CERTAIN ASPECTS OF THE FUTURE DEVELOPMENT OF THE BEEF CATTLE INDUSTRY

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Introduction

Mr. Chairman, Ladies and Gentlemen,

I welcome this opportunity to talk with this distinguished group of agricultural leaders in industry, the public sector as well as leading farmers.

I shall attempt to briefly outline the present status of the beef cattle industry, and discuss some of the most important factors limiting increased beef production. This will be followed by an attempt to critically and realistically analyse these factors in order to determine priorities in future beef production development programmes.

I will try and indicate, in the light of results obtained in other countries, what the magnitude of increased production in South Africa could be, should we tackle problems in a co-ordinated and co-operative manner based on priorities. I should like to see the community here represented focus its unique skills and resources on this great task.

The Beef Industry

The cattle population in South Africa fluctuates, depending on local conditions and factors, between 10-12 million head and has done so for decades. Of these, the latest figures reveal that some 8,2 million head are owned by whites. Unlike most other countries there has been no growth in the national herd. Comparative figures are shown in Table 1.

TABLE 1 The percentage growth of cattle numbers (1960 = 100%)

Countries	1965	1971	Cattle Numbers (Millions)
North America	111	122	174
U S A	113	119	114
Canada	113	116	12
South America	108	124	200
Argentine	103	114	50
Brazil	115	132	96
Europe	105	110	121
France	108	116	21,7
Netherland	105	123	3,8
Spain	137	156	4,2
United Kingdom	102	108	12,0
Ireland	105	126	3,8
Russia	117	134	99,0
Asia	109	120	448
Australia	114	148	21,0
New Zealand	113	147	8,8
World	109	121	1 214
Africa	108	116	137
South Africa	87	91	11,2

Furthermore, Figure 1 shows that the production per animal is of the lowest in the world (*ca* 35 kg/head/annum). By comparison that of the USA is approaching 90 kg/head/annum and that of Queensland, (agriculturally a relatively underdeveloped state in the Australian Commonwealth) *ca* 42 kg/head/annum.

Table 2 shows that the turnover (total slaughterings as a percentage of the cattle population) has increased to a certain extent since 1946 but nevertheless the present figure of approximately 14 per cent is deplorably low. If the turnover of the white-owned cattle only are considered the figure is still below 20 per cent. Comparative figures for other countries are as high as 45 per cent in certain European Economic Community (EEC) countries, the USA and South Coastal Queensland.

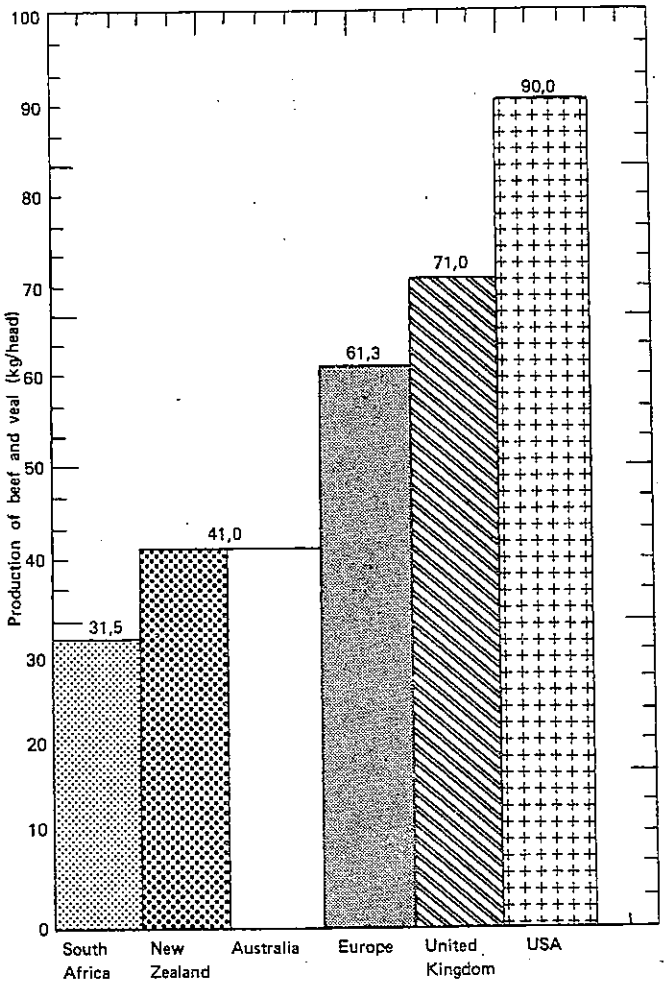

Fig 1 Beef and veal production per head of cattle population

TABLE 2 Increase in total number of cattle slaughtered and carcase meat produced in the Republic of South Africa

Year	Cattle population (million)	Cattle slaughterings (Republic origin)	Carcase meat available for consumption(t) Beef	% of cattle population slaughtered	Average carcase mass for controlled areas (kg)
1946	12,6	884 752	–	6,7	220,2
1947	12,1	936 203	–	7,7	214,2
1948	12,5	956 401	–	7,7	226,5
1949	12,2	963 858	–	7,9	223,6
1950	11,5	1 026 106	–	8,9	234,2
1951	11,6	922 081	–	7,9	233,3
1952	11,8	987 046	–	8,4	227,8
1953	11,7	1 051 420	–	9,0	227,2
1954	11,6	1 057 160	–	9,1	224,7
1955	11,7	936 211	–	8,0	221,4
1956	11,8	1 077 303	–	9,1	228,3
1957	12,0	1 055 826	–	8,8	220,6
1958	12,1	1 045 772	–	8,6	221,3
1959	12,3	1 087 277	–	8,8	216,4
1960	12,3	1 201 526	340 712	9,8	215,6
1961	12,5	1 266 595	343 873	10,1	211,7
1962	12,6	1 331 321	344 111	10,6	207,3
1963	12,6	1 305 714	363 809	10,4	211,5
1964	12,2	1 481 450	381 404	12,1	204,1
1965	10,8	1 523 370	359 765	14,1	189,5
1966	10,4	1 558 640	357 147	15,0	191,3
1967	10,5	1 282 234	347 813	12,2	203,4
1968	10,7	1 179 057	354 130	11,0	209,4
1969	11,0	1 190 914	352 949	10,8	208,7
1970	11,3	1 323 554	383 344	11,7	202,3
1971	11,2	1 439 923	411 772	12,9	205,0
1972	11,5	1 596 134	447 100	13,9	203,9

As shown in Table 2 the number of cattle slaughtered and the carcase meat produced shows a gradual increase. If, however, the static or declining cattle population is taken into account it is evident that slaughtering takes place at the expense of the growth potential. This is also at least partly the reason for the slight improvement in the turnover.

That slaughtering takes place at the expense of the growth potential is further illuminated by the considerable increase in the slaughtering of female stock as shown in Table 3.

The average carcase mass of cattle slaughtered in the Republic has also declined as shown in Table 2. This tendency seems to be evident in all grades and latest figures show that some 1/4 million head of less than 180 kg carcase mass were slaughtered. If these masses are compared with masses of between 240-330 kg for 12-16 months old cattle in France it is evident that cattle in South Africa are being slaughtered at too low masses, the cattle not having reached their optimum growth potential.

There seems to have been, however, an improvement in the overall quality of carcases slaughtered as reflected by the grading results (Table 4).

TABLE 3 Increase in slaughtering of female stock in the Republic of South Africa

Year	Slaughtering of female stock in abattoirs in the Republic
1953	341 651
1954	293 151
1955	234 101
1956	323 812
1957	335 275
1958	349 034
1959	362 162
1960	408 489
1961	395 628
1962	397 616
1963	467 282
1964	511 322
1965	570 524
1966	560 635
1967	447 829
1968	389 635
1969	375 288
1970	455 809
1971	561 945
1972	701 399

TABLE 4 Percentage grading of carcases

Year	Super Prime A Prime B	Prime C	Gr 1	Gr 2	Gr 3	Gr 4
1962/63	6,3	3,5	22,4	27,5	29,8	10,5
1963/64	6,9	3,6	25,5	27,5	27,9	8,6
1964/65	5,9	1,7	20,0	25,5	34,5	12,4
1965/66	7,2	2,1	22,3	25,0	31,9	11,5
1966/67	10,8	3,4	24,6	24,8	27,4	9,0
1967/68	15,8	3,3	28,8	23,1	22,1	6,9
1968/69	19,1		30,4	22,4	21,3	6,8
1969/70	18,9		29,6	23,8	22,4	5,3
1970/71	18,1		27,3	25,0	24,4	5,2
1971/72	19,7		28,0	26,3	21,9	4,1

Comparisons of performance of grading based on age, finish- and conformation over the last two decades are, however, difficult as there have been continuous changes in grading standards during this period.

Unfortunately, no data could be obtained to allow conclusions regarding the age of animals slaughtered.

The per capita consumption of beef and of red meat has decreased from 42,3 kg in 1961 to 37,6 kg in 1971 as shown in Table 5. On the other hand the per capita consumption has been static or has increased in other major beef producing and consuming countries.

It has been said that the price of beef has been the major factor militating against the expansion of the industry and against greater efficiency and intensification of production systems.

In Tabel 6 the price index of slaughter cattle is compared with those of maize and grain sorghum and fertilizers. These indices are graphically illustrated in Figure 2.

TABLE 5 Per capita consumption of red meat

Year	Per capita consumption of red meat (kg)				
	Republic	U S A	U K	Australia	New Zealand
1961	42,3	72,6	64,0	89,4	97,1
1962	41,7	73,9	65,8	97,5	110,2
1963	43,7	76,7	65,3	98,0	104,3
1964	40,2	78,9	63,5	98,9	95,7
1965	39,4	76,2	62,6	93,4	90,7
1966	38,2	77,6	63,0	91,2	112,5
1967	38,1	80,7	63,0	87,5	104,8
1968	37,5	83,0	62,6	91,2	98,9
1969	38,9	82,6	61,7	94,3	109,3
1970	39,5	84,4	62,6	91,6	97,1
1971	37,6	87,1	64,9	96,2	98,4

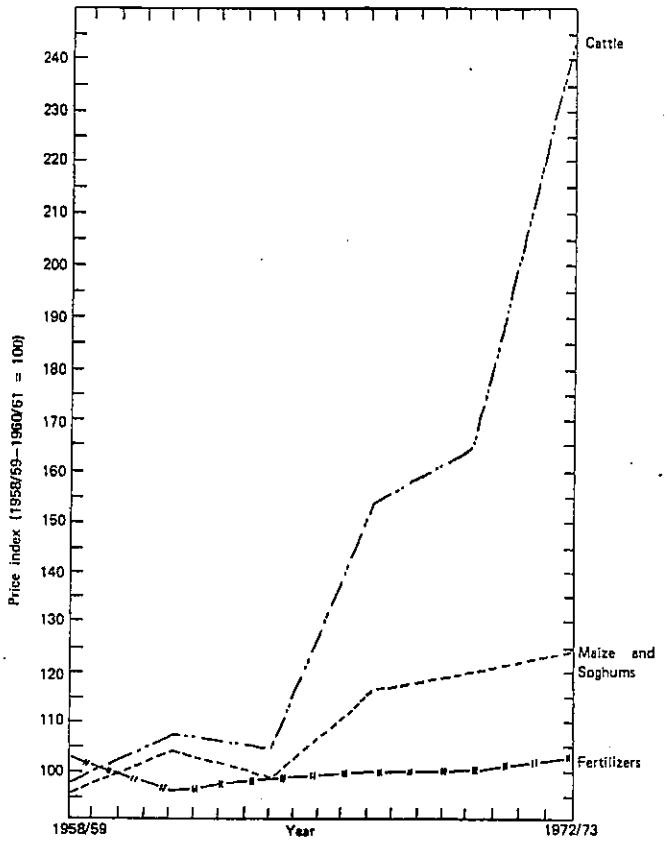

Fig 2 Price indices for cattle, fertilizer and maize and sorghum

From these indices it can be seen that relative to other industries the beef cattle industry enjoyed a decided advantage.

In spite of the lower price increases in the maize industry compared with the beef industry since 1960, the maize industry showed considerably greater growth as can be seen in Table 7.

TABLE 6 Price Indices (1958/59 – 1960/61 = 100)

Year	Cattle Slaughtered	Maize and Grain Sorghum	Fertilizers
1958/59	98,5	96,0	102,9
1959/60	100,8	100,0	100,4
1960/61	100,7	104,0	96,5
1961/62	99,6	100,5	96,5
1962/63	105,5	95,6	97,2
1963/64	106,3	98,0	98,9
1964/65	136,3	102,4	100,9
1965/66	142,7	109,8	100,2
1966,67	154,4	116,9	101,8
1967/68	173,6	111,2	101,8
1968/69	173,8	114,4	100,6
1970/71	165,7	118,9	100,3
1970/61	181,3	117,2	101,0
1971/72	182,9	119,9	104,8
1972/73	242,6	124,2*	113,1

*Excluding supplementations

This fact must certainly be ascribed to more modern production practices based on the application of the scientific principles. In this regard the raising of soil fertility through balanced fertilization programmes must rank as one of the most important factors notwithstanding the contributions made by hybrid seed and improved cultural practices.

The question must be posed: Why has the beef industry

TABLE 7 Growth of beef industry

Year	Red Meat Production (t)				Maize Production $tx10^6$
	Beef	Mutton	Pork	Total	
1960	340 712	91 310	39 465	471 487	3,95
1961	343 873	90 278	41 818	475 969	4,95
1962	344 111	98 250	43 573	485 934	5,75
1963	363 809	97 350	43 425	504 584	5,80
1964	381 404	94 865	44 273	520 542	4,00
1965	359 765	106 205	47 651	513 621	4,40
1966	357 147	110 092	55 222	522 461	4,90
1967	347 813	115 949	54 790	518 552	9,40
1968	354 130	132 391	57 817	544 338	5,20
1969	352 949	147 956	64 750	565 655	5,20
1970	383 344	154 119	71 999	609 462	6,30
1971	411 772	157 562	67 323	636 657	8,60
1972	447 100	117 644	69 229	633 973	9,30

reached this level?, but more important: What can be done to change the situation? Were the priorities realistic in the past? Have some basic requirements for a viable and growing beef industry received sufficient attention in the past?

The Problems

The beef cattle industry and its problems did not receive the attention it deserved of animal scientists until after World War II. Research and extension workers on beef cattle and meat were few and far between. Since then, however, the position has changed and the beef cattle industry has at least some information on which to base more sophisticated production systems.

Many animal scientists have since World War II in their enthusiasm tried to focus attention on the problems of the industry. Amongst others Harwin (1956) stated: "Beef production is at the cross roads; the period of primitive breeding policies and production systems are outdated. South Africa must utilize her undoubted natural potentials and all possible resources and means must be investigated and sound policies formulated to guide the beef industry to its rightful position in the Union's agriculture".

Luiting (1959) stated:

"The beef cattle industry in South Africa appears to be in a state of stagnation .... The inevitable result .... is that primitive breeding policies and production systems are the rule, rather than the exception.

"To aggravate this position there is only limited factual information available in South Africa regarding the most efficient beef production systems in the various ecological areas. The research done on beef production in this country has largely consisted of individual trials conducted at various experiment stations and few attempts have been made to approach this problem from the broad angle and national point of view.

".... few projects are in operation which have as ultimate aim to furnish information on which sound beef production policies for different farming systems under different ecological and environmental conditions can be based".

It is evident that the position has changed only to a small extent and that, in general, information regarding production systems and a dynamic co-ordinated approach and programming are urgently required.

Two points are clear: Firstly, we cannot return to the past and secondly, we cannot continue with the present inefficient, wasteful and unrealistic programmes. The essence of the task of government, responsible bodies and other interested organisations such as represented here today is therefore to establish goals, priorities, plans of action and co-operation to solve problems.

The problems confronting the beef cattle industry can be classified into two broad categories namely those affecting marketing and distribution and those affecting production.

The factors affecting marketing and distribution will not be considered at this stage. It is accepted that price incentive is of the utmost importance but other factors such as abattoir facilities, marketing systems, permits, import and export policies are not relevant at this stage.

There are, however, a host of production factors which influence beef cattle production and they can for the purpose of this discussion be broadly classified in two categories, viz:

Genetical and physiological factors, such as genetic potential of breeding stock, (beef cattle performance testing schemes) selection, crossbreeding systems etc, all of which receive widespread interest and are being intensively promoted. Other factors are: reproduction (low calving percentage), low milk production of cows, low weaning weights, low growth rates and relatively low carcase and meat quality.

Nutritional factors, including maintenance requirements, growth rations, finishing, supplementation, winter and drought feeding, nutrient requirements, quality of feeds etc. These basic nutritional aspects have received considerable attention in the past. On the other hand, the problem of feed supplies has not received the attention it warrants. It is, however, necessary to review these numerous production factors, to analyse the situation realistically and practically in order to determine such factors that could effect the greatest increase in the shortest period of time.

The status and magnitude of the problem is determined by its urgency which has in turn stimulated many attempts at possible solutions both realistic and unrealistic, correct and incorrect evaluations, different priorities and supplied evidence of clashes of vested agricultural and scientific interests.

If the situation is analysed realistically the following factors are in my opinion high-order priorities:

(1) *To increase the total cattle production*

This has been static for decades. This fact coupled with the deterioration of the natural grazing and the necessity of the implementation of the Stock Reduction Scheme points to the fact that *under present conditions* the feed resources of the Republic cannot support increased cattle numbers. As the total agricultural area is progressively being reduced an increase in feed supplies especially roughage must form the basis for maintaining a larger national herd.

(2) *Increase breeding stock (cow) numbers and proportion of breeding cows*

Growth in the beef cattle industry is directly dependent on cow and calf numbers. At present there are

about 2,8 million white-owned beef cows in the Republic and it is imperative that this number be raised. An estimate based on available but rather scanty statistics would probably reveal that the proportion of breeding cows is no higher than 30-32 per cent. Not only in this country but also in other major beef producing countries and communities the production of calves is a limiting factor.

Calf production is receiving high priority in the E E C and has been doubled in five years. The cow herd is basically dependant on roughage so that an increase in roughage production will be necessary.

(3) *Effect a quicker turnover*

The two most important factors in this connection are

- increase in calving percentage and
- a faster growth rate.

Research results and practical experience have shown conclusively that a higher level of nutrition is the most important factor in raising fertility in cow herds. Other factors such as decease and selection for fertility are likewise important but it has also been shown that genetic improvement of the fertility status of a herd is slow. However, these factors are interrelated and important and should receive the necessary attention.

The improvement in growth rate is also mainly dependent on a higher nutritional level although other factors (breed, type selection) play a part.

(4) *Eliminate winter mass losses*

Winter mass losses are difficult to quantify but are of considerable magnitude in South Africa. Attempts have been made to reduce these losses through maintenance rations in which supplementation (energy, protein, NPN, minerals, etc) have played a major role. The basic problem, in my opinion, seems to be the lack of sufficient high quality feedstuffs, especially roughage.

(5) *Reduction of drought losses*

Mortality due to drought and lack of reserve fodder and fodder banks is responsible for a varying seasonal reduction in cattle numbers as can be seen in Table 8.

(6) *Improve quality*

Apart from other less important factors such as breed or type, sex etc, quality is improved by reducing the age at slaughter through a higher level of nutrition during the growing phase based primarily on good quality roughage and improving the finish based on roughage and concentrates.

The situation and problems analysed in this manner would seem to allow the conclusion that in order to effect the greatest increase in production in the shortest possible time, the raising of the level of nutrition and increasing the production of high-quality roughage would have to receive the highest priority. The fact that this basic requirement has not been receiving the attention it deserves, in my opinion, is the most important reason why the industry has not shown the same development as other industries in the agricultural sector. Notwithstanding the fact that it has been widely conceded by many animal scientists that the genetic level of livestock in South Africa is higher than the nutritional level on which they are expected to produce and reproduce there has not been a national programme directed at this very important basic requirement despite the fact that cattle improvement schemes and beef performance-testing programmes have received considerable attention and support.

TABLE 8 *Drought losses of cattle*

Year	Cattle lost
1937	656 343
1939	348 024
1946	588 761
1947	976 996
1948	847 292
1949	861 482
1950	991 231
1951	774 962
1952	758 634
1953	852 458
1954	764 992
1955	786 085
1956	885 277
1957	967 547
1959	1 080 675
1960	851 612
1963	875 456
1964	454 135
1971	463 000*

*Preliminary figure (black homelands excluded)

The Resources

When considering the natural resources for beef production the following important factors must be taken into account:

South Africa is regarded as primarily an animal production country because of the limited area suitable for crop production. Furthermore, the country is notorious for the low fertility of its soils and thirdly, extensive areas are situated in the low rainfall zone. Generally the precipitation is erratic and the occurrance of drought is common.

Future Production Priorities and Potentials

Nutrition (quantity, quality and level of) having been identified as a high priority factor to increase beef production, the nutritional priorities and potentials should be further analysed.

The finishing of cattle in feedlots is receiving widespread interest in South Africa and this specialised production system is considered by many to effect a major contribution to beef supplies. It has, however, been shown that the major limiting factors would seem to be static or declining cattle numbers, low proportion of breeding cows and low calving percentage resulting in a shortage of calves and steers for grass and/or feedlot fattening.

It is, therefore logical to infer that any future development of feedlots is not directed at the source of the problem and that concentrate feeding cannot form the basis of a national programme aimed at increased production. In South Africa concentrates, especially maize, should only play a role at the final fattening stage of the production process and in supplementation.

Alexander (1973) pointed out that in Australia feedlots have only played an insignificant part in the production programme of that country *inter alia* because of the high cost factor of the enterprise when compared with pasture-based production.

This is also the case in Latin American countries and according to Boyazoglu (1974) there is an ever-increasing interest in increased production based on improved pastures and twinning cows in the European Economic Community.

Preston (1974), in reviewing trends in the United States of America, said that due to the high grain and protein prices 'backgrounding' — a term applied to a production system where calves are grown on high roughage rations up to 350 kg before finishing — is gaining in popularity in spite of the fact that the beef to grain price ratio has widened from about 7,5:1 to 14:1 in that country. The ratio in South Africa is of the order of 7:1, having been 3 or 4:1 in the past.

As the breeding and growing phases require the greatest proportion of nutrients in a beef production system (this figure can be as high as *ca* 90 per cent) the importance of increasing nutrient production from pastures and fodder-crops becomes evident.

Beef Production Potentials of Improved Pastures and Foddercrops

Increased beef production from pastures can be effected by veld fertilization, radical veld improvement and by planted perennial pastures.

Tribute is due to the pasture specialists for their contribution to the knowledge of grasslands in South Africa and especially to those who have directed their work at increasing production through the various techniques of fertilization, radical veld improvement and planted pastures. Allow me to specifically mention the pioneer work and major contributions of T D Hall, D Meredith, R E Altona, G F S Hyam of AE & CI and P Theron, P J Edwards, J Pons, N Rethman, B Birch of the Department of Agricultural Technical Services.

It is an unfortunate fact that research findings fail to find application in practice, especially in agriculture. This may be due to many factors — the discussion of which has not relevance in this paper — but often the importance of such findings are not realised or may not be applicable at the time and are subsequently hardly ever reconsidered in the light of changing conditions. Furthermore, when research findings show promise they often remain of academic interest because of a lack of co-ordinated follow-up and development programmes based on such results. Sometimes it may be considered that the particular field has not been adequately researched but I would warn, especially in the case of an applied biological science, against using as an excuse for inaction the possible inadequacy of precise information or absolute findings.

Twenty-six years ago Meredity (1948) concluded his monumental thesis as follows: "Increased use of nitrogenous fertilizers will improve the grass cover and increase the yield of nutrients. The increased yield of nutrients will make possible the maintenance of more livestock and will also enhance their productivity. Higher production on improved pastures will be of benefit to the farmer while the increased output of protein-rich foods of animal origin will benefit the population...."

Twenty-two years ago, in 1952, African Explosives and Chemical Industries provided data to show the dramatic effect of fertilization on veld and stated:

"The comprehensive experimental programme which has been carried out in recent years at their Frankenwald Research Station .... has proved beyond all question that a tremendous increase in production and wealth awaits the South African farming community .... in the fertilization of natural veld".

It is on these concepts of yesteryear and the subsequent relevant research findings by numerous workers that the Fertilizer Society of South Africa has set out to base a development programme which is aimed at

(1) maximising the advantage of the fertilization and improvement of pastures and foddercrops as indicated by research findings

(2) developing management systems to utilize such high producing pastures and

(3) extending and integrating such systems into farming systems in the relevant ecological areas.

The potential for increased beef production from improved pastures and foddercrops is of considerable magnitude as can be seen from Table 9.

The undermentioned figures are not absolute but are approximations based on trials of potentials under specific managerial practices. These potentials can be increased or decreased depending on the level of managerial practice.

When these potentials are compared with feedlot potentials and potentials for increased production through genetic and physiological pathways as shown in Table 10 it is evident that improved and fertilized pastures and foddercrops should and must form the basis of a realistic programme aimed at higher beef production as it could result in the most dramatic increase in the shortest possible time.

Production systems based on improved and fertilized pastures have been developed in other countries with considerable advantage.

The INTA system in the Argentine (see Table 11) has resulted in a four to six fold increase in dry matter production; *ca* three to four fold increase in carrying capacity; a three to four fold increase in mass gain; reduced the breeding age of heifers from about two to two and a quarter years, to fourteen to fifteen months; reduced the breeding season from five to seven months, to three months; reduced the age at weaning from ten to five to six months and reduced the slaughter age from two and a half years to one and a half years.

TABLE 9 Production potentials of grass and foddercrops

	Unfertilized	Fertilized
	kg live mass/ha	
Natural Veld		
Bushveld	25	
Soutpan	50-60	
Frankenwald	65	226
Kokstad	60	322
Athlone	117	–
Döhne	100	390
Greytown	73	
Reinforced Veld	3-6 times	
Replaced Veld		
Eragrostis curvula	2 cows and calves/ha	
Chenchrus ciliaris	1 cow and calf/ha	
Planted Pastures (Australia)	Up to 1 400 kg/ha	
Irrigated Pastures (South Africa)	5-7 cows and calves/ha (8 months)	
Fodder Crops (United States of America)	2 000 lb/acre	

TABLE 10 The potential of genetic factors

Weaning mass	
Expected increase (within breeds)	*ca* 3,0 kg/year
(between breeds)	*ca* 6,3 kg/year
Mass at one year	Potential increase per year (kg)
Selection for 1 factor	4,7
2 factors	3,3
3 factors	2,7
Crossbreeding (first crosses)	
Calving percentage	*ca* 10-15%
Weaning mass	*ca* 15%
Feed utilisation	*ca* 11%

Results of similar developments in Australia are illustrated in Figure 3.

Apart from the considerable increase in mass gains per acre as a result of fertilized reinforced pasture the dramatic improvement in fertility and the number of calves reared is clearly evident.

This development is at least partly responsible for an increase in the cattle population of Australia since 1965 as can be seen from Figure 4.

The intensification process of beef production can be summarised as shown in Figure 5.

It can be seen that there are two definite phases, a basic and a secondary development phase. It is further estimated

TABLE 11 Results of the Argentine beef production systems

Grass and Fertilization and Management = More Beef		
	Without Fertilizer	With Fertilizer
Dry matter: kg/ha	2 000	8 000-12 000
Carrying capacity	0,6-0,7 cows/ha	2,2 cows/ha
Mass gain: kg/ha/a	70-80	300
Breeding age, Female (months)	21-27	14-15
Breeding season	5-7 months	3 months
Weaning age	10 months	5-6 months
Slaughter age	31-32 months	18-19 months

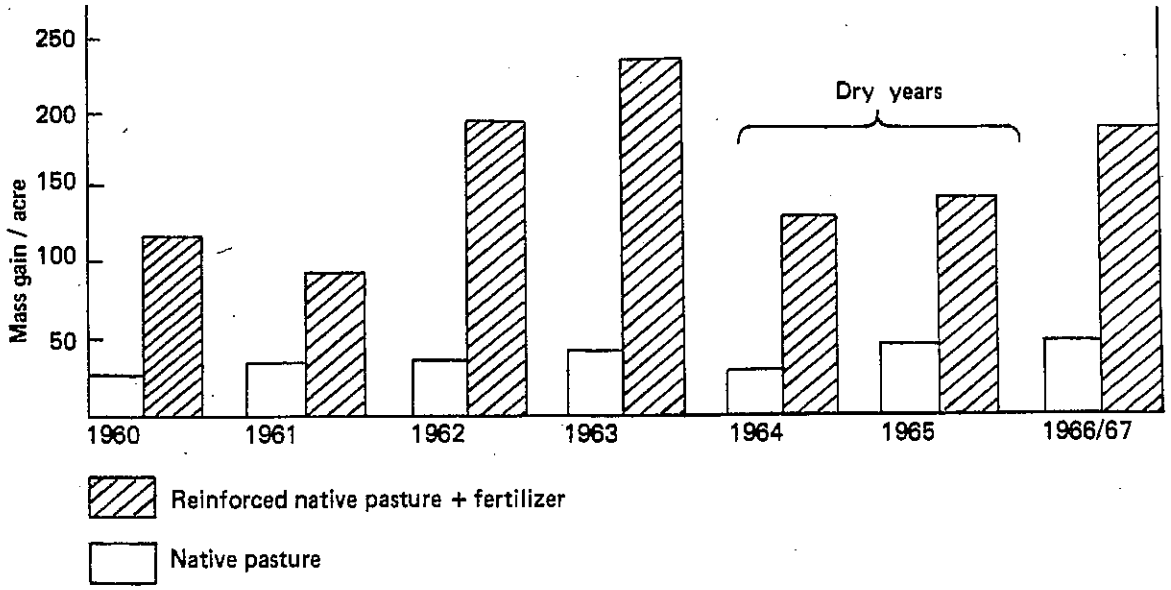

Fig 3 Increased mass gain on fertilized reinforced native pasture in Australia

that the production potential of the secondary development is more than three times that of the basic development.

Beef production in South Africa has only developed through the first (basic) phase and the scope for increased production is unlimited provided the priorities as discussed in this paper are recognised and implemented.

Lombard (1974) has calculated the increase in production and the profit after feed for different systems of different degrees of intensification based on natural veld, fertilized and fortified veld, ensilage and supplements. His results are summarised in Tables 12 and 13.

It is evident that as the degree of intensification rises so the cow-units/1 000 ha increase from 386 to 1 445. In terms of monetary value it is further evident that the total profit from a 1 000 ha unit increases from R8 171 to R138 843 and the profit per cow-unit from R21,17 to R96,09.

Having established the fact that increased plant production (roughage, grass, foddercrops) is unquestionably the most important factor for future increases in beef production, and if a national programme aimed at increasing beef production is considered necessary – which is no doubt the case – then the following considerations are of the utmost importance:

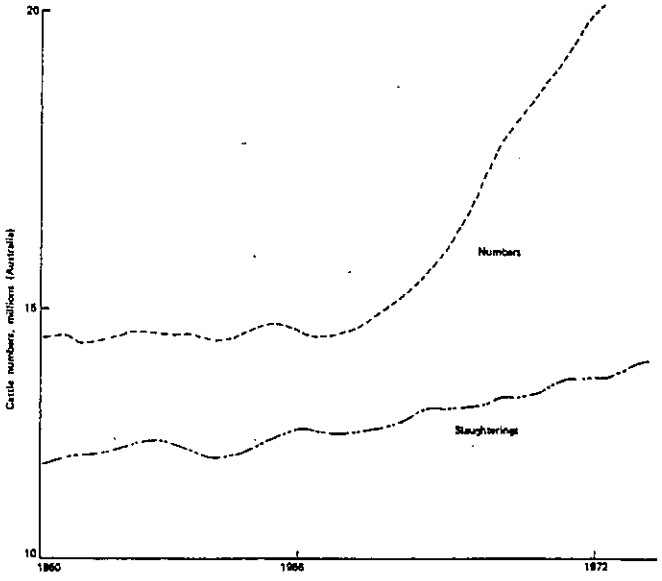

Fig 4 Cattle population and slaughterings in Australia

INTENSIFICATION

1 *BASIC DEVELOPMENT*

- a WATER
- b FENCING
- c CLEARING (IF NECESSARY)
- d BREEDS, CROSSBREDS & BREEDING SYSTEMS
- e IMPROVED MANAGEMENT

2 *SECONDARY DEVELOPMENT*

- a IMPROVED GRASSLAND
- b IMPROVED BREEDS & TYPES (HIGHLY PRODUCTIVE)
- c HIGHLY SOPHISTICATED MANAGEMENT

IF POTENTIAL 1 = 100

∴ POTENTIAL 2 = 300 + + +

Fig 5 Intensification process of beef production

TABLE 12 Criteria per cow-unit (C U) for different systems (Lombard, 1974)

Criterion	System+					
	I V (Mi-s)	II V (Mx-s)	III V+ (Mi-s)	IV V+ (Mx-s)	V P (Mi-s)	VI P (Mx-s)
Hectare: Summer	2,500	2,530	0,775	0,785	0,517	0,523
Winter	0,093	0,169	0,093	0,169	0,093	0,169
% under maize	3,60	6,30	10,7	17,7	15,2	24,4
40% Protein Supplement(t)	0,0192	0,1649	0,0192	0,1649	0,0192	0,1649
Lucerne (t)	–	0,145	–	0,145	–	0,145
Maize silage (t)	3,73	6,75	3,73	6,75	3,73	6,75
Calf Mass sold (t)	0,1318	0,261	0,1318	0,2610	0,1476	0,2610
Cow mass sold (t)	0,0765	0,0765	0,0765	0,0765	0,0765	0,0765
C U/1 000 ha	386	371	1 152	1 048	1 639	1 445

+ V = Veld, V+ = fortified veld, P = low cost pasture
Mi-s = minimum silage
Mx-s = maximum silage

TABLE 13 Profit after feed for different systems on 1 000 ha (Lombard, 1974)

	System+					
	I V (Mi-s)	II V (Mx-s)	III V+ (Mi-s)	IV V+ (Mx-s)	V P (Mi-s)	VI P (Mx-s)
Income:						
Calf mass[1] (R)	27 981	53 257	83 508	150 440	133 054	207 430
Cow mass[2] (R)	11 812	11 353	35 251	32 069	50 153	44 217
Total (R)	39 793	64 610	118 759	182 509	183 207	251 647
Pasture Cost (R)	24 254	23 575	59 590	54 919	38 177	34 035
Maize Silage Cost (R)	6 479	11 269	19 336	31 833	27 511	43 892
Protein Supplement* (R)	889	7 341	2 654	20 738	3 776	28 593
Lucerne** (R)	–	1 614	–	4 559	–	6 286
Total (R)	31 622	43 799	81 580	112 049	69 464	112 806
Total Profit (R)	8 171	20 811	37 179	70 460	113 743	138 843
Profit: Per ha	8,17	20,81	37,18	70,46	113,74	138,84
Per C U (R)	21,17	56,09	32,27	67,23	69,40	96,09

* At R120/tonne ** At R30/tonne
1 At 55c/kg 2 At 40c/kg
+V = Veld, V+ = fortified veld, P = low cost pasture
Mi-s = minimum silage
Mx-s = maximum silage

(1) *Increased plant production,* and therefore animal production, is primarily dependant on a high fertility status of the soils. Very little or no progress will be made if this important fact is not recognised. Therefore nitrogen and to a lesser degree phosphorus and potassium must play an important role in the intensification process. Meredith (1948) concluded from available data at the time that "natural veld on the Highveld will produce 15-30 lb of dry matter or 2½ lb liveweight gain or up to 15 lb TDN per pound of nigrogen applied".

At the present N to beef price ratio a very favourable economic advantage in the application of nitrogen on grass is evident.

(2) When increased beef production is considered the so-called 'ranching' or low rainfall areas traditionally receives high priority. Due to the enormous potential of the *high rainfall areas* of South Africa for beef production, it will be necessary to concentrate primarily on these areas to effect increased production. Luitingh (1956) drew attention to the advantages of the highveld high rainfall areas as potential future breeding areas and suggested methods of the intensification process in these areas.

Conclusion

We have been drawing on the capital of our natural vegetation as reflected by the deterioration of the veld and the stock reduction scheme, and on the capital of our national herd as reflected by our static and declining cattle numbers and increasing numbers of female stock slaughtered without making any substantial deposits.

We therefore find today that the status and importance of our problem is not determined by history, by unrealistic dreams or by scientific hairsplitting, but only by its urgency.

This urgency has lately given rise to many attempts at realistic and unrealistic solutions, incorrect and correct evaluations and priorities, clashes of vested agricultural and scientific interests, misunderstanding and even despondency.

Therefore, as the past is history and the present unsatisfactory, it is the essence of the task of government, interested bodies, organisations and individuals such as represented here today to establish goals, priorities, action programmes and co-operation to solve these urgent problems.

Shakespeare said (Julius Caesar):

> "There is a tide in the affairs of men
> Which, taken at the flood leads on to fortune
> Omitted, all the voyage of their life
> Is bound in shallows and in miseries.
> On such a full sea are we now afloat,
> And we must take the current when it serves
> Or lose our venture".

(3) To facilitate an increased beef production programme the *integration of pasture and animal science* will become more and more vital. It is probably because of the fact that in the past pasture and animal scientists worked in unco-ordinated, unintegrated programmes the concept of increased animal production through increased pasture production has as yet not found practical application. We must beware of the specialist who understands everything about his job except its ultimate purpose and its place in the general order of things.

(4) If a dynamic and purposeful programme aimed at increased beef production based on increased plant production needs to be implemented it will require the *co-operation and support* (technical, financial, administration) of many different bodies and organisations in the agricultural sector (state departments) Control Boards, organisations in the meat industry, the private sector supplying inputs to agriculture etc). Without this co-ordinated and co-operative support an intensification programme of this nature is doomed to failure.

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