

MR TURNER

*SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION*

ANNUAL GENERAL MEETING

20 November 1997

MOUNT EDGECOMBE

Thanks,

Welcome also.
Sally or Hewitt

Les Beth

Marta

Louise

Kathy Holy

Arthur

Ray

Membership

Committee - members

Guests

Some old faces

Comments on programme. (table)

**SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION**

Annual Meeting

Date : 20 November 1997
Venue : Conference Room, SASA Experiment Station, Mount Edgecombe

PROGRAMME

| | | | |
|------|---------------|--|--|
| | 9.00 - 9.10 | Welcome | Chairman |
| 9.17 | 9.10 - 9.45 | Small Scale Growers issues | J Lonsdale |
| | 9.45 - 10.30 | The economies of Small Scale Grower sugarcane production <i>- Need to pool expertise.</i> | <i>DR?</i> R Bates |
| | 10.30 - 11.00 | TEA | |
| | 11.00 - 11.30 | The New Water Act - Implications for the Sugar Industry | <i>New Africa University</i> E Schmidt |
| | 11.30 - 12.15 | El Nino | <i>Head Hydrology Unit Pret.</i> Prof R Schulze |
| | 12.15 - 12.45 | ISSCT Irrigation Workshop report back | E Schmidt |
| | 12.45 - 2.15 | LUNCH | |
| | 2.15 - 2.45 | New Farms for Plant Breeding | KJ Nuss |
| | 2.45 - 3.15 | Recent variety trial results | RK McIntyre and KJ Nuss |

**SOUTH AFRICAN SUGAR ASSOCIATION
AGRONOMISTS' ASSOCIATION**

SMALL SCALE GROWERS: IS THE INDUSTRY DOING ENOUGH?

By JE Lonsdale

The latest 'yuppie' quote in extension services is that we have to make a paradigm shift. I consider myself an up and coming 'yuppie' so I have no problems with this statement but for others who may not know what a paradigm shift is, I include an example taken from Naunlu.

A man was travelling home on a train and was disgusted by the behaviour of some teenage children. Even worse was the fact that the father seemed totally unaware of the affect his children's behaviour was having on other passengers. Unable to contain himself the man challenged the father. The father apologised profusely and told the man that he had not noticed the children's' behaviour as he was devastated by the death of his wife an hour earlier. The anger of a few moments earlier changed to compassion.

I certainly don't believe our decisions should be made for compassionate reasons but at some stage Researchers and Extension Officers will have to decide whether the Agronomists are contributing what they should to the Small Scale Growers situation. All I hope to do in this introduction is to generate a little lateral thinking about this situation.

So what paradigm shifts would be required? The following are some suggestions:

1. I don't believe that we can ignore rural development as not being any concern of ours. I believe that our futures will be linked by Government actions.
2. We should perhaps accept that we will get less and less assistance from the State and realise that if we are unable to influence critical aspects of our future without State assistance, we may not survive.

I would like to start by posing the following question:- "What would happen if the existing Quota Growers were to prosper and the Small Scale Growers did not prosper as well?"

These are some of the possibilities:-

1. There could be large scale bad debts in the R80m owed to FAF

2. The industry may fail in its objective to improve industrial returns and to make SA a world competitor in sugar markets.
3. Disillusioned Growers may fall prey to unscrupulous politicians who feel not enough is being done to right the wrongs of the past.
4. The State, or even foreign markets, may feel that an industry which is prospering is not bearing its share of the RDP and take the relevant action.
5. There could be greater poverty and wide scale hunger in rural areas with an increase in crime.
6. There could be a split in the Cane Growers Association and/or Agricultural Unions.

I believe that after the 1999 elections there will be a hardening of Government to critical issues like land re-distribution and contribution to the RDP.

What can be done that we are not already doing?

Already Farm Watches are working well with some communities employing security firms to support the SAPS. However I believe that we should not only build lagers. I believe these security measures should be supported by active development in rural areas because simply by curbing crime the economy of these areas will be adversely affected.

The State has put out a White Paper on Government policy guidelines relating to Agriculture and I would like to give a few quotes from this and other literature which may put my fears in perspective (Walters):-

'The agricultural sector and rural economy are also in crisis. Many white owned farms are deeply indebted and vast tracts of land designated for occupation by whites are inefficiently cultivated. Many thousands of black rural households are meanwhile crammed into tiny plots unable to produce or buy any affordable food'.

'The RDP aims to create a restructured Agricultural Sector that spreads the ownership base, encourages small-scale agriculture, further develops the commercial sector and increases production and empowerment. Agriculture should be oriented toward the provision of affordable food to meet the basic needs of the population and toward household food security. The pursuit of National food self-sufficiency proves too expensive and will not meet these aims'.

While these quotes provide an insight into State thinking I don't believe the Industry will bump heads with State. The sugar industry has always been pro-active. However the point I would like to make is that we shouldn't make token assistance to Small Scale Growers. The State expects delivery and morally what they want can only be good. I believe it would be to our advantage to assist them with these objectives before their solutions are imposed on us.

If we utilised all the industries resources e.g. Agronomists Commerce and Farmers, we have the capacity to ensure their prosperity at least keeps pace with ours and know that we have done all we could to avoid the above situation.

There are such large numbers of growers needing help, the question must be asked 'what can the industry do that it is not already doing and still remain competitive in world markets?

It is my intention to list as many as I have encountered and would welcome more from the floor so please feel free to make suggestions or give examples. I will also be quoting from articles and you will be able to get these references from the printed matter if you so wish.

The following is a list of suggestions"

1. Purchase a farm using the SSG access to development capital and Quota growers management skills to provide profitable returns. This has been achieved on a wine farm.
2. Quota growers could become mentors to sections of the SSG. This has been achieved in the Western Cape and at Eston (Street and Kleynhans).
3. Agrivillages could be a possibility for providing land to staff and eliminating the necessity for housing. This could also provide mechanisms for solving problems with application of the extension of security of tenure bill.
4. There are numerous papers on how extension services can adapt to the 'changing client basis' in SA and I will deal with this as a separate section.
5. Agricultural projects (Potgieter, Potgieter and du Toit)
6. Perhaps soccer tournaments could be developed to provide young Doctor Khumalo's to get opportunities in pro football.
7. Assistance with record keeping.

The Role of Extension

'The greatest challenge to Agricultural extension and rural development professionals today is not how our work fits into or gets accepted in Western context but the emancipation of millions of impoverished ... people in the rural areas' (Ewang).

While the responsibility of these fine objectives lies more with the State, I believe that in order to secure our future and morally we need to ensure DELIVERY of the Farmer Support Programme to the rural communities by monitoring progress and assisting or even chasing wherever possible.

Obviously time and money are already stretched to the limit in SASA Extension services but there may be, as indicated earlier, some avenues open which would not require large inputs of either of these scarce commodities. Would it be possible to raise the possibilities of Growers assisting as mentors or with joint investment ventures?

Another requirement is to establish what Research, if any, is required specifically for SSG and feed this aspect back to Researchers. The danger exists that as the State seems involved, there may be unreliable communication with the Researchers.

Thabethe states "A vital part of the development process is empowering local people (individuals and communities) to take charge of their own affairs, to establish their own priorities, to make choices, and deal effectively with outsiders. However, few Governments display a real willingness to trust the people to decide for themselves". The cane industry has the Local Grower Councils which could be 'primed' by Extension services to get involved in rural development.

Thabethe also states that "A large proportion of the disadvantaged population do not rely on agriculture as a primary source of income, because the low returns to farming are due primarily to the barriers and distortions designed to favour the large scale sector at the expense of small scale extensive farmers. This has been exacerbated by inequities in the provision of and access to services. In general, a lack of skills, a lack of appropriate support services, a lack of appropriate technology and a lack of financial and land resources, have exacerbated these distortions and barriers".

While we may not agree with all he says there is a lot of meat in the quote leaving somebody with a lot of hard work. The question I put to Agronomists today is:- "Can we leave this to the State or do we accept they cannot deliver and get on with the job ourselves with whatever assistance we can get from State and overseas?"

It could be pointed out to foreign buyers that if we are to remain competitive on world markets we cannot finance rural development but we can certainly oversee it if they were to assist.

'The development of private sector agricultural consultation services must be encouraged, even to the extent of support measures similar to that being provided to the small business sector. A close relationship between such consulting agencies, co-operatives and Government extension services should be developed' (Worth).

Research

Walters states that the Government white paper lays out the following research, technology development and training:-

1. Researchers, extensionists and farmers should be part of a dynamic wholistic system.
2. Research programmes and technology development should be planned in consultation with other support services and farmers.

3. Allocation of resources to agricultural research (and basic research) must be balanced and in accordance with the priorities of farmers.
4. Funding of research, extension and training will be the primary responsibility of Government with the greater priority to small scale farmers.
5. Research is a long term investment and can best be realised by co-operation between the Government, research institutions, agricultural organisations and the private sector.
6. Equal access to relevant and effective extension and training, with emphasis on farming communities denied such access, must be assured.
7. Local knowledge of farmers will be acknowledged and verified and the complimentation of such existing knowledge through research must be assured.
8. The needs of farmers, especially new entrants and small scale farmers must receive attention through the re-orientation and training of extensionists and researchers.
9. New farming systems and relevant agricultural technology must be developed to suit the needs of small-scale farmers.
10. The important contribution that resource-poor farmers make to the support of the rural population must be acknowledged and supported.
11. The additional workload and time limitations brought about by the household duties of women, should be accommodated in the design and delivery of services and infrastructure for resource-poor farmers.
12. Research and technology development must take food-insecurity brought about by increasing urbanisation into consideration, and
13. Agricultural extension should provide relevant information to farmers over a wide range of alternatives so as to empower them to make their own production and marketing decisions.

Clearly much of this is intended for Government departments and sugar growers are already conforming, but it is interesting to see State thinking. Perhaps the one area of scope is to develop new farming systems and relevant technology for small scale farmers.

Land Redistribution

'Access to land is a central issue to be addressed in the new South Africa. The majority of agricultural land is held by white farmers. It is the intention of the new Government to implement land and rural development programmes to redistribute land to assist those with limited means who were denied access to land under apartheid laws (ANC, 1995). The land reformation and

redistribution programmes identify at least three new categories of farmers/producers who will require support from the Departments of Agriculture. These are resettled farmers, women and farm workers: each category being specifically targeted as a part of the Reconstruction and Development Programme, the ANC agricultural policy, and the Draft White Paper on 'Agriculture' (Worth).

Cane Growers Association has developed a policy statement on land re-distribution but I believe that action is necessary to get suitable land handed over so that small-scale farmers are settled. In addition, all achievements by the Industry should be properly published and serious consideration should be given to employing the services of a public relations officer.

Conclusions

Quota growers should consider their future linked to small-scale growers and ensure DELIVERY of land re-distribution and the State rural development programme.

There is land which is available for small-scale growers which needn't affect existing growers. All efforts should be made to see this is allocated to worthy applicants.

Similarly we should work closely with the State to ensure delivery of the rural development programme.

Contributions to education and development of soccer could produce positive results, especially if we have a public relations officer to ensure good press.

There is a lot which can be done by farmers who could invest time and money in their futures. This includes being mentors and possibly joint investors.

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THE ECONOMICS OF SMALL SCALE GROWER SUGAR CANE PRODUCTION

by RF Bates

INTRODUCTION

Surveys of small scale grower average production costs in respect of different mill areas were undertaken for the period 1988/98 to 1995/96. Although the survey was of average production costs the trends obtained are seen as important indicators of the viability of small scale growers.

INPUT COSTS

Transport costs were presented for different distances. Although data were dated an analysis of small scale grower average distances from a sugar mill was presented. It was shown that 44% of small scale growers were within 16 kilometres of a sugar mill and that 41% were between 16 and 30 kilometres of a mill. A majority of growers used heavy road vehicles to transport sugar cane from loading zones to mills. Sugar cane was transported by tractor/trailer from fields to loading zones.

The reason that a majority of small scale growers, 91% were with 35 kilometres of the mill could be ascribed to Government planning and development parameters which restricted small scale grower development to within a maximum of 40 kilometres from a mill, FAF policy of not providing finance, under normal circumstances, to growers beyond 35 kilometres from a mill as well as to the impact of increasing transport costs the further a grower was located from a mill.

Transport costs are shown to be a major cost item and factor influencing the profit which a grower obtains. It was shown that growers utilising loan finance could have experienced negative returns at distances greater than 30 kilometres. Growers who did not use loan finance were not indicated as experiencing negative returns but did receive substantially lower net income per ton of sugar cane than those growers situated closer to a sugar mill. The net income of a grower 40 kilometres from a mill could be up to 50% less than that of a grower situated at 10 kilometres from a mill./

Paper delivered to Agronomists Association, SASEX, 20 November 1997. Opinions expressed in this paper are those of the author and not necessarily those of the South African Sugar Association

It should be noted that the costs indicated are averages. In terms of input costs there are elements which could experience diminishing returns and would not be applied beyond a point where marginal costs equated with marginal returns. Fertiliser and weed control measures would fall into this category, however major costs such as harvesting and transport relate to tons cane produced and vary accordingly.

The profit per ton of sugar cane of small scale growers redeeming loans is approximately 26% lower than the net income of growers not redeeming loans. This arises from FAF's loan redemption rate of 25% to 30% of a borrowers sugar cane proceeds.

It was shown that harvesting costs, transport costs and ratoon management costs made up an average of 22%, 24% and 25% respectively of a small scale grower's sugar cane production costs. In terms of controlling or reducing costs, ratoon management is an area where a grower can have direct management control and maximise returns to inputs used. Small scale growers have, it has been observed, exhibited a generally poor level of ratoon management.

LABOUR COSTS

Labour costs, which are included in costs discussed above, were extracted and considered as a separate item. It was shown that labour costs account for from 22% to 31% of small scale growers' sugar cane production costs. It was found that labour management was weak. It was shown that labour shortages exist, that the quality of labour available is probably lower than that available to commercial farmers and that wage rates are influenced by commercial farms. The apparent shortage of labour would appear to be a paradox in the light of un- or under employment in the sector. Small scale growers require to improve labour management to attract labour and to enhance its efficiency.

RATOON MANAGEMENT

Small scale growers could increase their productivity and returns by improving ratoon management practices. It was indicated that ratoon management expenditure accounts for a high proportion of growers' costs. In discussing weed control and fertilisation, inefficiencies in small scale grower production were identified. The overall conclusion reached was that *appropriate methods require to be researched for small scale growers*. This was not to say that current technology was not appropriate however its efficiency in respect of small scale growers requires investigation.

The adoption of improved methods is one element of improved ratoon management, another is promotion of improved management of sugar cane farming operations by small scale growers themselves. The latter may rest on grower motivation which may be associated with the economies of sugar cane production. It was shown that the real return to sugar cane production has declined over the period 1960 to 1996. Small scale farmers are rational decision makers and hence, given trends in returns from sugar cane

production, increasing their motivation may be difficult unless financial returns are seen to be favourable.

CONTRACTORS

A way of improving returns is by reducing costs and/or increasing productivity of inputs used. Ratoon management was shown to suffer from inefficiencies. Another area which would appear to involve diseconomies is that of harvesting and haulage of sugar cane to loading zones. It was observed that there appears to be a lack of competition amongst small scale contractors with a system of establishing prices which was not related to constraints of demand and supply as well as uneconomic use of resources in respect of tonnages handled. These influences impact on the cost structure of small scale growers who appear to have little or not bargaining power in the situation. Small scale contractors were identified as influential people.

It was noted that small scale contractors require training. Regulatory measures have been suggested to facilitate competition and improvement in service levels.

Heavy road vehicle (loading zone to mill) transport and transshipment costs are usually established by a market tendering process. Small scale growers are linked to transport agreements established for large scale growers. It has, however, been observed in some instances that, due to poor infrastructure, costs can be higher for small scale growers.

CASH FLOW

An analysis of the small scale grower sugar cane production cycle was presented. Cash flow problems, presented in nominal monetary terms, were demonstrated with low levels of productivity reinforcing growers perceptions of economic shortcomings of sugar cane production. It was demonstrated that with judicious use of credit and focusing on productivity the net return to sugar cane production could be improved significantly.

It was demonstrated that using small scale contractors as "money-lenders" and maintaining yields, small scale growers could achieve high levels of income per hectare. Small scale contractors are known to provide "money-lender" services. The system has not, however, been widely practised or promoted. Further investigation into this system is required.

A theoretical model was developed which aimed to maintain a high level of productivity and spread the use of labour. It was shown that this model could maximise a small scale grower's return. The model did not suggest the use of any new technology or methods but involved the application of current knowledge in a co-ordinated way. It was suggested that research into the model or some variation of it may be advantageous.

INFRASTRUCTURE

Infrastructure, such as roads etc, has not be dealt with in this overview of small scale grower development. It is an area into which substantial investment has been made by the respective government departments and one in which continuous difficulties arise. The Development Bank of Southern Africa has suggested that to overcome problems of insufficient infrastructure and its inadequate maintenance that small scale growers should contribute to its funding. This suggestions was not accepted but, given frequent problems which surround maintenance of road infrastructure, there may be merit in revisiting the recommendation (DBSA, 1993).

CONCLUSION

By addressing improved productivity and efficiency of use of inputs and services, return to small scale growers could be improved. The impact of a declining real sugar cane price may be lessened as a result.

The results and suggestions detailed in this paper may not address problems faced by small scale grower who are poor producers and are indicated as being located in the lower quartile of the distribution of growers according to productivity. It should be noted that there is a positively skewed distribution of small scale growers according to production and land holdings. It is suggested that growers in the lower portion of the distribution may not benefit, as a result of their non-involvement, from improved methods and that they may discontinue sugar cane production. Growers in the upper portion of the distribution referred to may be expected to be beneficiaries of increasing efficiencies. The welfare problems of small scale farmers who do not or cannot benefit from the small scale grower development programme will require addressing in other ways.

Efficiency of production is extremely important for small scale growers. It is suggested that attention and effort be directed to research and extension which develops and transfers appropriate technology and methods to small scale growers. A farm system research and extension (FSR&E) methodology could probably be beneficially applied.

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

The New Water Act - Implications for the Sugar Industry

By : E Schmidt

The fourth draft of the National Water Bill was published for discussion in September 1997. It is proposed that a final draft of the Bill will be completed by December 1997. This will be the culmination of a process started in May 1995 to revise Water Law in South Africa. This paper briefly outlines:

- Why a new Water Act is being developed.
- The process towards a new Water Act.
- Implications for the Sugar Industry.

1. Why a new Water Act

The current Water Act was promulgated in 1956. Recent political changes in South Africa and a new constitution prompted changes to legislation to allow greater access to water by disadvantaged communities. Supporting documentation to the draft Act emphasises that a more equitable sharing of water is required. This sharing must give greater emphasis on the water needs of the environment and basic human consumption.

The Water Act of 1956 was developed primarily around agriculture and irrigation and water rights were linked to land. This has posed increased problems as competition for water has escalated, resulting in frequent referral to water courts and the need to establish government water control areas. While agriculture accounts for 50% of water use it generally gives a low economic return per kilo-litre of water used. Greater focus is placed in the new legislation on allocation of water in accordance to maximise socio-economic benefits.

South Africa is a water scarce country. It is estimated that we are the 9th poorest nation in terms of usable water per capita. Our water resources are poorly distributed spatially and through time (droughts and floods). Water quality is declining and costs of storing water are increasing as less favourable sites are developed. The new Act thus places greater emphasis on sustainability, conservation and promotion of water use efficiency. International competition for water is adding to the complexities of water sharing and management.

The South African Sugar Industry has endorsed the need for more efficient water use and has supported a review of the 1956 Water Act. The Industry has been active in commenting on proposed changes to legislation. The Industry has however voiced serious concerns about aspects of the new legislation. These are highlighted later.

2. The process towards a new Water Act

The process that has been followed towards developing water legislation is briefly summarised below and SASA's inputs to this process have been indicated.

The process towards a new Water Act began in May 1995 with publication of a discussion document "You and your water rights". Following a period of review, a document "Water Law Principles" was published in April 1996. SASA submitted comments on this document in August 1996.

Following a consultation conference in October 1996, a White Paper on National Water Policy was published in April 1997. SASA responded in June 1997 indicating areas of support and concern.

The draft National Water Bill was published in September 1997 and it is proposed to finalise the bill by December 1997. SASA have again submitted for consideration comments on the draft bill.

In parallel with this process new irrigation policy is being developed to support the National Water Bill. A document "Towards an irrigation policy for SA" was published in April 1997 and various regional workshops have been held to discuss and review this document. SASA has been represented at these workshops and has submitted a commodity report on sugar production from irrigation as input to this process. A national agricultural workshop on water law was held in September 1997 and it is planned to have a white paper on irrigation policy available by the end of 1998.

3. Implications for the Sugar Industry

The proposed new legislation will have far reaching implications for the sugar industry. Key areas are discussed briefly below.

3.1 Central versus devolved control

The government recognises its role as custodian of the nations water resources. There is however a need for a flexible overall policy with limited central regulation, providing the framework for management and implementation at local catchment level. The extent to which responsibility for licensing and management of water resources will be devolved to local catchment authorities is however not clear in the Act. SASA believes that apportionment and management of water resources on a local catchment level would best be done by local catchment authorities which are representative of all stakeholders.

3.2 All water is a common resource requiring common approaches to management

In terms of the new Act all water in the hydrological cycle will be treated as part of a common resource and will be subject to a common management approach. Previously water was categorised in terms of private versus public water; surface versus subsurface water; normal flow versus surplus flow; riparian land versus non riparian land. Each class of water

had different limitations on access to and controls on that water. These classes will fall away. Thus a riparian land owner will no longer have preferential rights to water and a farmer will not have uncontrolled rights to store surplus runoff from his land in a private dam. Concerns have been voiced at the practicality of implementing the required controls on each farm, dam and borehole.

3.3 Priorities for water use

The new Act will give first priority in water use to the environment, basic human consumption and international obligations. Thereafter water will be apportioned in accordance with the economic efficiency with which the water can be put to use. This will essentially place agricultural water users at the end of the line.

3.4 Water allocation

Access to water will no longer be a permanent right attached to land as in the past (i.e. riparian ownership). A licence for a water allocation will be granted for a limited term only and will be subject to regular (5-yearly) review. Those with existing rights will have to apply for such a temporary licence. Priority will be given in terms of highest beneficial use of water, although certain categories can on social grounds and grounds of affordability get precedence over others. The duration of the licence will take cognisance of any investment in infrastructure but will have a maximum duration of 40 years. Water licences will be tradable between users to encourage optimum usage. SASA has stated its objection to any water licensing system, which will impact negatively on land value, and will limit further long term investment.

3.5 Pricing policy

In the past the full cost of water has seldom been charged for. In terms of bulk supply and distribution schemes only operational and maintenance costs have been recovered. In order to encourage efficient and sustainable water use the new act proposes to charge the real value of water. This will include charging for capital costs of infrastructure, operating and maintenance costs as well as costs of running catchment management authorities and resource conservation costs. Some of these charges could be waived for a certain period for disadvantaged groups to promote equitable access to water. Landowners with private dams will in all likelihood be required to pay for catchment management and resource conservation costs for each unit of water used.

3.6 Phased implementation

Clearly it will be a major task to implement the mechanisms and structures required to support the act. It is likely that implementation will be phased in with priority given to areas of greatest water competition.

3.7 Pollution sources

Pollution sources will have to be registered and standards complied with. Environmental impact assessments will be required of significant pollution sources. Economic incentives

will be applied to encourage low waste. Catchment management and resource conservation charges will be levied against the pollution source in accordance with its level of pollution.

3.8 Treatment of existing water rights

Where existing riparian water rights exist, they may be removed without compensation. SASA has consistently objected to this and holds the view that this would be neither reasonable nor constitutional. The Act states that "existing lawful water use" will be given consideration in drawing up a water allocation plan. The impact on growers who have a water allocation, but which is not currently being used, is not clear.

3.9 Control of land use

The act allows for the control of "activities intercepting water" through a permit system. The use of a "rainfall interception levy" for crops intercepting excessive amounts of rainfall has also been proposed. It would appear that sugarcane and timber could be key targets for this control. It is not clear how the authorities will quantify the extent of any reduction in streamflow by various land uses. Implementation of this would be difficult and could encourage poor conservation practices (eg minimum tillage and trashing) to limit infiltration. SASA has objected in strong terms to this principle which effectively gives ministerial control over land use at a local level.

4. General considerations for the sugar industry

As described above the new water bill will have far reaching impacts on the sugar industry. All sectors of the economy, including the sugar industry, will be expected to develop water use and conservation policies and practices. Increasingly data will need to be collected, analysed and presented to defend the sugar industries fair use of the regions water resources. Research will need to focus on the economic return on each kilo-litre of water used under rainfed and irrigated conditions, while methods to improve crop water use and application efficiency will need to be developed.

There will also be a need to gain strong representation on local catchment management structures, especially in priority catchments where competition for water is currently acute. In these key catchments management plans will have to be developed and implemented.

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

ISSCT Irrigation Workshop – Report Back

By : E J Schmidt

1. Introduction

An ISSCT irrigation workshop was held in Townsville, Australia from 15 to 19 September 1997. The primary aims of the workshop were to establish collaborative links, share experiences and identify irrigation research requirements. The first two days involved a pre workshop tour from Mackay to Townsville. Fifty delegates from 12 countries attended the workshop.

The visit proved to be highly valuable in getting a better understanding of irrigation practices and problems internationally. Currently some 21% of SA's sugarcane area is irrigated, producing typically 30% of the crop. There is increasing pressure on the industry regarding efficiency water usage. The workshop provided an ideal opportunity to discuss issues of common concern and compare research directions.

2. Workshop Structure and Content

The workshop was divided into 5 sessions, namely:

- Water Use Efficiency
- Irrigation and the Environment
- Drip Irrigation
- Overhead Irrigation
- Surface Irrigation

Important conclusions reached at the workshop are indicated below.

- There are seldom clear cut solutions to the problems facing irrigators. Problems are becoming more complex and are impacting on a greater number of stakeholders in the river catchment.
- Greatest research contributions have often been where there has been significant community contact in development and execution of the research plan.
- Typically very low irrigation efficiencies occur in less developed areas. There are however difficulties in implementing better systems and scheduling methods owing to a low skills base.
- Insufficient focus is given to drainage issues even though over irrigation is a common problem. Excess moisture causes root suffocation and can lead to water logging and associated salinity problems.
- Water needs to be costed appropriately if it is to be managed properly. General consensus was that this was not done and that the common practice of payment per hectare regardless of volume of water used is not appropriate.

- Drip irrigation offers many advantages over other irrigation methods. The system has however a high capital cost and different management requirements. Careful consideration must be given to its appropriateness prior to changing to a drip system.
- While computer models are being widely used in seeking solutions there appears to be a lot of duplication in model development. There would be benefits in greater collaboration and sharing of data.
- Sophisticated models are being used with much success in irrigation research and planning. The value of good observations and research data to validate these models must not be underestimated.
- With increased use, water quality is steadily declining. Greater focus will need to be placed on management and use of poor quality water.

3. Pre Workshop Tour

A two-day pre-workshop tour gave delegates an overview of irrigation in the Australian industry. During the two days focus was placed on:

- Water harvesting, to maximise use of all water resources and reduce off site impacts.
- Overhead, furrow and drip irrigation systems, their pros and cons.
- Irrigation scheduling methods.

The value of the tour was enhanced by the presence of irrigation suppliers who were able to provide technical information on various systems. The tour demonstrated the ingenuity of many of the farmers and how the best ideas have to be proven on the farm for true success.

4. Research Recommendations

Key areas for research, identified at the workshop, are highlighted below.

- The workshop highlighted the importance of benchmarking crop water use efficiency (WUE) and irrigation efficiency, within and between industries. Some inconsistency exists however in interpreting these indices. Given the current focus in South Africa on efficient water use our research should focus on quantifying WUE and irrigation efficiency under various irrigation strategies.
- Greater focus needs to be placed on the environmental impact of large-scale irrigation development. Waterlogging and salinization due to over irrigation affects many areas. The impact of this on yield decline as well as off site environments is under estimated.
- Methods for scheduling irrigation have not been widely adopted. Success has been achieved in Australia and Columbia with the relatively simple minipan method. Consideration should be given to developing this method elsewhere.
- Significant gains in production per unit of water can be made when irrigating at strategic times of crop development. Guidelines need to be given to exploit these periods.
- Simulation models provide a powerful tool to identify best management practices for water resources. Combination of crop models combined, economic analysis and spatial representation of trends can result in improved industry planning and decision making.

A detailed report on papers presented at the workshop and on the tour is available from the author.

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMIST'S ASSOCIATION

The new Experiment Station farms

by KJ Nuss

In the mid 1960s, the Experiment Station enlarged the breeding programme when the Pongola and CFS (near Umhlanga) farms were purchased and plant breeding trials were planted. From the mid 1980s CFS farm was being encroached by urban development. In 1991, the encroachment became a reality when property developers showed an interest in purchasing the land. The land of CFS was to be developed for residential and commercial use. The value obtained would exceed that for paid agricultural farms and this created the possibility making changes to the present breeding programme should an evaluation indicate the need for it.

A study tour of the Australian and Taiwanese sugar industries in late 1992 showed that these industries were increasing the number of sites at which the first selection stages were planted in contrast to one or two large centralized breeding farms. Outcomes from a detailed review of the breeding programme in 1993 where that in the rainfed areas:

the present farms were not representative of the major cane growing regions; the midlands where 20 % of the sugar is being produced in had a small breeding programme;

the soil types on the farms were not on the major soil types occurring in the industry; there were no plant breeding trials on TMS-derived soils, the soil type on which about 30 % of the sugar is produced;

the soil on several farms was extremely variable. When compared to the good results obtained on the uniform soil at Pongola, the area under plant breeding trials at Mtunzini would have to be increased four fold to obtain similar results;

only a few were selected from rainfed farms whereas a number of varieties were available for release from Pongola.

These outcomes and other criteria were used as basis for planning a new breeding and selection programme for the rainfed areas of the sugar industry. The following criteria were set by a panel of staff at the Experiment Station, experts in their fields which could contribute to the development of sound criteria in setting up the new farms. These criteria were:

The size of the plant breeding farms should be able to accommodate a breeding programme starting with 50 000 single stools (ie similar to the Pongola farm). While the sizes of the farms were almost doubled, the number of staff would not be doubled.

Two farms should be situated on the coastal lowland, one in the coastal hinterland and one in the midlands.

The farms should be situated on soils representing the major soil types in the rainfed areas. The major ones should include the TMS derived soil in the hinterland and the midlands, TMS mistbelt derived soil in the midlands, an average potential soil (Middle

Ecce or Dwyka) on the coast and high potential (Inanda or Tugela Schist) on the coast.

Stages I to III should only be planted on slopes of less than 10 % to ensure that soil erosion is minimal in stages where the cane is ploughed out after plant cane or first ratoon.

The size of the farm should be limited to the requirements of the Plant Breeding and supporting departments.

Additional rules included that most farm staff would not be housed on the farm but would arrive at work from their homes every day and return in the evenings.

The funds derived from the sale of CFS were to be used to purchase or lease and develop the required farms without impinging on the annual budget of the Experiment Station.

The proposals were accepted by the management of the Experiment Station in late 1994 and also approved by the Experiment Station Committee. In 1995, the millers and growers also approved the proposals.

Progress to date:

1. Midlands

A farm of 100 ha on a TMS (mistbelt soil) near Bruyns Hill has been secured on a 25-year lease on a TMS (mistbelt) soil type. The soil appears very uniform, there is sufficient large area with a gentle slope, there is water to establish trials with water and there is accommodation to house senior field staff. The first single stools were planted there four weeks ago and two variety trials are currently being planted there.

Preparations for leasing a farm on TMS (ordinary) are well under way. This farm will be the main farm as there is sufficient land to for housing offices and workshops for the staff. Both farms will be run a one unit with staff moving from one farm to another to do the work required. The first cane will be planted there in spring 1998.

Both farms are in areas where frosts are not frequent. This is extremely useful for planting trials every year. Frosts often interfere with the supply of seedcane and reducing that threat will ensure that trials are planted every year and not delayed, which usually causes problems.

2. Coastal hinterland

A suitable farm on TMS derived soil is being acquired from Tongaat Hulett Sugar in the Kearsney area near Stanger. The farm is on a gently sloping terrain, the soil appears uniform, there are power and water and room to construct the buildings required. This farm will be an important farm to cater for varieties on the TMS soils in many areas of the industry. In October, the first 50 000 seedlings were planted and two variety trials

are to be planted there this season.

3. Coastal lowland (high potential)

A farm on high potential soil, on Tugela Schist, is being acquired from Tongaat Hulett Sugar just north of Empangeni. The cane growing there appears very uniform, the farm has a history of high cane yields and the slopes are gentle to ensure negligible soil loss in the early selection stages. Preparations are being made to establish the first trials on the farm in March 1998.

4. Coastal lowland (average potential)

A farm on low potential soil has not been found yet. Large areas of the South and North Coasts are too hilly and steep to meet the requirements laid down.

Expected outcomes:

The new farms have been carefully selected to obtain uniform soils, soils that represent the major soils in the industry and the farms are situated in the major areas producing the bulk of the sugar. On these farms, together with the best crosses and dedicated and qualified staff, the industry should be well served with varieties for a long time.

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

Update on new varieties

by KJ Nuss

Since 1991, a number of promising varieties have been released. For the irrigated areas, varieties N22, N23, N24, N25, N26, N28 and N30 were released. In the rainfed areas, N27, N29 and N31 were released. All these varieties were tested thoroughly for yield traits and passed the disease and eldana tests.

VARIETIES FOR THE RAINFED AREAS

N27

N27, a seedling of N52/219, was released in 1996 and all indications are that it will yield well in most conditions on the coast. In plant cane, the sucrose yields are average, but its yields in ratoons are good and better than NCo376 and N12. It performs well on heavy soils as it showed in a trial at Ottawa where it was ranked first in the droughted trial and again in the season with good rainfall. N27 is resistant to the major diseases, smut, mosaic and rust and moderately resistant so to eldana. The performance of N27 in the Midlands has been disappointing and its future use there has to be determined.

N29

N29, selected from the cross 70E457 x CP57/614, was released this year. Its favourable traits include resistance to eldana (similar to N12) and it has a very high sucrose content of 2.6 units more than that of NCo376 (or similar to N24 and N26 in the irrigated areas). N29 is resistant to mosaic, rust and smut. In the bulking plots it germinated well and its early growth was excellent. The sucrose yield of N29 is slightly more than that of NCo376 and has a lower cane yield but has the high sucrose content. N29 is well suited to being harvested annually.

N31

N31 was released in 1997 **for the Midlands only**. Its sucrose content is 1.2 units lower than that of N12 but produces excellent yields of cane and thereby produces up 40 % more sucrose than N12 under the same conditions. The greater harvesting and transport costs will be negated by the very high cane yields. It is resistant to mosaic but susceptible to smut and eldana. N31 was not released for the coastal areas because of its susceptibility to smut (to a lesser extent) and eldana and its average yields in the trials on the coast.

Rainfed areas: Varieties for bulking in 1997 and release in 1998

85L1781 is resistant to eldana (similar to N21) and the major diseases mosaic, rust and smut. The yields are good and better than NCo376 if harvested at 15 to 18 months but not so good if harvested at 12 months. It is another promising cane for hardy conditions.

86W1417 (a variety with NCo310 as one of its grand parents) yields well if harvested at 12 to 15 months of age. The yields are better than NCo376 even on poor soils (Middle Ecca derived soils), is moderately resistant to diseases such as mosaic, rust and smut. It is moderately resistant to eldana.

VARIETIES FOR THE IRRIGATED AREAS

N22

N22 is known for its erect growth habit and good truck weights, produces high yields of sucrose when grown on good soils and when irrigated well. The sucrose content of N22 in mill returns is surprisingly high. Conditions where stress could occur should be avoided. It is resistant to all the major diseases. N22 does not flower profusely.

N23

N23 is resistant to smut, mosaic and rust and produces good yields in a number of different conditions. An unattractive feature of N23 is that it flowers profusely almost every year. Despite this trait, it produces good yields of sucrose if the flowered fields are harvested before the end of September.

N24

N24 has an unattractive growth habit with long stalks, long narrow leaves and does not canopy well. It should not be planted where water is in short supply as it is susceptible to stress. However, its sucrose content on average is 2.2 units more than that of N14 and 1.3 units more than that of N19. Despite its appearance, its cane yield is also acceptable and its sucrose yield is more than that of N14 and N19. Good early season variety. It is resistant to the major diseases and does not flower.

N25

N25 is a high tons cane variety with a sucrose content marginally lower than that of N14 but a sugar yield of 4 % more than N14. N25 should be harvested in mid-season but with ripeners its harvesting season can be adapted. It is moderately resistant to smut and resistant to rust and mosaic. On the heavy and poorer soils, N25 is producing excellent sucrose yields and it is not so sensitive to short spells of drought even if its leaves show scorching after a period of water and heat stress.

N26

N26 was released in 1996. It has a very high sucrose content early in the season,(similar to its half-sib N24) and ratoons well. Its yields in plant cane are not as good as those of its second and third ratoons when compared to N14. N26 has thick stalks but lodges almost to the extent of N19. It is resistant to the major diseases but susceptible to eldana borer.

N28

N28 was released in 1997, has a high stalk population and is resistant to the major diseases. Its sucrose content and sucrose yield is similar to N19. Its appearance is similar to an NCo variety.

N30

N30 is a very promising variety with a high sucrose content similar to N24 and N26. It was released in 1997. N30 is resistant to smut, mosaic and rust. Its sucrose yields are superior to N14 and N19 in average and good soils. It appears to ratoon well too.

Irrigated areas: Bulking in 1997 and for release in 1998

Variety 86F0915 is another promising variety for the irrigated areas. It has yielded well at all sites where it has been tested. Its sucrose content is similar to that of N19 and ratoons well. Its sucrose yield is similar to that of N30, better than N14 and N19.

These varieties were released to contribute to the economic well-being of all members of the industry. While some varieties may not yield well in all conditions, all varieties should be evaluated and grown widely if they yield well and discarded if they fail the test.

EXPERIMENT STATION



PLANT BREEDING DEPARTMENT

**NEW VARIETIES FOR
COMMERCIAL USE
AND BULKING**

X
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**SA Sugar Industry
Agronomists' Association
Annual General Meeting**

20 November 1997

SOUTH AFRICAN SUGAR ASSOCIATION EXPERIMENT STATION

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NOTES

New varieties recently released for commercial use and for bulking:

| | | |
|-----------------|---------------|--|
| Rainfed South | N27 | Released |
| | N29 (84E1334) | Released in spring 1997 - General |
| | N31 (85H0241) | Released in spring 1997 - Midlands only |
| | 85L1781 | Bulking in 1997 |
| | 86W1417 | Bulking in 1997 |
| Irrigated North | N26 | Released |
| | N28 (86F3396) | Released in spring 1997 |
| | N30 (87F2383) | Released in spring 1997 |
| | 86F0915 | Bulking in 1997 |
| Irrigated South | N24 | Released |
| | N25 | Released |
| | N26 | Released |
| | N28 | Bulking in 1997 |
| | N30 | Bulking in 1997 |

Variety N24

Stage Released in 1993

Area All irrigated areas

Parents Q96 x 75F1463

Average recoverable sucrose % cane of N14 = 12,0%

Average recoverable sucrose % cane of N19 = 12,9%

Average recoverable sucrose % cane of N24 = 14,2%

Average tons/ha recoverable sucrose of N14 = 12,00 tons

Average tons/ha recoverable sucrose of N24 = 12,36 tons

Other traits

Very high sucrose content, +2,8 units ers early in the season and +2,1 in spring.

Low fibre content; can lodge early and severely.

Resistant to diseases, moderately so to eldana.

Sucrose yields on poorer soils relatively better than N14, but does suffer badly when drought stressed. Some exciting sugar yields have been obtained.

Variety N25

Stage Released in North in 1994
 Released in South in 1997

Area All irrigated areas

Parents N14 x Co62175

Average recoverable sucrose % cane of N14 = 12,0%

Average recoverable sucrose % cane of N25 = 11,8%

Average tons/ha recoverable sucrose of N14 = 12,0 tons

Average tons/ha recoverable sucrose of N25 = 12,5 tons

Other traits

High tonnage, average sucrose variety, low fibre content.

Erect growth habit, lodges with heavy crops, cane yield is more than N14.

On poorer soils, yields are better than those of N14.

Variety N26 (83F2008)

Stage Released in North in 1996
Released in South in 1997

Area All irrigated areas

Parents 75F1463 x 69F607

Average recoverable sucrose % cane of N14 = 12,0%

Average recoverable sucrose % cane of N19 = 12,8%

Average recoverable sucrose % cane of N26 = 14,0%

Average tons/ha recoverable sucrose of N14 = 12,00 tons

Average tons/ha recoverable sucrose of N26 = 11,64 tons

Other traits

High sucrose content, very high early in the milling season
(+3,5 units more than N14).

Cane and sucrose yields improve with ratoons.

Cane yield is 15% lower than N14.

Susceptible to eldana, but resistant to smut, mosaic, rust and
leaf scald.

Variety N27 (82E0123)

Stage Released in 1996

Area All rainfed areas

Parents NiN2 x N52/219

Average recoverable sucrose % cane of NCo376 = 12,0%

Average recoverable sucrose % cane of N27 = 13,2%

(+1,2 units)

Average tons/ha recoverable sucrose of NCo376 = 8,0 tons

Average tons/ha recoverable sucrose of N27 = 8,9 tons

Other traits

Sucrose yield in all trials (except Midlands) was better than NCo376 and N12.

Cane yield of N27 is the same as NCo376.

Yields well when harvested annually or at ages of up to 18 months.

N27 is resistant to mosaic, smut, rust and leaf scald and is moderately resistant to eldana.

Yellow leaf syndrome may be a problem disease for this fantastic variety.

Variety N28 (86F3396)

Stage Released in spring 1997

Area Northern irrigated areas only

Parents 76F1553 x 69F179

Average recoverable sucrose % cane of N14 = 12,0%

Average recoverable sucrose % cane of N28 = 12,8%

Average tons/ha recoverable sucrose of N14 = 12,00 tons

Average tons/ha recoverable sucrose of N28 = 12,12 tons

Other traits

Sucrose yield was better than N14 later in the season.

Appears to be more **erect** than other varieties;
has a **high stalk population**.

Resistance to eldana as good as N12, moderately resistant to smut.

Variety N29 (84E1334)

Stage Released in spring 1997

Area All rainfed areas

Parents 70E457 x CP57/614

Average recoverable sucrose % cane of NCo376 = 12,0%

Average recoverable sucrose % cane of N29 = 14,6%

Average t/ha recoverable sucrose of NCo376 = 8,00 tons

Average t/ha recoverable sucrose of N29 = 8,32 tons

Other traits

First variety with **very high sucrose content for rainfed areas** (ers % cane similar to N24).

Resistance to eldana as good as N12.

Best results are from annually harvested cane.

Crops of 18 months yielded a little less.

Resistant to mosaic, smut and rust.

Variety N30 (87F2383)

| | |
|---------|-------------------------------|
| Status | Released in spring 1997 |
| Area | Northern Irrigated areas only |
| Parents | 77F637 x 78F1025 |

Average recoverable sucrose % cane of N14 = 12,0%

Average recoverable sucrose % cane of N30 = 14,1%

Average tons/ha recoverable sucrose of N14 = 12,00 tons

Average tons/ha recoverable sucrose of N30 = 12,84 tons

Other traits

Sucrose yield in all trials (except on poor soils) good.

Sucrose yield was good in autumn and spring.

Good milling traits: high purity, high sucrose and low fibre.

At Malelane had very high sucrose in spring (+3,0 units).

Resistant to diseases such as smut, mosaic and leaf scald.

Open growth habit, reasonably erect.

Variety N31 (85H0241)

Stage Released in spring 1997

Area **Midlands only**

Parents 69E991 x ?

| | |
|---|--------------|
| Average recoverable sucrose % cane of N12 | = 12,6% |
| Average recoverable sucrose % cane of N31 | = 11,4% |
| | (-1,2 units) |

| | |
|--|-------------|
| Average tons/ha recoverable sucrose of N12 | = 8,0 tons |
| Average tons/ha recoverable sucrose of N31 | = 10,5 tons |
| | (+2,5 tons) |

Other traits

85H0241 has performed very well in the Midlands.

Sucrose content is **low**.

Fast growth; consider for annual harvesting.

Moderately resistant to mosaic, resistant to rust, susceptible to smut, intermediate to eldana.

Variety. 85L1781

Stage Bulking in spring 1997

Area Rainfed

Parents 75L1463 x N8

Average recoverable sucrose % cane of NCo376 = 12,0%

Average recoverable sucrose % cane of 85L1781 = 12,8%

Average t/ha recoverable sucrose of NCo376 = 8,00 tons

Average t/ha recoverable sucrose of 85L1781 = 8,24 tons

Other traits

Resistant to eldana, similar to N21, average rating of 3.

Resistant to mosaic, moderately so to smut.

At Mtunzini it was infected with rust. Although this variety does not show the typical symptoms, rust has been seen in several trials.

Sucrose yields better when harvested at an age of 15 to 18 months.

Fibre and dry matter values are 7% higher than those of NCo376.

Variety 86W1417

| | |
|---------|------------------------|
| Stage | Bulking in spring 1997 |
| Area | Rainfed |
| Parents | 78F1025 x 68W1049 |

Average recoverable sucrose % cane of NCo376 = 12,0%

Average recoverable sucrose % cane of 86W1417 = 13,0%

Average t/ha recoverable sucrose of NCo376 = 8,0 tons

Average t/ha recoverable sucrose of 86W1417 = 8,8 tons

Other traits

Good yields of sucrose on poor soils at Shakaskraal and La Mercy.

Yields of sucrose good with 70% of the results better than NCo376.

All results from harvesting at 12 to 15 months were better than those of NCo376.

Moderately resistant to eldana (average rating of 4), smut, mosaic and rust.

Variety 86F0915

Stage Bulking in spring 1997

Area Irrigated North

Parents N12 x MO

Average recoverable sucrose % cane of N14 = 12,0%

Average recoverable sucrose % cane of 86F0915 = 12,7%

Average t/ha recoverable sucrose of N14 = 12,00 tons

Average t/ha recoverable sucrose of 86F0915 = 12,84 tons

Other traits

86F0915 has consistently yielded well on all sites in the irrigated north.

It is moderately resistant to smut, rust and leaf scald.

Yields equally well on both poor and good soils.

Cane yields similar to that of N14, but with higher sucrose content.