SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

PROGRAMME FOR ANNUAL GENERAL MEETING

6 NOVEMBER 1984

8.30 - 8.45	Chairman's Report		
8.45 - 9.15	Brian Sugden	:	The A & B price pool system and the economic implications.
9.15 - 9.45	Dennis Benningfield	:	A cane growers strategy for the A & B pool system.
9.45 - 10.15	Norman Graham	:	Cassava - it's place in the coastal cane growing areas.
10.15 - 10.45	T E A		
10.45 - 11.15	John Boulle	:	The value of some sugarcane by-products as cattle feed.
11.15 - 11.45	Brian Mapledorum	:	Pastures for the coast lowlands.
11.45 - 12.15	Brian Lowe	:	Beef production on the coast lowlands.
12.15 - 12.45	Bill Delport	:	Cattle marketing.
12.45 - 2.15	L U N C H		
2.15 - 2.45	Gerhard de Beer	:	Cutting costs of machinery.
2.45 - 3.15	Peter Turner	:	Cutting costs of weed control.
3.15 - 3.45	Henry Moore	:	Cutting costs of labour.
3.45 - 4.15	Tony Wood	:	Cutting costs of fertilizer.

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

THE EFFECT ON AGRICULTURE OF RATIONALISATION IN THE SUGAR INDUSTRY

by

BA SUGDEN

The Sugar Industry plays a major role in the economics of some 18 of +- 45 districts in Natal and in portion of Piet Retief and Barberton districts of the Eastern Transvaal. Therefore any change in aspects affecting the financial position of cane growers will inturn have a marked affect on a large proportion of the agricultural economy of such districts. It is said that "when sugar shivers NATAL catches a cold".

I would like to outline what is considered as TWO major aspects of RATIONALISATION in the sugar industry which is likely to affect the agricultural economy in these 20 odd districts of South Africa.

These are firstly, the impact of the changes in the cane transport cost responsibility and secondly, the pending introduction of a MULTIPLE PRICE POOL SYSTEM in the industry.

1. CANE TRANSPORT COST RESPONSIBILITY

The background to these changes stems from the appointment in March 1981 of the RORICH COMMITTEE of INQUIRY to investigate certain aspects of the sugar industry. In dealing with the question of expansion of sugar production, the Committee also recommended the further investigation of a MULTIPLE PRICE POOL. This important recommendation was however, relegated to relative obscurity by the controversy created by the recommendation regarding the assumption of CANE TRANSPORT COST and responsibilty by CANE GROWERS and the ellimination of the subsidisation of transport costs. The RORICH COMMITTEE obviously saw the total lack of ECONOMIC LOGIC in the cane transport subsidisation scheme and made the following far-reaching recommendation in an endeavour to solve the problem.

2/... "It is

"It is accordingly recommended that a new cane transport scheme, in terms of which the growers will accept full responsibility for cane transport and the appropriate COMPENSATION will be paid to the losers, be introduced without delay. It should be **emphasised** that the longer the existing system is allowed to continue the more complex and difficult it will become to change. If concerted action is not now taken to place the system on a sound economic foundation, the opportunity for doing so may be lost permanently".

Leaders within the industry saw that the vital issue was the FUTURE ECONOMIC WELFARE of the Industry and not the protection of differential privileges. The Government were steadfast in their resolve to implement the RORICH recommendations and thus the Sugar Industry agreement was amended and the new "RORICH" cane transport dispensation was implemented from 1st April 1984.

In terms of the new scheme, growers now bear all the cane transport costs and receive a cane price nearly R4.00 higher than would previously have been the case, instead of the bearing subsidised transport cost and receiving a lower cane price.

We thus have two classes of growers namely:
LOSERS, whose transport cost relative to the 1983/84 season have risen more than about R4,00 per ton and:
GAINERS, whose transport costs have risen less than R4,00 per ton. The losers have been paid a CAPITAL COMPENSATION based on CAPITALISATION rate of 13,5% of their relative loss, from a FUND which is financed by the GAINERS, from their relative gain. In the absence of inflation if a LOSER was able to invest his compensation at 13,5%, the interest received would exactly offset the additional transport cost.

3/...However,

However, in practice, the inflation of transport costs will tend to erode this benefit. Equally, however, the ability to invest at a rate better than 13,5% will offset the erosive effects of inflation.

In terms of the S A Cane Growers' Association research, it appears that, by using the most suitable method of transport a reasonable economic transport distance for sugar cane is between 30 and 40 kilometers. Experience has, however shown that under favourable circumstances, including growing conditions, efficient management and competitive transport costs this distance can be increased to about 50 to 55 kilometers without serious adverse effects on PROFITABILITY. Therefore one would have expected a gradually phasing out of cane production at distances in excess of about 55 kilometers from the mill OR restricted to the most favourable farms at those distances.

2. MULTIPLE POOLS

Having considered the effects of the CANE TRANSPORT COST on the sugar industry, it is now necessary to consider the additional, and to an extent, counter impact of the POSSIBLE introduction of a MULTIPLE PRICE POOL SYSTEM in the sugar industry from the start of the 1985/86 season.

In terms of the proposals currently being considered by the South African Sugar Association, the POOL SYSTEM would involve the division of total sugar production into 2 pools as follows:

"A" POOL - comprising 1,8m tons of sugar (2,12m tons sucrose) which is about 80% of the Industries average production.

The "A" pool price would be derived from the LOCAL MARKET SALES and about 50% of average EXPORT SALES.

"B" POOL - comprising about 400 000 to 500 000 tons of sugar which is the balance of sugar produced for the EXPORT MARKET. The "B" Pool price would be derived from the average EXPORT PRICE received for such sugar and any revenue from the sale of non-sugars such as high test molasses, animal feed etc.

2.1 DISPOSITION OF CROP:

	TONS (M)	%
"A" Pool: Local Market White sales	1.14	51
Brown sales	0.16	7
Export Market sales	0.50	22
Total "A"	1.80	80%
"B" Pool: Balance of Export Sales	0.45	20%
Total	2.25	100%

2.2 DETERMINATION OF ENTITLEMENTS

It would be necessary to determine a production entitlement for both GROWER'S and MILLER'S.

The Miller's entitlement in terms of tons of SALEABLE SUGAR and the Grower's in terms of the SUCROSE.

It is envisaged that the existing provisions of the sugar industry agreement relating to AUTHORISED REGISTERED LAND will be left unchanged.

A <u>GROSS SUCROSE ENTITLEMENT</u> would be determined for each individual grower, where possible, based on an average of total production where a grower's quota area has not changed during the applicable period OR on average yield applied to area under cane where a grower's quotas area has changed.

The sum of all grower's GROSS ENTITLEMENTS would represent the TOTAL GROSS ENTITLEMENTS. The individuals "A" POOL SUCROSE ENTITLEMENT would be determined by <u>REDUCING</u> the individuals gross entitlement, <u>in the same proportion</u> as the total "A" Pool sucrose entitlement (+- 2,12 m tons) bears to the total gross sucrose entitlement.

<u>For Example:</u>

If the sum of the Grower's gross sucrose entitlements are determined as 3,03m tons sucrose, (2,57m tons sugar) then the factor of reduction to determine the "A" Pool sucrose entitlement would be:

$$\frac{2,12}{3,03} = \underline{70\%}$$

The Millers "A" POOL SUGAR ENTITLEMENT would be determined as the sum of "A" Pool sucrose entitlements of each grower attached to a Mill, converted to sugar at an appropriate sucrose:sugar ratio.

2.3 OTHER ASPECTS:

Details relating to the following aspects are still under consideration and will have to be appropriately catered for in the new scheme, namely:

(a) Future new growers
(b) Increase in entitlements for existing growers
(c) Reducibility of entitlements
(d) Restriction of production
(e) Sale of entitlements and transfer of land
(f) Penalties
(g) Guaranteed estimates
(h) Length of milling season and cane quality etc.

3. FINANCIAL IMPLICATIONS

The aim of introducing the two pool system is to expose producers to the realities of prices achieved from marginal production. At the moment any producer who increases production uses as a basis for ECONOMIC JUSTIFICATION an AVERAGE SUCROSE PRICE. The sugar industry, however, may receive a much lower (or occassional higher) price for that additional sugar. The loss is borne by all other producers.

Under a multiple pool system the marginal cost of producing that additional ton of sucrose will be measured against the expected MARGINAL VALUE (PRICE) and therefore, the economic consequences do not affect other producers.

Equally when export prices are HIGH the RISK taken by those who produce "B" Pool sucrose will receive the full benefit.

7/... An important

An important aspect of the multiple pool system is that the growers would only be expected to produce the "A" pool entitlement on a continuous basis in order to retain that entitlement. The present QUOTA SYSTEM requires growers to produce to the maximum in order to retain basic quota. A multiple pool system will therefore provide for greater planning flexibility.

The direct benefits to the sugar industry which will result from a multiple pool scheme are:

(a) HIGH COST GROWERS, particularly in respect of transport will not produce cane during periods of low world prices. The incentive to produce economic "B" pool cane will therefore result in general cost efficiences.

(b) Growers with MARGINAL LAND, either very steep, weak sands (nematodes), very rocky or shaley, are unlikely to replant such land when "B" pool prices are low. One would expect that some of this type of land will be withdrawn from cane production permanently.

(c) MARGINAL AND SEMI-MARGINAL LAND far from mills will be withdrawn from cane production and the entitlements sold/transferred to farms closer to the mills.

(d) Poor farms producing EXPENSIVE CANE would tend to cease production with the entitlements being sold to more economically efficient farms.

The introduction of a system with a generally anticipated HIGHER "A" POOL PRICE will result in offsetting some of the effects of the RORICH TRANSPORT SCHEME. It is considered that a price differential of about R3,00 per ton cane will retain in production land which may have been rendered UNECONOMIC by transport costs.

Equally, however, the anticipated lower price for marginal production will result in a more rapid withdrawal of the marginal land far from the mill (20 to 25%) and also marginal land closer to the mill than the considered economic distance of about 45 kilometers.

3.1 DECISION MAKING PROCESS:

It is considered that there are three stages in the production cycle that will require logical decisions by the cane grower. These stages are simplistically illustrated in the following table:

STAGE 1: The current MATURE CROP STAGE.
QUESTION - Is the cost of harvesting and transport lower that the expected MARGINAL PRICE ("B" Pool)?

If NO - replace with best alternative enterprise.

If YES - harvest cane crop since any additional marginal revenue will help cover overhead costs.

STAGE 2: The RATOONING STAGE, having harvested the current crop.
QUESTION - Is the cost of RATOONING, HARVESTING AND TRANSPORT LOWER than the marginal price of cane?

If NO - replace with best alternative enterprise

If YES - ratoon the crop and harvest.

9/.. STAGE 3:

<u>STAGE 3:</u> The PLOUGH-OUT/REPLANTING STAGE, should one plough-out existing crop and replant?
QUESTION - Is the cost of REPLANTING, RATOONING, HARVESTING, TRANSPORT and any other cultural practices lower than the marginal price of cane?

If <u>NO</u> - replace with best alternative enterprise

If <u>YES</u> - Is the GROSS MARGIN between cane price ("A" or "B" Pool) and DIRECT PRODUCTION COSTS greater than GROSS MARGIN from best alternative enterprises.

If <u>NO</u> - Replace with best alternative enterprise

If <u>YES</u> - Proceed with new crop cycle <u>PROVIDED</u> the cane gross margin is adequate to cover farm overhead costs in longer term (Management, Interest Payments etc)

3.2 <u>COMBINED FINANCIAL IMPLICATIONS</u>

The combined implications of the "Rorich" Transport scheme and the probable introduction of the multiple price pools are summarised as follows:

(a) Within a distance of <u>about 30 kilometers</u> from a mill, there is likely to be <u>NO</u> change in the pattern of farming. Small areas of very marginal land may be withdrawn from cane, but in general, it is expected that "A" pool entitlements will be sold/transferred into these areas.

(b) Between 30 and 60 kilometers from the mills, at least 70% to 80% of the existing areas are expected to remain in sugar cane production. However, the withdrawal of the remaining 20% may be more rapid than dictated by the transport cost only.

(c) Over 60 kilometers there is expected to be a greater degree of withdrawals from cane production with the sale of "A" pool entitlements to growers closer to mills at fairly HIGH prices, unless controlled. The limit on production will be at about 80 kilometers from mills.

The envisaged combined rationalisation effect as a result of the new cane transport cost arrangement and the proposed multiple price pool scheme has been graphically illustrated in FIGURE 1 attached.

3.3 EXAMPLE: MULTIPLE POOLS vs AVERAGE PRICE

It is important to appreciate that in any season the WEIGHTED AVERAGE of the "A" and "B" pool prices will be the SAME price as would be received under the current single average price system.

Therefore no grower will be worse off as a result of the multiple pools system. However, some growers, with HIGH VARIABLE COSTS, such as cane transport cost, will stand to benefit most from the introduction of multiple pools.

A multiple pools price system therefore, takes nothing away from cane growers but gives growers "new" options.

The following hypothetical example illustrates the financial implications of two growers, one 5 kms from the mill and the other 60 kms from the mill.

ASSUMPTIONS:			R-c/TON CANE
(a)	PRODUCTION:		
	5000 tons average production 4000 tons "A" pool (80%)		
(b)	REVENUE		
	(1)	Ave. sucrose price R190 per ton @ 13%	24,70
	(2)(a)	Equivalent "A" Pool price R210 per ton @ 13%	27,30
	(b)	Equivalent "B" Pool price R110 per ton @ 13%	14,30
	(3)	Equalisation & Retention interest	
		5000 tons	,70
		4000 tons	,80
	(4)	Cane transport refund:	
		5km Grower (gainer)	2,30
		60km Grower (loser)	3,80
(c)	COSTS		
	(1)	Harvesting and ratooning costs	8,00
	(2)	Fixed costs: 5000 tons	14,00
		4000 tons	17,50
	(3)	Cane transport: 5Kms	2,00
		60Kms	11,00

	PRODUCES AVERAGE OF 5000 TON		PRODUCES ONLY "A" POOL - 4000 TON	
Distance from Mill	"5KMS"	"60KMS"	"5KMS"	"60KMS"
	(R)	(R)	(R)	(R)
<u>REVENUE</u>				
"A" Pool 4000 tons @ 27,30	109200	109200	109200	109200
"B" Pool 1000 tons @ 14,30	14300	14300	-	-
Equalisation & Retention				
Interest	3500	3500	3200	3200
Transport Refund	11500	19000	9200	15200
	138500	146000	121600	127600
Revenue Loss "B" Pool	-	-	16900	18400
<u>COSTS:</u>				
Harvesting and ratooning	40000	40000	32000	32000
Cane Transport	10000	55000	8000	44000
Variable Costs	50000	95000	40000	76000
Fixed Costs	70000	70000	70000	70000
TOTAL COSTS	120000	165000	110000	146000
Saving "B" Pool costs	-	-	10000	19000
Margin (Loss)	18500	(19000)	11600	(18400)
Therefore benefit from "B" Pool Production (Loss)	-	-	6900	(600)

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

A CANE GROWER'S STRATEGY FOR THE A AND B POOLS

by Dennis Benningfield

The Muliple Pools System is a cane payment system designed to ensure that the industry reacts logically to the signals being generated by the world sugar supply position. Whether or not the system provides suitable conditions to enable growers to do this will determine the strategy growers employ.

It is probably true to say that no one will, on average, receive less for their crop than if multiple pools had not been introduced.

Growers have been told that they will have to face up to market forces. To do this in the prevailing economic climate it is essential that they be free to use the resources made available by the system to do whatever they can to improve their profitability. Indeed in some cases economic survival may depend on being able to do this.

The overriding consideration in achieving this will be the degree of vulnerability of the A pool entitlement.

Up to the present no finality has been reached on this issue, and so it is probably prudent to formulate a strategy for both eventualities.

1. **If the A pool is vulnerable:** a careful study of past performance both in relation to the size of the A pool entitlement and as regards the evenness or otherwise of the crops. This will give a good idea of the size of the safety margin (B pool) required.

   In an area with high transport or other costs this might well mean producing cane at a loss, so the amount of B pool would be as small as possible. An erratic producer would probably require a bigger safety margin. Consideration could also be given to the employment of irrigation if available, to make erratic production more even, and so reduce the amount of B pool insurance necessary. Obviously a profitable use for the land so released would be a prerequisite.

2. **If the A pool is secure:** here the options are manifold:

   a) Conversion of the farm to wholly A pool by purchase of quota.

   b) The release of land for the range of alternate crops depending on situation, labour availability and grower energy, bearing in mind that these have only to be viable in relation to the B pool price.

   c) **The opportunity to farm for maximum profit rather than maximum production:** extending the life of ratoon crops, and the extent to which this can be done in heavier soils is quite surprising with good field hygiene. Fertilizing on the 'economy side' of the fertilizer response curve and so on. In short one can push to the limits for maximum profitability without incurring too much financial risk if one goes a bit too far.

My farm is supposedly in a good rainfall area, but over the last five years I would have lost A pool if the two out of five year rule had applied and I'd taken one hectare out of cane. I shall probably adopt a 'wait and see' policy while initiating an 'economy class' ratooning and fertilizing programme.

Fortunately, I have fairly low transport and general costs and so can afford to continue producing in the B pool, but should the B price fall or should I decide that there is a better alternative, I feel that my decision should not be influenced by the need to safeguard my A pool entitlement with B pool cane.

It cannot be denied that what I'm suggesting will reduce milling throughput, and this must cause concern amongst our milling colleagues. If it did not do this then the industry would not be responding logically to the low world price. However, the miller will also benefit from higher prices for A pool, and surely a controlled reduction in production is preferable to the traumatic reduction caused by growers going out of business.

Other valid objections are that inefficient growers will be protected, and that a closed shop image will be created for the industry. Viewed in the right perspective against the enormous problem of gross worldwide over-production these objections, whilst perfectly valid, become problems with which we can live; certainly until the sugar mountain begins to subside.

Provided growers maintain an area under cane commensurate with the percentage that their A pool bears to the farm mean peak, non-performance of A pool should not result in its reduction.

Box 4001
EMPANGENI RAIL
3910

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

CASAVA - ITS PLACE IN THE COASTAL CANE GROWING AREAS

by Norman Graham

INTRODUCTION

Cassava was first cultivated over 4000 years ago in Brazil and Mexico and introduced into Africa in the 17th century. World production in 1980 was 112 million tonnes of which 40% was produced in Africa.

Traditionally it is a subsistence crop grown in the tropics and is of value because it is drought tolerant and grows on poor soils.

Intensive research on the crop only started in 1970. It produces more carbohydrate per hectare per annum than any other non irrigated tropical crop. Its main use is still as a subsistence food crop but it is also used industrially for the production of fuel, animal feed and starch.

Work on cassava in South Africa started ten years ago and the present project was initiated in 1979. The crop is grown from Mkuze to Stanger and the distance from the coast does not exceed 60 km. As at 31st March 1984 a total of 1008 hectares was established by 38 white growers and 89 hectares in half hectare fields by black growers.

PRODUCTION

It is a root crop which requires an annual rainfall of 1000 mm for optimum production and mean temperatures during the summer of above 22° which, in Natal, means an altitude below 800 metres. It is grown world wide between 30°N and 30°S. A trial grown inland from Hibberdene at an altitude of 150 meters suffered severe cold damage in 1978 with the lowest temperature being 9°C.

Soils must be well drained as cassava is very sensitive to waterlogging. It is generally grown on grey or yellow recent sands but it responds well when planted on red apedal sands and other soils with upto 20% clay.

The crop is planted as stakes, 150-200 mm long cut from the stem of the plant, during the period September - February. They can be placed either in the horizontal or vertical position with the bottom of the stake 100 mm below the soil surface.

A yield of 25 tons/ha removes 122 kg of N, 27 kg of P and 145 kg of K. Fertilizer applications depend on soil nutrient status and would be in the range 50 -100 kg/ha N, 20-60 kg/ha P and 50 - 200 kg/ha K. Zinc is an essential trace element.

The crop remains in the ground for 18-24 months and the yield varies from 20-25 t/ha with an annual rainfall of 600-700 mm to 35-45t/ha with 1000 mm.

Cassava is tolerant of nematodes, has no serious insect pests at present and the production area is free of major diseases. African Mosaic Disease and Cassava Bacterial Blight are present in the Makatini area.

ECONOMICS

Variable costs of production of an 18 month crop were estimated at R675/ha in February 1984. This can be split into land preparation R108, planting R60, fertilizer R214, weed control R156, disease or pest control R20, harvesting R116.

The gross margin based on variable costs of R450/ha/annum, management costs of R50/ha/annum, roots at R42/t, transport at R4/t range R108/ha/annum for a yield of 24 t/ha to R513/ha/annum for a yield of 40 t/ha at 18 months.

AFRICAN PRODUCTS

The company is a division of the Tongaat-Hulett Group which manufactures starch and products derived from starch. It requires cassava starch for certain specialised uses but the main object of the cassava project is to supply markets in Natal and the Eastern Cape. There is an assured market for the present production target of 300000 tonnes of roots per year.

An excellent research programme and technical back up is available to all growers. The Centre for Cassava Research with six professional and technical staff is responsible for plant breeding, plant pathology and plant physiology research. The Cassava Agronomic Team with three staff covers agronomic research, advice to farmers and provision of planting material.

Support teams are available to assist farmers with planting machines and to harvest the crop. A contract has been entered into for the transport of roots which is subsidised by 50%.

Financial assistance with planting costs is available for the 1984/85 and 1985/86 seasons. Advance payments are being made for crops which are being held in the ground until the pilot plant is operational.

Growers have formed the Umfolozi Cassava Producer's Co-operative which at present is fully subsidised by the company. Two extension liaison officers are employed to assist growers. Price for roots which is R42/t as from 1st May1984, is negotiated on an annual basis between the Co-operative and the company and is guaranteed.

A pilot mill to process 5t of roots/hour is being built at the Old Empangeni Mill site and will start production in July 1985. A refinery to handle starch slurry will be established on the same site. Additional starch mills will be established within the production area.

The initial production target is 300 000t of roots per year from 15-18000 hectares. The 1984/85 planting programme is 2500 hectares. Quotas will be introduced to limit production to the capacity of the plants.

Work is in progress on the utilisation of the stems and leaves as an animal feed. Preliminary work indicates that it is a medium quality roughage which can be used in fattening and maintenance rations.

SUMMARY

Cassava is a crop that is complementary to sugar and does not compete with it. Although it is a comparitively new crop it has shown tremendous potential. It has shown very good drought tolerance and responds very well to good rains. There is an assured market for the present production target and the price is guaranteed.

On marginal sugar soils it can be a useful rotation crop and on all soils which are suitable for cassava it can be used to eliminate volunteers and so assist in disease control. In the coastal areas where the rainfall is 1000 mm yields of 40 t/ha are possible giving a gross margin of R513/ha/annum.

Senior Agronomist
Casava Agronomy Team
Box 463
MTUBATUBA

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

THE VALUE OF SOME SUGAR CANE BY-PRODUCTS AS CATTLE FEED

by John P. Boulle

INTRODUCTION.

Sugarcane is a low protein, high fibre and high carbohydrate livestock feed. If we consider the plant as three components, viz. PLANT = STALK + GREEN LEAVES (TOPS) + DRY LEAVES (TRASH)

We find that we have a livestock feed which will give maintenance (sustaining the main body functions) of a mature animal and possible growth of 0,1 to 0,2kg per day. Separate feeding of each component barely results in growth, let alone maintenance.

Animals, viz. cattle and other ruminants, can utilize sugarcane as a feed in two ways:

1. Graze the standing crop; or

2. Eat processed sugarcane

   (a) whole stick

   (b) chopped stick

   (c) silage

The animal factor can be incorporated in sugar production to utilize sugarcane under the following circumstances:

1. sugar overproduction

2. drought or disease affected sugarcane

3. residue gleaning

1. Grazing Sugarcane.

   Green growing sugarcane may be grazed like any pasture is grazed. The advantage of this is that the crop remains in the ground and when conditions for sugar production are favourable, the cattle are removed and with minimal attention, the crop will grow into a mature stand.

   Grazing mature sugarcane presents wastage problems although cattle will eat the 'downed' pieces of cane. I would advocate grazing of disease or drought affected cane which is not even worth hand cutting and laying in windrows.

pg.2...

2. CUT OR PROCESSED CROP.

2.1. Cut and windrow whole sticks, with control by electric fence. This is an economic proposition, especially when the potential crop is valued at less than R30 per ton (break even price at mill). A protein lick supplement is necessary to assist higher growth rates. Note no additional processing costs bar labour, electric fence, water and lick.

2.2. Cut and process whole sticks. High growth rates of the fed cattle have to justify the cost of transport and processing the sugarcane. Unless this is undertaken on a large scale, the processing costs are prohibitive.

2.3. Shredded sugarcane extracted from the milling process. This would envolve the formation of permanent feeding facilities right at the sugar mill. Potential problem with long fibres.

3. RESIDUES.

3.1. Post harvest (between 28 and 31 tons per 100 tons of green cane harvested) should be rather gleaned by cattle in the fields, preferably between the non-rainy period of April to November to avoid compaction problems. Machinery costs prohibit the collection of such and the feeding of it to cattle in confined areas. Control of cattle by electric fence.

3.2. Cane cleaning centres. The extraneous matter blown out by the extractor fans is an excellent source of potential cattle feed.

How does all this fit into the South African context?

4. APPLICATION METHODS.

4.1. Kwa Zulu farmer

- feeding whole stick drought or diseased affected sugarcane on small feed lot basis, supplemented with green bananas and cassava forage.

- strategic winter feeding of his stock with whole sugarcane.

pg.3...

4.2. Small grower, producing less than 10 000 tons per annum.

- purchase oxen for April to November feeding of whole stick sugarcane on the lands with supplementary high protein lick.
- as above except cattle are post harvesting gleaness resulting in a slower return (lower growth rates).

4.3. Large grower, producing 10 to 50 000 tons per annum.

- as above
- acquisition of a breeding herd which would be fed on pastures or sugarcane silage during the non harvesting period.

4.4. Sugar Millers

- feedlot at mill to utilize partially shredded cane which is treated with sodium sulphate, fermented for 24 hours and fed with supplement.

Carnation Genetics
Box 1274
DURBAN 4000

JPB/sm.

SOUTH AFRICAN SUGAR ASSOCIATION
AGRONOMISTS' ASSOCIATION

BEEF PRODUCTION ON THE COAST LOWLANDS

By BP Louw

Options available to producers considering beef off pastures:

1. Breeding (cow/calf)

   Requires a relatively large initial capital outlay, and is more management-intensive than speculative fattening off pastures. Profits generally smaller than with fattening off pasture. Unless abundant, relatively cheap winter feed available, a system of breeding is not economically justifiable.

2. Fattening off pasture

   Smaller initial capital outlay than with breeding, and management input not as large. Profits generally larger than with breeding, but marketing problems may arise due to supply/demand and consequent price structure which varies considerably over the course of a year.

   Options available include:

   a. Buy in during spring, fatten on summer pasture and sell during autumn.

      Profits highly dependant on initial purchase price, and selling price. Supply of cattle may present problems during spring, which results in relatively high prices, and reduced profits.

   b. Buy in during autumn, overwinter, fatten on summer pasture and sell during autumn.

      Cattle supplies more abundant during autumn, and prices generally lower than during spring. An overwintering programme based on cane tops favours older, heavier cattle. It is therefore suggested that cull cows or long yearling cattle are purchased during autumn/early winter, and overwintered by grazing pasture foggage and cane residues, supplemented with molasses, and protein supplements such as broiler litter. With current high interest rates, producers should aim for mass increases during the winter period. Cattle are then placed on summer pasture, and marketed from January onwards.

      Further considerations with speculative fattening

      . Direct buying of cattle with at least, and perferably more, than 50% Bos indicus (Zebu) breeding. Preferably obtain cattle from areas below 800 metres (Valley Bushveld, Zululand, coastal areas).

- Disease prevention. A wide spectrum of vaccinations will be necessary in the coastal areas, but these are cheap and effective. Regular dipping essential, especially on farms with wasteland.

- Pasture supplementation

  Mineral licks should be provided on pasture, but limited grain supplementation on good quality pasture has proven uneconomical in research trials. Growth promoters (implants) improve gains by approximately 10% in rapidly-growing cattle.

- When fattening cull cows pay attention to condition of teeth.

- On farms with irrigation potential the use of Ryegrass to grow out weaners or long yearlings is economically feasible Ryegrass can also be used to winter cattle at relatively large gains (0,5 - 0,8 kg/day), prior to growing them out on summer pasture.

BPL/PKM/IS Cedara College of Agriculture
1 November 1984

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

PASTURES FOR THE COAST LOWLANDS

by Brian Mapledorum

The departmental agricultural development program, although recognising this bioclimatic group as most suitable for intensive farming systems, recorded that livestock production was less efficient than the potential and therefore placed a low priority research input on permanent planted pasture evaluation. The current lack of confirmed data on pasture production in this geographic area is as a consequence of these limited inputs. The suggestions regarding suitable pastures are therefore based on research results recorded from surrounding pastoral areas.

It is obvious that in a discussion of this nature one has to generalize simply because of the extensive sets of conditions which dictate the final choice in practice.

Briefly, the presentation will include the following components of permanent pasture production.

1. Choice of Pasture

    1,1 Semi intensive - Cenchrus, Panicum, Rhodes and Digitaria

    1,2 Intensive - Kikuyu, Coastcross II, Stargrass

    1,3 Irrigated - Ryegrass

    1,4 Legumes.

2. Soils, fertilization and establishment (rough costing)

3. Fodder Flow and Production

4. Daily livemass gains and stocking rates

5. General Management.

Dept Agriculture
Ntabamhlope Experiment Station

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

CATTLE MARKETING

by Bill Delport

The most common means of marketing cattle in South Africa are by private treaty transactions, at country auction sales, or through controlled abattoirs.

For the twelve month period ended July 1984 the total slaughterings of cattle in the Republic amounted to 2 312 875 of which 1 536 866 were slaughtered in the controlled areas.

Because roughly two thirds of all commercial sales of beef therefore take place in the controlled areas these markets are the price barometers for the whole of the industry.

Marketing at controlled abattoirs is subject to the meat scheme which is under the control of the Meat Board. Supplies are regulated by means of a quota or permit system and a prerequisite to entry into the market is that applicants are registered with the Meat Board.

Supplies are controlled by the Board to ensure that holding, slaughter and other facilities are not overtaxed. Carcases are sold by auction under supervision of the Board and sales are subject to guaranteed minimum producer prices and/or support prices based on mass and grade.

The Board stipulates daily the number of animals to be slaughtered, weighs the carcases and hides and grades the hides.

All carcases and offal are subjected to health inspection and before being sold have to be passed as fit for human consumption by the Department of Agriculture: Veterinary Inspection Services.

The grading of the carcases is performed by the Department of Agriculture: Division of Agricultural Products Standards and is based on the age, fat covering, fleshing and sex of the animal from which the carcase is derived.

The value of a slaughter animal can therefore only be its trade value in carcase form based on grade, mass and if fit for human consumption.

GRADING

The age of an animal is an important factor in determining tenderness of the meat.

Basically carcases are grouped into three age classes viz.

0 Teeth - A class
1-6 Teeth - B class
7/8 Teeth - C class.

2/.....

Fat apparently has a great influence on the eating quality and cutability /trade economics of meat. Carcases are therefore classified mainly according to fat covering into four grades:-

(a) 3,1 to 7mm fat - Top grades: SA, PB & TC

(b) 1 to 3mm fat - Grades 1

(c) more than 7mm fat- Grades 11

(d) No fat - Grade 111

Bruising which is normally caused in the process of handling and transporting of animals is a very serious factor in marketing at controlled abattoirs as it is the main cause of down grading and of lower price realisation of carcases.

SUPPLY

Supplies of the various grades of beef to our markets are cyclical mainly because of the seasonal growth and production of cattle in South Africa. It is quite natural that the conception rate for our cattle reared under free range conditions is highest during the months December to February when optimum fodder is available.

It follows that the pattern of supply of the various grades to the market is a direct consequence of the sequence of production events namely birth, weaning, feeding, culling and slaughter which follow on conception during these months.

True to the production pattern the greater percentage of Super and grade A1 animals mainly from feedlots reach our markets between June and December. Conversely culled breeding stock and other animals marketed off the veld are allowed to gain mass during summer and are slaughtered mainly between January and June (Graphs 1,2 and 3).

This pattern is clearly illustrated by the supply position between 1973 and 1977 which were climatically relatively normal years when roughly 70% of supplies of Super and grade A1 cattle were marketed between July and December and 70% of the older animals off the veld were marketed between January and June.

Production and marketing patterns of cattle are obviously closely related to climatic and economic conditions.

Severe drought conditions were experienced during 1978, 1979 and the first part of 1980 and again from the second half of 1981. The drought increased in severity during 1982 and 1983 and still prevails in some parts of the country.

3/.....

The cattle population in the white areas decreased from 9,3 million in 1977 to approximately 8 million in 1984. The drought obviously played havoc with the national calving percentage and the effects are expected to be felt at least for the next few years.
The favourable economic conditions in 1980 when the gold price reached it highest level ever resulted in a dramatic increase in beef prices. The weighted average price of beef increased during this time from around 115 c/kg to around 220 c/kg where it leveled off in 1981. (graph 4)
The cooling off of the economy which started around 1981 resulted in a substantial drop in consumer demand and the accompanying drought conditions caused a critical oversupply of particularly lower grade animals.
Meat Board purchases under the floor price scheme increased from

4 601 carcases during 1980/1981 to
26 397 carcases during 1981/1982; to
158 471 carcases during 1982/1983 and to
196 000 carcases up to June 1984.

These purchases are funded from a stabilisation fund for which producers are levied.
Slaughterings of cattle at controlled abattoirs were sharply curtailed by the Meat Board and supplies strictly regulated by means of permits and quotas as follows:-

1979/80	2 687 million
1981/82	2 143 million
*1982/83	2 208 million
*1983/84	2 291 million

* These figures include slaughterings under special emergency slaughter/ canning/export schemes introduced by the Meat Board.

Large numbers of cattle in feedlots could not be accommodated in the controlled abattoirs when they were ready for the market because of the reduced slaughterings. This resulted at times in severe financial losses especially for producers whose animals were being custom fed.
The numbers of female animals slaughtered during this period increased and slaughterings compared as follows:-

<u>Slaughterings</u>

Jan/Dec.	Heifers	Cows	Total Females	Increase
1981	202 436	386 167	588 603	
1982	223 220	444 016	667 236	78 633
1983	244 459	462 864	707 323	40 087

Jan/May	Heifers	Cows	Total Females	Increase
1983	92 941	203 350	296 290	
1984	124 830	235 920	360 750	64 460

It is a peculiar characteristic of the Meat Industry that there appear to be no gradual changes but rather sudden and dramatic situations of over and under supply.

Climatic conditions this year appear to have changed for the better over most of the country. Since September 1984 Meat Board purchases decreased dramatically and are at present virtually nil.

Prices at country auction sales have shown a sharp upward turn. Supplies of weaner feeders and store cattle are scarce and good feedlot animals are expensive.

These are indications that the general over supply position in the country has come to an end.

At this stage supplies are adequate to meet the demand but prices for all grades at all the controlled abattoirs are firm at levels above floor prices.

No dramatic price increases at the abattoirs are expected in the short term but price levels should remain firm and prices for breeding and feeding stock at country auction sales are expected to show further increases.

Marketing Costs

The major marketing costs at the abattoir are

(a) Abattoir fees : 7 cents per kg carcase mass

(b) Slaughter fees : 2,8 cents per kg carcase mass

(both payable to the S A Abattoir Corporation)

(c) Meat Board Special Levy : 7 cents per kg carcase mass

(d) Agent's Commission : 2 to 4%

(e) Transit Insurance : +- 3%

(f) Meat Board Insurance : 1,11 cents per kg cold mass

(g) Transport : rail/road costs/distance.

(From Newcastle +- R13 per beast).

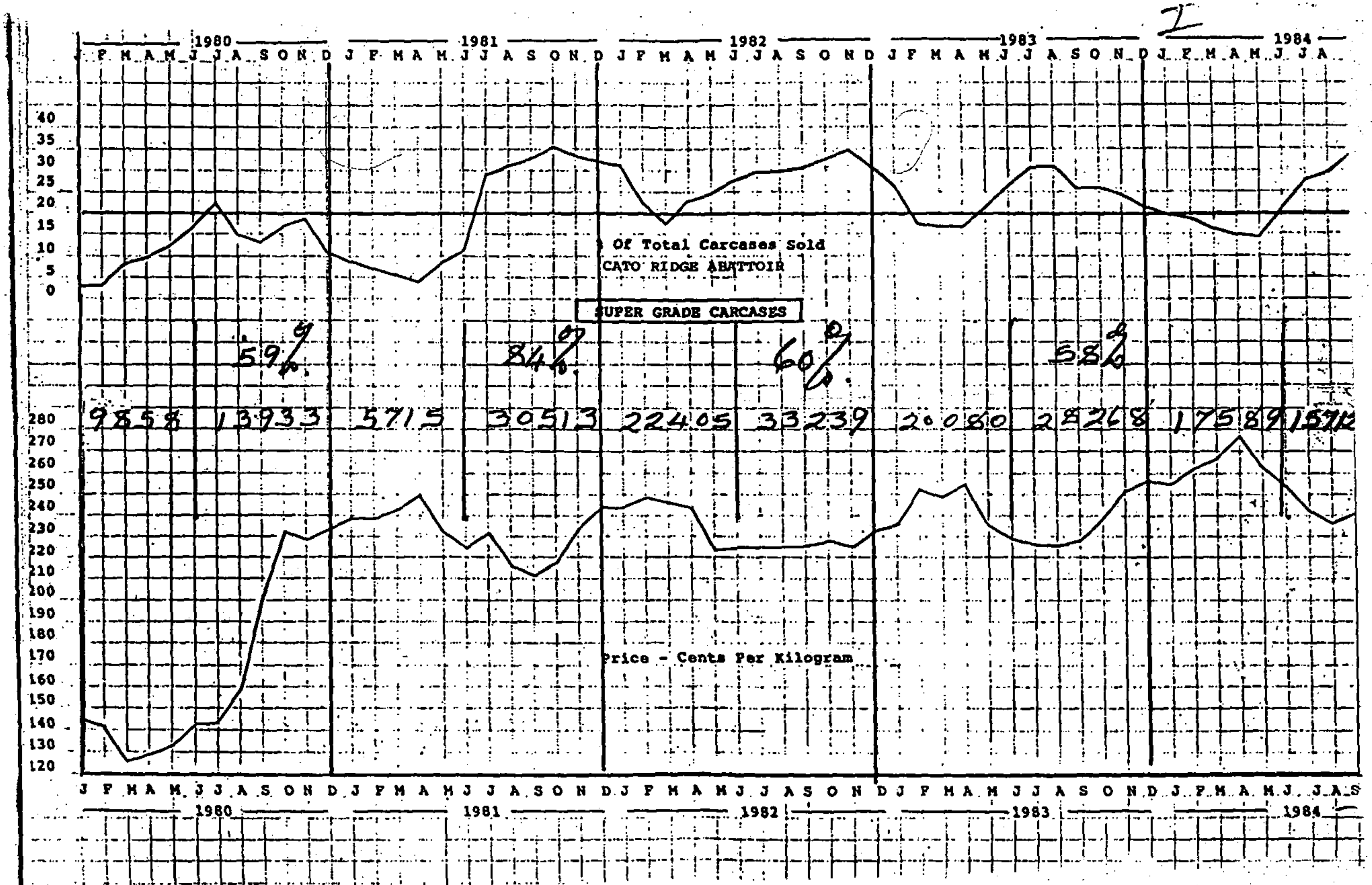
Marketing costs on average at Cato Ridge abattoir at present are about 12% excluding transport costs. (graph 5)

Obviously this percentage will vary considerably between a consignment of Super and one of grade 111 cattle in the same mass group.

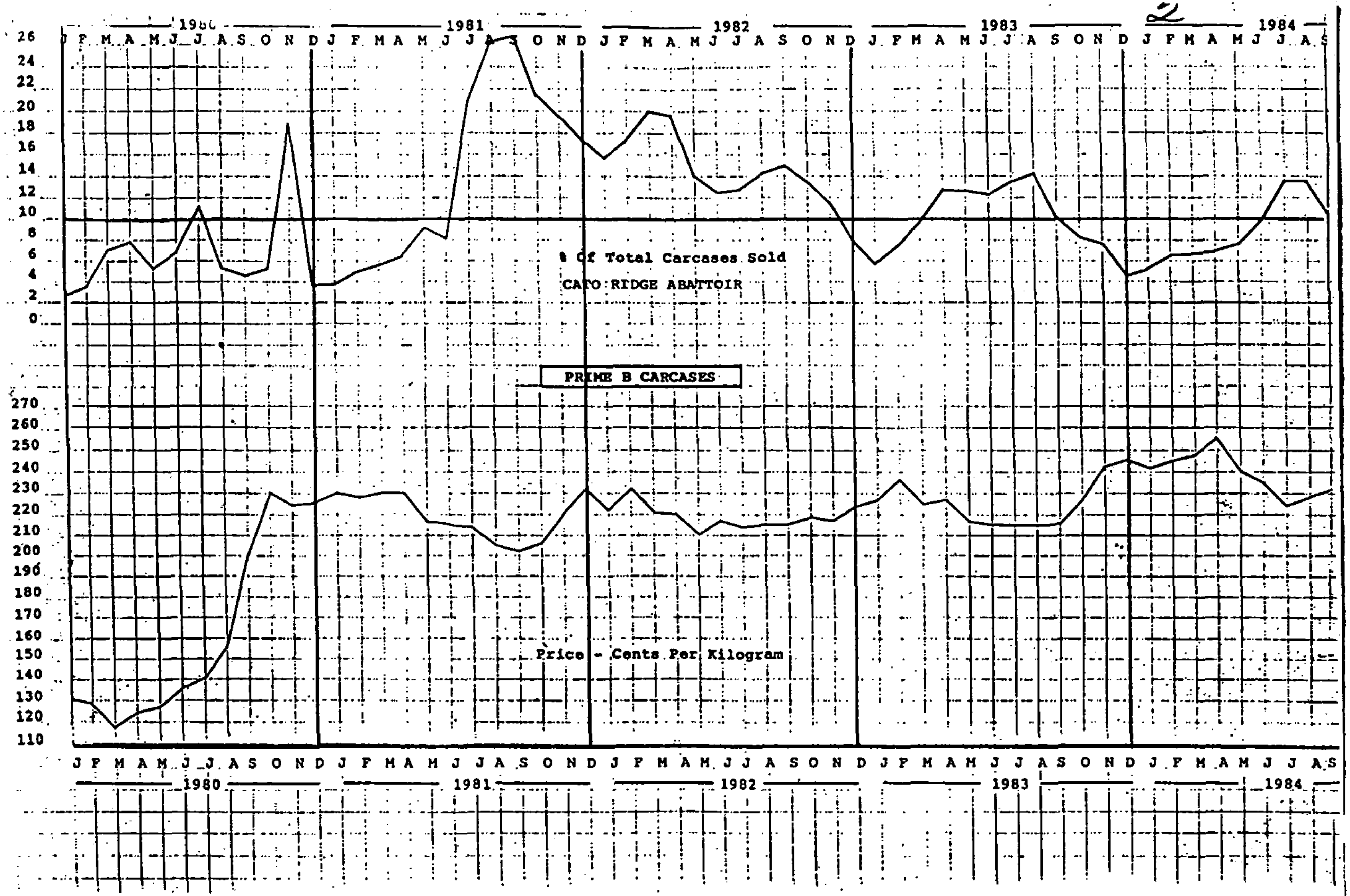
STOCK OWNERS CO-OPERATIVE LIMITED
ABATTOIR DIVISION MANAGER (H G DELPORT)

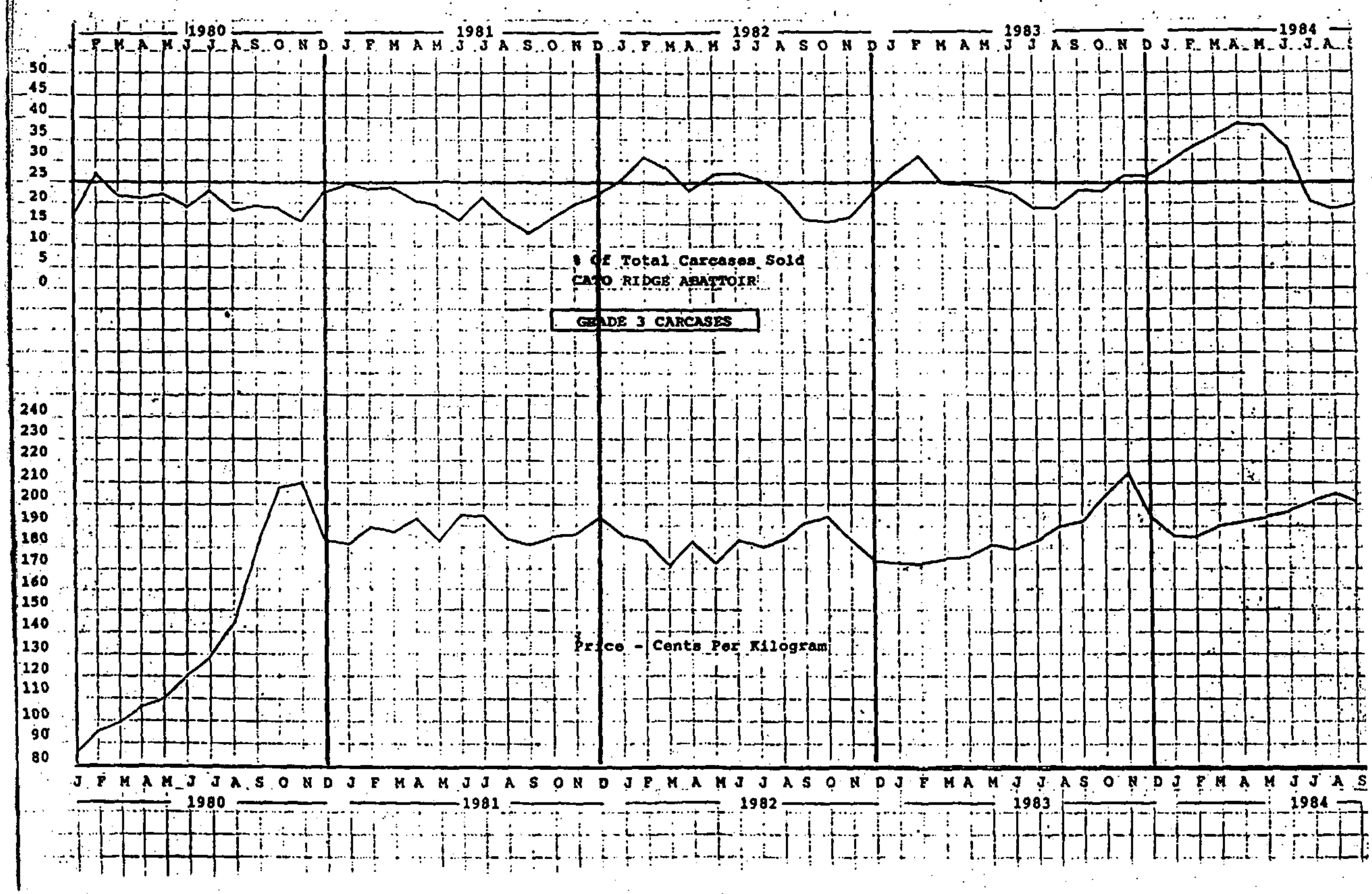
HGD/ab

26 October 1984

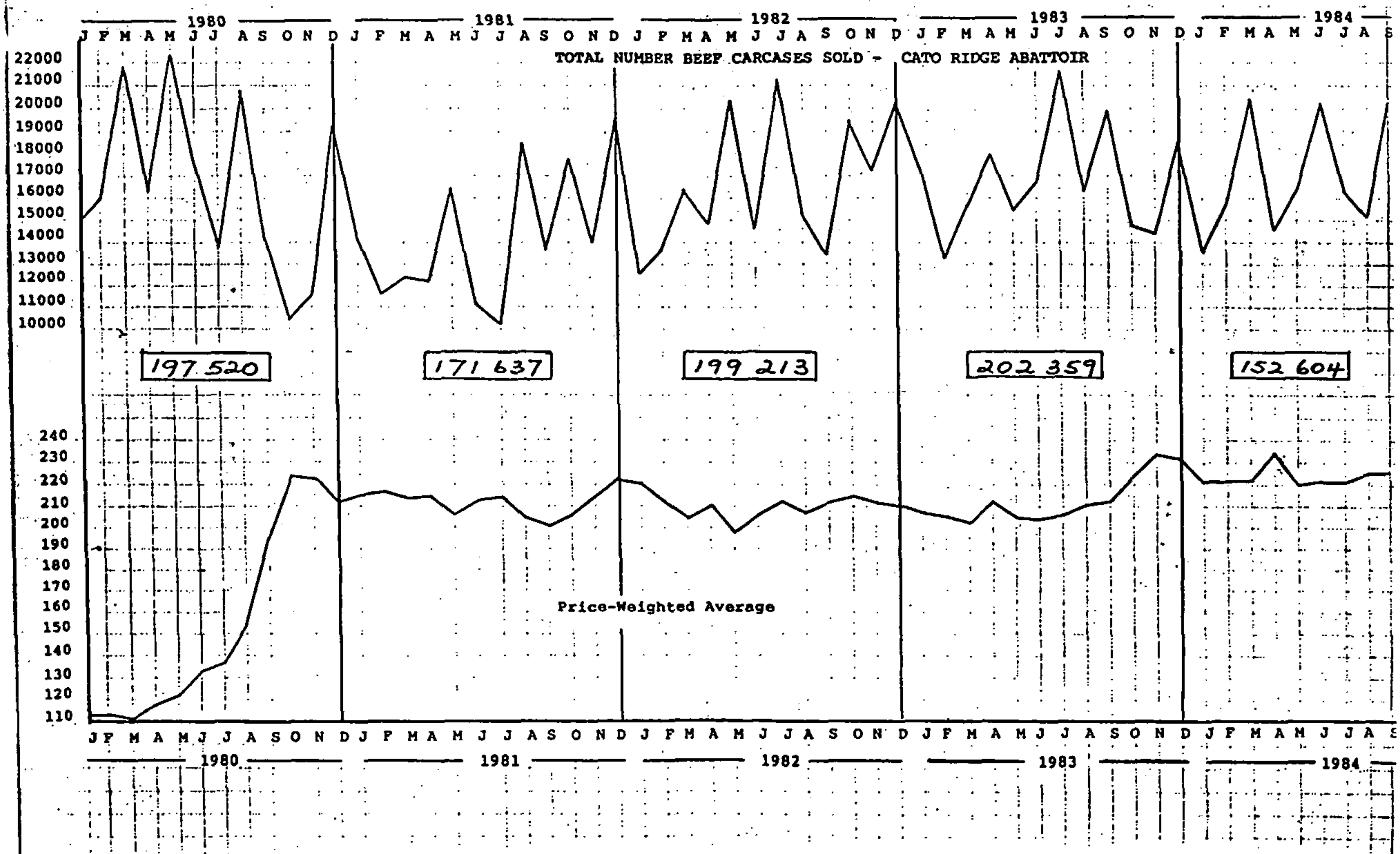


1980
1981
1982
1983
1984
% Of Total Carcases Sold
CATO RIDGE ABATTOIR
SUPER GRADE CARCASES
59%
84%
60%
58%
9858
13933
5715
30513
22405
33239
20080
28268
17589
Price - Cents Per Kilogram


1980
1981
1982
1983
1984
% Of Total Carcases Sold
CATO RIDGE ABATTOIR
PRIME B CARCASES
Price - Cents Per Kilogram
2



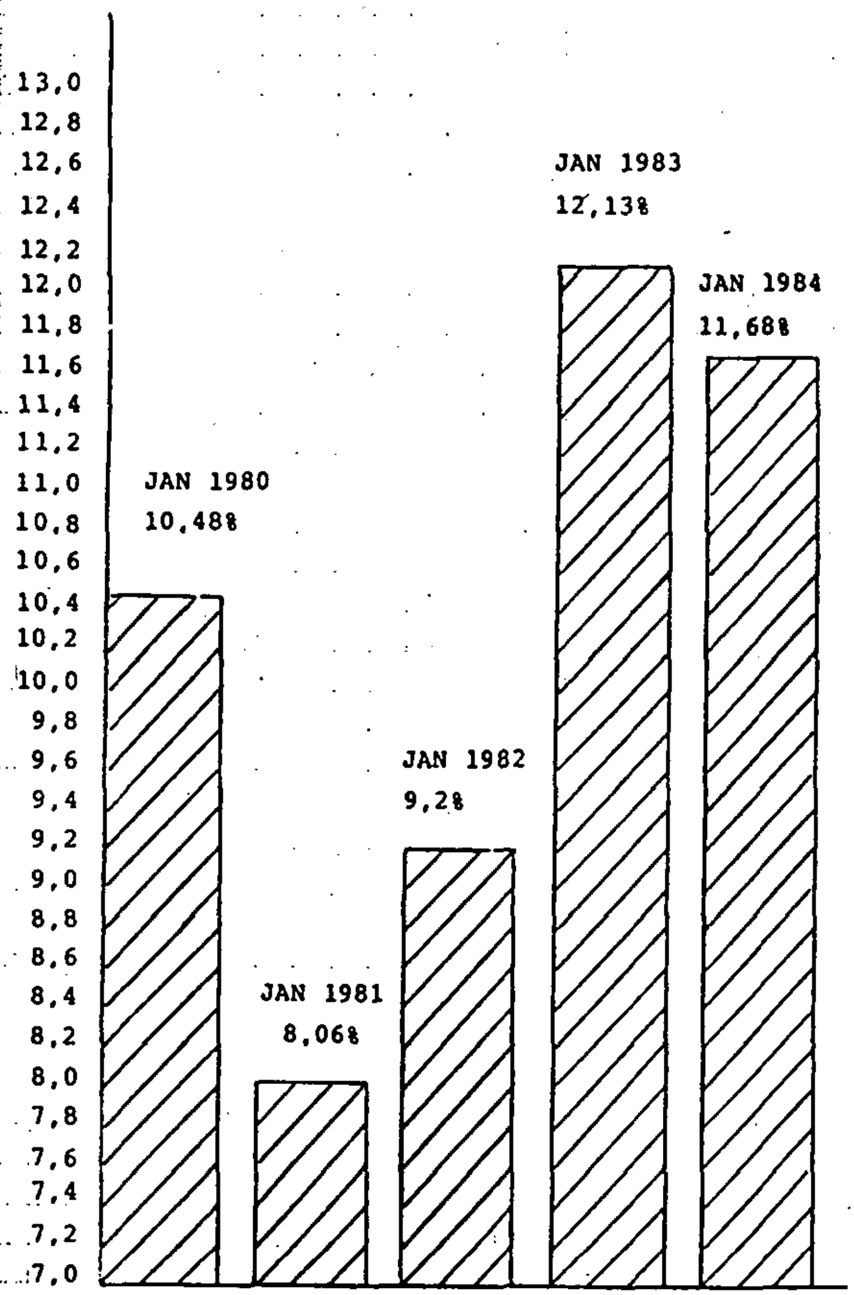
1980
1981
1982
1983
1984
J F M A M J J A S O N D
50
45
40
35
30
25
20
15
10
5
0
% Of Total Carcases Sold
CATO RIDGE ABATTOIR
GRADE 3 CARCASES
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
Price - Cents Per Kilogram


TOTAL NUMBER BEEF CARCASES SOLD - CATO RIDGE ABATTOIR
1980
1981
1982
1983
1984
J F M A M J J A S O N D
22000
21000
20000
19000
18000
17000
16000
15000
14000
13000
12000
11000
10000
197 520
171 637
199 213
202 359
152 604
240
230
220
210
200
190
180
170
160
150
140
130
120
110
Price-Weighted Average

1. JAN 1981 Dramatic price increase during 1980 (w/a Jan 1980 113c/kg w/a Jan 1981 216c/kg) with no significant costs increase resulted in decrease in percentage costs for Jan 1981.

2. JAN 1984 Price increase coupled with very high prices for hides resulted in slight decrease in percentage costs for Jan 1984. No significant cost changes during the period Jan 1983 to Jan 1984.

PERCENTAGE MARKETING COSTS OF A
BEEF CARCASE AT CATO RIDGE ABATTOIR
MASS 220KG AT WEIGHTED AVERAGE PRICE



SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

CUTTING COSTS OF MACHINERY

by Gerhard de Beer

Aspects to be discussed:

1. UTILIZATION OF MACHINES

A 52 kW tractor operating for 1 000 hours per year will cost R16,50 per hour. At 500 hours per year the cost is R23,50 per hour.

2. CHOICE OF TILLAGE OPERATION

	R/ha
Single tine subsoiler	35
2-furrow mouldboard plough	55
Chisel plough	29
Heavy disc harrow	39
Rotary minimum tiller	80
Disc minimum tiller	41

3. CHOICE OF LAND PREPARATION SYSTEM

	R/ha
2 x plough, 3 x disc, ridge	307
3 x chisel, disc, minimum tiller	157

(see Mechanization Report 84/4)

4. CHOICE OF LOADING AND HAULING SYSTEM

Stacking vs mechanical loading
Loader output vs cost
Payload
Direct delivery vs transloading
Own or contractor's transport

5. MECHANIZATION PLANNING

To determine minimum number and type of machines or machinery systems required.

AGdb/HDN
1 November 1984

SOUTH AFRICAN SUGAR ASSOCIATION
AGRONOMISTS' ASSOCIATION

CUTTING LABOUR COSTS

by HW Moore

Introduction

To cut labour costs without reduction in output, the grower has two alternatives, namely

* to obtain a higher output from the labour, or

* to use less labour by mechanizing some of the work that can be done more cheaply by machines.

To obtain a more productive work force he will have to ensure that the present physical and psychological management of labour are conducive to higher productivity.

Physical management of labour

This has to do with planning, organising and controlling of human resources. Without a manpower plan this cannot be done effectively. Manpower planning implies that all the work on the farm must be measured. Without measuring no objective assessment of productivity can be made.

Erratic demand of labour leads to wastage of capital investment and manpower development. In addition this creates a work force that is not inclined to carry responsibility.

It is time for growers to form productivity groups. Such groups could investigate in depth the productivity problems experienced by its members and also find ways of eliminating these problems.

It is important that the grower should understand the basis of workstudy. This will not only make him question the way he uses available labour but also whether his work measurements are really a measure of productivity.

Psychological management of labour

No matter how well the operations on the farm are organised, nothing will happen unless there are willing hands. In this, worker involvement management is the key and the Japanese used it to the detriment of the West.

HWM/VSJ
30 October 1984

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

SOME THOUGHTS ON CUTTING COSTS OF WEED CONTROL

by

Peter Turner

Two possible approaches to this problem are:-

1. Improve the efficiency of existing programmes.
2. Re-design the weed control programmes to achieve greater cost savings.

If an assessment of relative costs of sugarcane production inputs indicates that there is a high likelihood that savings can be made in weed control costs then the second proposal may be warranted. However, whatever the relative status of weed control costs, the first aim of improving efficiency should be carried out. (In considering these relative costs it is important that the cost of labour be included in the weed control cost).

1. Improving weed control efficiency of existing programmes.

   Application

   Relatively small quantities of chemical are required to be spread evenly over the soil or weed surface. (2,5 ℓ/ha of diuron is equivalent to 0,25 mℓ/m² of soil surface). Thus there is a high probability of failure due to poor application. Attention to details such as:-

   - calibration
   - measuring and mixing
   - nozzle wear
   - equipment

   are essential.

   Timing

   Perhaps the most vital aspect of weed control with chemicals since weeds are generally (with the exception of watergrass) only well controlled at a very young or pre-emergent stage of growth. Weather conditions also play an important limiting role in this respect.

Timing in respect of sugarcane growth, although considered secondary to weeds, is also important in regard to possible cane damage.

Some points in regard to timing are:-

- weed spectrum
- need for field inspections
- need for sufficient resources and correct planning
- limit cane damage

Considerable savings could be achieved in this manner depending on the present system.

2. Re-design the weed control programmes.

In some cases marked savings could be made depending on the present systems used, but inherent dangers are present in trying to cut costs to a minimum. Some consideration should be given to

- the long term effect on weeds of intended changes
- the possibility of failures in the present season
- the possible extra demand on management time.

However, in many instances present programmes may not only be expensive but also inadequate and hence changes are warranted. Some possibilities are:-

- tailor the chemical programmes to the weed spectrum. Fields with resistant weeds should be identified and treated as special situations. eg. Watergrass is a particular problem in that correct timing of applications for grass control do not adequately control watergrass. Thus a cheaper combination could be applied for grass control at an early stage and a follow up cheap treatment used for watergrass at a later stage.

- use a trash blanket in suitable fields - part trash on the line if necessary

- alter the ratio of labour to chemicals depending on resources and time of year. eg. use labour more in relatively clean burnt ratoons with a short expected canopy time.

- decrease the time to follow up weeding after chemical treatment and use selective weeding

- use cultivation in flat non-erodible fields and row only band sprays

- assess weed control costs in detail and choose the most cost effective programme.

The final suggestion would necessitate estimates of the cost of factors such as yield loss due to weed competition and due to chemical damage to cane. The equation could be:-

Weed control cost = chemical cost + labour cost + application cost + cost of yield loss due to weeds + cost of yield loss due to chemicals

Cost of yield loss due to weeds = weed factor x expected yield - savings on cutting and transport costs

Cost of yield loss due to chemicals = herbicide factors x expected yield - savings on cutting and transport costs

Weed factor = estimated percentage yield reduction due to weeds (if the programme in question was applied as intended).

Herbicide factors = estimated percentage yield reduction due to herbicide (if the programme in question was applied as intended).

Of necessity the estimates of percent yield reduction from weeds or herbicide damage could only be made by the farmer taking into account his ability to time treatments such that they eliminated weed competition or cane damage. Weed effects and herbicide effects would depend on weed type and chemical type and would also be related to cane variety, season, soil type, row spacing, cane growth stage etc. Some indications of possible effects are given below but no definitive values are available as wide variation occurs in practice.

	% yield reduction	
	Plant	Ratoon
* No weed control - heavy infestation of grass dominated weeds	± 50	± 25
Directed interrow application of diuron + Actril - cane ± 30 cm high	± 4	± 4

* All these figures would need to be refined and in practice may be valueless due to high degree of variation ~~of limited value.~~

PETT/SN
1 November 1984

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

CUTTING FERTILIZER COSTS

by Tony Wood

With the sugar industry currently spending over R50 m annually on fertilizers, fertilizer costs can account for up to 20% of the annual farm budget. With the introduction of A and B pool cane, it has become important to determine where reduction in fertilizer application can best be made without substantially reducing ratoon cane yields based on tons sucrose per hectare.

It is not recommended that any reduction be made in fertilizer application rates to plant cane as it is important that a healthy vigorous stool be established initially.

Nitrogen N

Almost 60% of the total amount the cane grower spends on fertilizer is on nitrogen, so reductions in usage of this nutrient are likely to have the greatest effect on cane yield though not necessarily sucrose yield.

The amount of N required by cane on the wide range of soils within the industry has been closely examined. With the help of additional field experiments it has been possible to establish more accurately the average amount of N required by the cane crop to supplement that not met by N mineralization within the major soil groups. As a result a new system of recommendations has been prepared based on soil form and system and the potential of the soil to release N to the crop by mineralization.

Table 1

N REQUIREMENT BASED ON SOIL FORM AND SYSTEM

Crop criteria		Soil mineralization potential			
		LOW I	MEDIUM II	HIGH III	V. HIGH IV
Soil forms		Fernwood Cartref Glenrosa Katspruit Mispah Dundee	Hutton Bonheim Mayo Milkwood Arcadia Rensburg	Hutton Shortlands Bonheim (Red) Oakleaf	Inanda Nomanci Griffin Clovelly Kranskop
PLANT	All systems				
	R	120	100	80	60
	I	140	120	80	60
RATOONS	Coastal				
	R	160	140	120	100
	I	180	160	120	100
	Midlands				
	R	140	120	120	100
	I	160	140	120	100
	Lowveld				
	I	200	160	120/140	N/A

This proposed new system will help to rationalize the use of N fertilizer ensuring increased application to the poorer sandier soils whilst heavier soils with a moderate to high mineralizing capacity will receive reduced rates of N fertilizer.

A series of N response curves for both rainfed and irrigated cane has been prepared for the low (Category I) moderate (Category II) and high (Category III and IV) N mineralizing soil forms (see Figs 1 and 2). These curves together with the data in Tables 2 and 3 indicate that considerable reductions

Table 2

Effect of reducing N on Sucrose Yield
(Rainfed cane)

LOW			MEDIUM			HIGH		
Avge. yield ts/ha = 9,7			Avge. yield ts/ha = 11,5			Avge. yield ts/ha = 12,9		
Reduction ts/ha	%	Cat I	Reduction ts/ha	%	Cat. II	Reduction ts/ha	%	Cat. III & IV
		kg N/ha			kg N/ha			kg N/ha
Nil	Nil	160						
0,15	1,5	140	Nil	Nil	140			
0,30	3,1	120	Nil	Nil	120	Nil	Nil	120
0,45	4,6	100	Nil	Nil	100	Nil	Nil	100
0,70	7,2	80	0,20	1,7	80	0,15	1,2	80
1,10	11,2	60	0,40	3,5	60	0,30	2,3	60
			0,75	6,5	40	0,60	4,7	40
						1,20	9,3	20

Table 3

Effect of reducing N on Sucrose Yield
(Irrigated cane)

LOW			MEDIUM			HIGH		
Avge. yield ts/ha = 12,2			Avge yield ts/ha = 14,0			Avge yield ts/ha = 15,7		
Reduction ts/ha	%	I	Reduction ts/ha	%	II	Reduction ts/ha	%	III
		kg N/ha			kg N/ha			kg N/ha
Nil	Nil	200						
0,35	2,9	180						
0,75	5,7	160	Nil	Nil	160			
1,00	7,8	140	0,25	1,8	140			
1,40	11,5	120	0,45	3,2	120	Nil	Nil	120
1,80	14,8	100	0,75	5,4	100	0,20	1,3	100
2,40	19,7	80	1,00	7,1	80	0,40	2,5	80
			1,50	10,7	60	0,90	5,7	60
						1,30	8,3	40

in applied N can be made in Category 2-4 soils without greatly affecting sucrose yields under rainfed conditions, and to a lesser extent under irrigated conditions. Category I soils however, start to show reductions in yield immediately N fertilizer is reduced.

Phosphorus (P)

In the past the P status of sugar industry soils was often very low as many were in the virgin state. However, phosphatic fertilizers have been used for many years now with the result that apart from the strongly P fixing soils found in the Natal midlands which require regular broadcast P applications to every ratoon, there has been an appreciable build up of available P levels in the soil. In particular where heavy applications of filter cake have been made in the past, P content can now be very high. Basaltic doleritic and granitic soils are generally the most deficient in P.

There is of course still a need to supply P where required at time of planting in order to establish a good root system. Traditionally this application of P has been considered sufficient for the first ratoon crop also. However, the necessity of always applying additional P fertilizer to subsequent ratoons is in many cases questionable as a recent survey conducted by Eric Hulbert has shown (see Table 4). He examined soil test P values from 1 000

Table 4

Distribution of soil P

(survey of 2 000 fields)

Soil test P	M.C.P. % (1 000 fields)	Growers % (1 000 fields)
<20	4	3
20-29	9	7
30-39	10	12
40-49	11	13
50-59	12	13
60-69	8	10
70+	46	42

M.C.P. and 1 000 growers ratoon fields in his extension area. Based on the current FAS recommendations for P in ratoon crops shown below (Table 5) only about 10-13% would have required additional P fertilizer, and if one were playing really safe a further 10% could have been included. So the majority of growers fields could probably manage without additional P for at least 2-3 years or longer without there being any noticeable effect on yield.

Table 5

Current FAS recommendations for P in ratoon crops

Soil P kg/ha	P requirement kg/ha	kg/ha supers (10,5)
>30	Nil	Nil
29-16	20	200
<16	30	300

However, regular leaf sampling will quickly show up any deficiency. Where any doubts exist it is probably a wise precaution in times of restriction to take periodically a ratoon soil sample in order to check on current P and K soil levels. With the unit cost of P now R1.82 per kg using fertilizer 1-0-1 instead of 5-1-5 where P is not required, can mean a saving of up to R65 per hectare.

Potassium (K)

Since 1950 more than 100 K fertilizer trials have been conducted throughout the industry and the results correlated with soil and leaf analysis in order to assess crop fertilizer requirement.

The data obtained have been used to construct the two response curves shown in Fig 3. It is evident from these curves that the response to applied K is more marked in the lighter rather than the heavier textured soils in the 100-300 kg/ha soil K range. Put another way, the response curves indicate that potential yield loss on the sandier soils is greater than that on the medium to heavy textured soils which generally have larger K reserves, although a notable exception would be the clay soils in the Natal midlands represented by the Inanada, Nomanci, Griffin and Clovelly soil forms. K reserves on the basis of soil form are given in Table 6.

Table 6

K reserves on the basis of soil form

Low	Low - Moderate	Moderate	Moderate to High
Fernwood	Inanda	Bonheim	Arcadia
Cartref	Kranskop	Mayo	Rensburg
Glenrosa	Nomanci	Hutton	Milkwood
Shepstone	Magwa	Willowbrook	Inhoek
Longlands	Griffin	Swartland	Tambankulu
Estcourt	Clovelly	Oakleaf	
Katspruit	Hutton (sandy)	Shortlands	

The implication is, however, that fertilizer savings would be possible at least in the short term on the medium to heavier soils with moderate to high potassium reserves (see Table 6). The recent survey by Eric Hulbert also examined soil test K values from 2 000 ratoon fields (see Table 7).

Table 7

Distribution of soil K

(survey of 2 000 fields)

Soil test K kg/ha	M.C.P. % (1 000 fields)	Growers % (1 000 fields)
<100	9	7
100-124	11	7
125-149	12	8
150-174	10	9
175-199	9	11
200-224	6	11
225-249	6	8
250+	37	40

Based on current FAS recommendations for K in ratoon crops, between 40-50% of the fields would have required relatively little or no fertilizer K in order to maintain yields. Potential yield loss in relation to exchangeable soil K values are shown in Table 8 for low to medium, and heavy textured soils.

Table 8

Potential yield losses (kg/ha) in relation to exchangeable soil K

Light to medium textured soils (+ midlands clays) (low, low-moderate K reserves)			Heavy textured soils (moderate to high K reserves)	
Soil K kg/ha	Potential yield loss (ts/ha)	K requirement kg K/ha	Potential yield loss (ts/ha)	K requirement
<150	>2,50	175	>2,00	250
175	± 1,75	150	± 1,50	225
200	± 1,50	125	± 1,25	225
225	± 1,25	100	± 1,20	200
250	± 0,80	75	± 1,00	175
275	± 0,50	Nil	± 0,75	150
350	Nil	Nil	< 0,50	100

Lime and zinc

Where lime is required to remove aluminium toxicity or the need for zinc is apparent, no reduction in the recommended rate of fertilizer should be made.

RAW/PMO
5.11.84

Fig 3 Mean response curve to applied K in relation to two textural classes of soil (< 30% and > 30% clay)