been dealt with adequately by Dikeman, (1984); Meaker (1984) and Dzuik & Bellows (1983) and it is certainly not the objective of this paper to repeat or draft a review on what has been recorded before on this subject. Furthermore, the tremendous advances made over the past few decades as regards animal science research, have resulted in the adviser using most of his time directing this information at the farmer in an effort to improve the efficiency of beef production. Unfortunately, the same may not be said as regards advising the farmer on financial matters.

Gone are the days that farming was regarded as only 'a way of life'. Today it is regarded as a highly capital-intensive and specialized venture requiring multidisciplinary inputs. For example, unlike a decade ago when interest costs represented 12,9% of all farming requisites, this figure at the end of 1985 stood at 29,1% making interest costs the single largest expenditure in farming (personal communication — South African Agricultural Union, 1986). Needless to say, the world-wide phenomenon of 'buy now, pay later' has also caught up with many of our farmers who, coupled with the tremendous increase in all farming requisites (Figure 1) and the drought over the past few years, have resulted in a spiral of ever-increasing debt. Remembering that all debt has to be repaid some time or another and realizing that many farmers, or for that matter countries, simply would never be able to honour their debt, one shudders to think of the consequences should there be a repeat of the banking crisis of 1931 – 1933.

To conclude, although it may seem inappropriate for an animal scientist to report on economic matters, it is the author's firm conviction that the biggest limitation in farming today is the lack of sound financial management by the farmer. Has the time not come for (i) much closer liaison between agricultural economists and animal scientists, and (ii) for animal scientists advising farmers to acquaint themselves with financial management practices through self-tuition or by incorporating additional courses in graduate training.

References

ABSTRACT OF AGRICULTURAL STATISTICS, 1986. Directorate Agric. Econ. Trends, Pretoria.

BOOYSEN, P. DE V., 1980. Pasture improvement possibilities in effective animal production systems. *S. Afr. J. Anim. Sci.*, 10, 293.

DIKEMAN, M.E., 1984. Cattle production systems to meet future consumer demands. *J. Anim. Sci.*, 59, 1631.

DZUIK, P.J. & BELLOWS, R.A., 1983. Management of reproduction of beef cattle, sheep and pigs. *J. Anim. Sci.*, 57, 355.

GROSSKOPF, J.F.W., 1976. Herkonsepsie van lakterende vleisraskoeie as beperkende faktor by die praktiese toepassing van ovulasiesinchronisasie. Ph.D. (Agric)-thesis, Univ. Stellenbosch.

GROSSKOPF, J.F.W., 1985. Bemarking van die veld af: Speenkalwers of osse? *Red Meat*, Aug., 18.

HARWIN, G.O. & LOMBARD, J.H., 1974. Intensification of the beef-cow herd. *S. Afr. J. Anim. Sci.*, 4, 247.

LAMOND, D.R., 1970. The influence of undernutrition on reproduction in the cow. *Anim. Breed. Abstr.*, 38, 359.

LISHMAN, A.W., 1980. A strategy for beef production in Natal and Eastern Cape. *S. Afr. J. Anim. Sci.*, 10, 323.

LISHMAN, A.W., PATERSON, A.G. & BEGHIN, S.M., 1984. Reproduction rate as a factor in meat production. *S. Afr. J. Anim. Sci.*, 14, 164.

MEAKER, H.J., 1978. The importance of age at first calving, relationship between body mass and fertility and feeding systems on production in the beef female. Ph.D. (Agric)-thesis, Univ. Natal.

MEAKER, H.J., 1984. Effective extensive beef production as a prelude to feedlotting. *S. Afr. J. Anim. Sci.*, 14, 158.

MEISSNER, H.H. & NAUDÉ, R.T., 1982. Aksie: Beesvleisproduksie tot die jaar 2002. *S. Afr. J. Anim. Sci.*, 12, 187.

VAN WYK, S.P. & KRUGER, C.D., 1968. Cattle farming practices. *Fmg. in S. Afr.*, Nov. 27.

VENTER, H.A.W. & LUITINGH, H.C., 1980. 'n Beesvleisproduksiestrategie vir die Transvaalse Bosveld en Noord-Kaap. *S. Afr. J. Anim. Sci.*, 10, 311.

VENTER, H.A.W. & MAREE, C., 1979. Recent studies on the improvement of reproduction in cattle in Southern Africa. In: Biometeorological Survey, Vol. 1, 1973 – 1978. Part B, Animal Biometeorology, Ed. S.W. Tromp & Janneke, J. Bouma, Heyden, London.