

AN INTRODUCTION TO SIMUNYE SUGAR ESTATE

By S. J. F. WINN

Tate & Lyle Technical Services Limited, Cosmos House, Bromley Common, Bromley, Kent, England

Abstract

This paper describes the origins of Simunye Sugar Estate, the formation of the Royal Swaziland Sugar Corporation Limited, its sole proprietors, and some of the achievements and features of this project to date.

Introduction

On 7th October 1978 His Majesty King Sobhuza II, OBE, Ngwenyama of Swaziland, dedicated the Swazi Third Sugar Mill "Simunye Sugar Estate — We are one". So culminated five years of intensive planning and negotiation to effect another major increase in sugar production in Swaziland.

The first step towards establishment of the Royal Swaziland Sugar Corporation Ltd (RSSC) was taken in 1973 when the Swaziland Government, working in close co-operation with the Commonwealth Development Corporation (CDC), carried out a pre-investment study for the expansion of sugar production.¹

In reaching its final decision on the new project, the Government had a four-fold aim in sight, namely:

- (a) Expansion of the agricultural/industrial base of the nation, thus increasing foreign exchange earnings.
- (b) Creation of new employment opportunities.
- (c) Expansion of the personnel capability of Swaziland by training and developing Swazi nationals in management and skilled labour positions.
- (d) Stimulation of increased economic activity in rural areas.

The results of the pre-investment appraisal prompted a final planning and development study for a completely new project — the third mill. This was entrusted to Tate and Lyle Technical Services Limited (TLTS) and completed in June, 1975.²

At the same time the Swazi Government and Nation entered into a wider partnership with the Tate and Lyle Group to bring the project into being. Specifically the parties agreed to three levels of participation:

- (1) Equity investment and the financial expertise to assist raising equity and loan capital.
- (2) Trading advantages through agreement with the Swaziland Sugar Association (SSA) on the selling arrangements for tonnages of sugar equivalent to that to be produced by Simunye in its first few years of operation.
- (3) Management and technical know-how for the construction of the project and its on-going operation.

For about three years the twelve investors and financial institutions who had agreed to participate, discussed and planned the technical and commercial aspects of the project while negotiating with many Government, Nation and private bodies in Swaziland to build a legal and practical base upon which the project could go forward.

Progress

By the 1st May, 1979, the following achievements could be recorded:

1. The Royal Swaziland Sugar Corporation Limited, sole proprietors of Simunye Sugar Estate (SSE), was created

by seven partners signing a Joint Venture Agreement with the Swaziland Government and Swazi Nation in December 1977, to subscribe E.40,1 million of equity share capital. This was subscribed by October, 1978.

2. RSSC entered agreements with eight institutions or corporations for the provision of approximately E.91 million in the form of loan capital or buyer credits. These became effective in March, 1979.
3. The Swaziland Government arranged for the finance (E.22,5 million) and construction of the Lake Mnjoli Dam, to ensure water availability for the project.
4. RSSC entered into two concurrent agreements with subsidiaries of Tate and Lyle Limited, one with Tate and Lyle Engineering (TLE) for the management of the construction of the project, and subsequently a second, with TLTS, for the management of the completed project.
5. Of an anticipated capital expenditure of approximately E.100 million, 67% is now committed and 29% expended.
6. Nineteen contracts for construction have been tendered, evaluated and awarded, leaving approximately 13 to be undertaken. One hundred and thirty-four contracts for supply of plant and equipment have been tendered leaving approximately 24 to be awarded.
7. SSE has engaged the services of 540 Swazi nationals and 30 expatriates. They are accompanied by 20 qualified engineers who represent the project establishment managers (TLE). Overall the contractors' work force has reached a level of 2 400 management and labour.
8. A major weir and river pump station has been constructed on the Umbuluzi river, 2 950 ha net of land cleared and prepared, and 1 155 ha planted. The first irrigation water was applied to the Mlaula cane on 3rd November 1978.
9. A new township "Lusothi", has been created with about 650 housing units completed and in occupation.
10. A factory site of 1,7 ha has been cleared and levelled. Of a total mass of 6 500 tons of structural steel, plant and equipment 2 600 tons have been installed and an additional 1 000 tons delivered to site.
11. The Lake Mnjoli Dam wall has been completed. The main outflow valve will be fitted towards the end of the 1979 dry season so the dam will be ready to impound the flood waters of the next rainy season, permitting irrigation to commence in Ngomane in February, 1980.
12. Resettlement of the families on the Lake Mnjoli dam site has taken place; that of families in the cane areas of Ngomane is commencing now.

Features of the Project

Organisation

RSSC is directed by a 14 member Board, meeting on a three monthly basis.

In order to deal with the many urgent decisions arising during the important development phase of the project on a more frequent basis, the Board set up an Executive Committee who all lived locally and had had experience of sugar projects.

In addition, two further Board committees were set up. The first, a Financial Committee, reviews and advises on financial policy. The second, a Tender Awards Committee, awards tenders following completion of international bidding procedures.

Finance and Planning

The subscribers to the E.40,1 million equity capital are The Swaziland Government, The Swazi Nation (Tibiyo Taka Ngwane), The Nigerian Government, Tate and Lyle Ltd, Coca Cola Export Corporation, Mitsui and Co Ltd, the Commonwealth Development Corporation, the German Development Company (DEG) and the International Finance Corporation (IFC). Of the above, the Swaziland Government and the Swazi Nation have a majority holding of 65%.

TABLE 1
Financial Sources

Source	Equity (E million)	Loan (E million)
Swaziland Government	13,0	29,0
Swazi Nation (Tibiyo Taka Ngwana)	13,0	13,0
Nigerian Government	4,0	
Tate and Lyle Limited	3,5	
Coca Cola Export Corporation	1,7	
Mitsui and Company Limited	1,5	
Commonwealth Development Corporation	1,0	3,0
D.E.G. (German Development Company)*	2,0	2,1
International Finance Corporation	0,4	7,0
E.I.B. (European Investment Bank)		10,0
I.D.C./C.G.I.C. (R.S.A.)		20,5
Barclays Bank/E.C.G.C. (U.K.)		6,6
TOTAL	40,1	91,2

* Deutsche Gesellschaft für Wirtschaftliche Zusammenarbeit (Entwicklungsgesellschaft) mbH.

Loan capital amounting to approximately E.64 million has been made available by the Swaziland Government, the Swazi Nation, CDC, DEG, IFC and the European Investment Bank (EIB). Of the Swaziland Government's loan, approximately E.5 million represents the loan from the African Development Bank (ADB) direct to the Government of Swaziland specifically for the Simunye Project (Table 1).

Following international tendering procedures with a number of countries to determine the most favourable combination of prices and loan terms, buyers' credits have been negotiated with the IDC/CGIC from South Africa and from Barclays Bank/ECGD in the United Kingdom. These funds amount to approximately E.27 million (Table 1).

Investment funds will be applied to five principal categories of capital expenditure as well as to pre-production expenses, future crop expenditure and working capital (Table 2).

TABLE 2
Application of Funds during Development Period, 1978-1981

	Approximate	Expenditure
	%	E million
Land Development	8	10,0
Agricultural and Harvesting Equipment	9	10,0
Irrigation and Drainage	19	23,0
Factory	24	30,0
Infrastructure and Housing	24	29,0
Net Working Capital, Pre-production Expenses	16	20,0
TOTAL	100	122,0

TABLE 3
Targets for Sugar Production at 98,5° Pol (Tons)

Year	Farmers	Simunye	Total
1980	8 000	40 000	48 000
1981	11 000	79 000	90 000
1982	13 000	113 000	126 000
Future	13 000	105 000	118 000

SSE's targets for sugar production are set out in Table 3. The predominance of plant cane gives a potential for peak production of sugar in the third year of operation.

Actual production, besides being influenced by technical factors, will also be dependent on matters such as International Sugar Agreement quotas, etc.

An indispensable part of the Simunye Project is the Lake Mnjoli Dam. Its construction and operation are not part of the SSE's responsibilities but those of Government. It is financed (E.22,5 million) by a soft loan from Kreditanstalt für Wiederaufbau (KfW) and European Development Fund (EDF) (Table 4). The loan will be repaid and serviced by means of a commercial water charge to the users.

TABLE 4
Finance for Construction of Lake Mnjoli

Source	E. million
K.F.W. Kreditanstalt für Wiederaufbau	17,0
E.D.F. European Development Fund	3,5
Government of Swaziland	2,0
APPROXIMATE TOTAL	22,5

Resettlement

From the outset it was recognised that up to 550 families might have to be moved to make way for cane fields, and the associated development and infrastructure in the Ngomane or Western portion of the project. The Government of Swaziland expressed its criticism of the way a major resettlement on an earlier project (not sugar) had been handled, and insisted that first class financial and administrative arrangements should be made in order to promote satisfactory relocation in a manner acceptable to the Swazis. These included the preparation of new lands for agricultural purposes, the reconstruction of buildings and the re-siting of graves. Such a policy was endorsed whole-heartedly by the other investors and the International Lending Agencies contributing to the project, and almost E.1 million was set aside specifically to ensure resettlement in accordance with laid down criteria.

Widespread counselling, under the auspices of the Ministry of Agriculture, responsible for carrying out the resettlement, has led to an acceptance by the families concerned of the arrangements made for their movement. Co-ordination of all parties, including SSE, takes place through a liaison committee set up at the express direction of H.M. King Sobhuza II.

To date 12 families have been resettled from the dam wall site of the Lake Mnjoli Dam. Land clearing started in the Ngomane areas in March 1979 and with the completion of the 1978/79 maize harvest, some 275 families will now be asked to move to nearby developed land on the neighbouring ranches.

Infrastructure

The overall work force to be engaged by SSE will number approximately 3 000 persons, of whom more than 300 will be of staff grade. The policy of the Corporation is to accommodate

all personnel in houses of a standard comparable with other sections of the Swaziland sugar industry. As a result of SSE's disposition of land areas and operational requirements, it has been decided to have three townships, sited at Lusothi, Ngomane North and South respectively. Married workers will each, with their families, occupy three-roomed houses equipped with kitchen, laundry and toilet/shower facilities. It has been estimated that 10% of the labour force will form part of families already housed as employees. The final number of housing units is also based on the supposition that 25% of the personnel, including cane cutters, will be housed in single accommodation and this will entail the sharing of rooms in the bachelor quarters, particularly those allocated for agricultural workers.

Townships are laid out with full attention to supplies of water, power and sewerage with oxidation ponds and water treatment plants to high standards of performance. SSE is determined to provide good amenities and these will centre around a shopping complex to be sponsored by a local development corporation. A sports stadium for soccer (national sport) and athletics is being constructed, together with a community centre with swimming bath and tennis courts. Schooling will be catered for by a Government primary school in each of the main townships to be followed by a secondary school in due course as the need for this develops. In addition, there will be a grant aided primary school in the vicinity of the factory, a country club, a non-denominational church, clinics, an airstrip and a police station.

Land Development

The majority shareholders decided from the outset that the fulfilment of the project and through this, the aspirations of the Swazi people, could best be served by organising the estate on a plantation basis, at least during the period of major development until loan repayments had been met. Thereafter it would be possible for small farmers to joint the project. Agricultural lands (19 600 ha gross) are thus held on a long lease from the Swazi Nation, while the site for the factory has been purchased freehold.

The most notable feature of the location of SSE is its division into two parts, each lying in close proximity to the Ehlane Game Reserve. The preservation of this part of Swaziland's heritage is of prime importance, both to its people and to the investors in the project. In fact, benefit may accrue to the Reserve since the project should enable it to distribute water to far more drinking holes than heretofore. Thus it may be possible to avoid the concentration of animals at the present few drinking spots on the Black Umbuluzi River, leading to greater opportunity for the herds of game to flourish and stabilizing the ecology in such areas.

Originally the planning teams hoped to avoid cultivating the difficult Zwidi soils. However, in the light of reduced world sugar prices, and in view of the desire to improve earnings, it was decided to expand the Estate to include all land for which water seemed likely to be available in the catchment area. As a result, 10% of the cultivated land area will probably have to be Zwidi soils. Meanwhile the techniques of their cultivation are becoming better understood.

Bush clearing and land preparation has proceeded with little difficulty, apart from stones and rock bars for example, in Mlaula. In Ngomane, scrub removal will not be easy and while rock bars may be less prevalent, erosion through over-intensive land use by subsistence farmers, means some soils will require special handling.

Water Resources

Commercial production of sugar cane requires a fully irrigated regime in the Lowveld of Swaziland. The original pre-

investment study made it clear that to justify a major programme of water conservation (for which there was only one reasonable site, namely, Lake Mnjoli), a minimum of 8 000 ha net of land would be required under cane development. This figure is matched almost perfectly by the forecast of possible water conservation in the Umbuluzi catchment area, taking into account the requirement for minimum flows to Mozambique and the prior rights of existing users. It could be that as SSE develops the experience to increase the efficiency of water application to the crop, the water requirements will be reduced to the point where additional areas could be taken in at least from the technical standpoint.

Final confirmation of the potential of the area will be problematic until reliable data can be accumulated as to the irrigation run-offs of adjacent sugar and citrus estates and their effect on the total flow in the Umbuluzi river.

Cultivation

SSE follows with great rigidity the procedures laid down for disease control by the SSA and the Cane Growers Association particularly for smut prevention. Realising that this is a matter of the utmost importance to the future of the industry, seed cane has been purchased from adjacent "B" nurseries which in turn were planted with cane from "A" nurseries in the Highveld Malkerns region of Swaziland, since, with such seed the incidence of smut is greatly reduced. SSE has planted "B" nursery areas from the selected varieties now under multiplication at Malkerns.

SSE is committed to pursuing a very active policy in the search for new varieties, and believes that efforts must be accelerated in this respect. Currently variety NCo 376 is being planted for production, (84%), with N52/219 (14%) and J 59/3 (2%), as crucial pilot production plots.

Irrigation and Drainage Requirements

Since water resources are the limiting factor to maximum production levels, the planning team devoted considerable effort to resolving whether to adopt a higher capital cost system of overhead irrigation, or a lower capital cost furrow system. The policy now is to install the latter wherever soils and topography permit.

During the initial design stages it was forecast that between 25 and 35% of the net area under cane could go under furrow irrigation. However, as bush is cleared and more detailed soil surveys take place, the micro-topography and degree of past erosion that dictates final land use and preparation, is gradually being exposed. As a result there is evidence that this original forecast might have been rather optimistic. However, it is probable that overhead irrigation will lead to higher productivity so there might be a reduction in the total amount of land that will have to be brought into cultivation to reach SSE's production targets and quotas. This is a matter that will be under continuous evaluation as the project progresses, and as yields and production rates of cane become established agronomically.

It is encouraging to note, however, that on the soils more favourable for furrow irrigation, row lengths of up to twice those currently used on neighbouring estates are being utilised while still achieving or exceeding the expected rates of growth of cane and irrigation efficiencies. Again it is felt that this is a subject justifying considerable further investigation towards improvement in the efficiency and labour productivity of irrigation application.

The sprinkler system installed is a semi-solid set system, designed to apply approx 2 150 mm depth (gross) per hectare per annum, based on a 22 hour day, 6 day cycle. Sprinklers are used in a 12 position rotation on an 18 × 20 metre grid.

Provision is being made, by attention to accurate grading of fields, for the promotion of good surface drainage. In the original plan it was anticipated that approximately 10% of the net cane area would require sub-surface drainage applied to overcome problems associated with rock and impermeable soil bars. The inclusion of more of the Zwidi and other less desirable soils previously referred to, will probably result in a greater proportion of land requiring such drainage. Flexibility will be the keynote in the future if capital costs are to be minimised. In any case the regional drainage system will be so designed as to allow installation of sub-surface drainage as and when found to be necessary.

Harvesting

Since the closure of the border between Swaziland and Mozambique several years ago the availability of unskilled labour for agricultural operations has decreased drastically. SSE is therefore committed to mechanical harvesting — expected to be of the chopper combine type — from the outset. In-field bins will be transferred to road vehicles for transportation to the mill. However, in the interests of minimising the introduction of complex equipment and maximising the potential for offering jobs in the less skilled job sector some 40% of the cane will be harvested by hand in the initial years and for this cane, methods of loading and transporting to the mill are still under evaluation, but SSE has noted the growing success in developing countries, of continuous loaders which chop the cane. Whatever the final decision may be it is the intention that all cane will be delivered in 10 ton bins to the factory and that there will be some compatibility of equipment with neighbouring Mhlume. SSE has also to decide whether or not to contract out road haulage of cane or to do it in-house.

Factory

The designers were faced with the usual problem: to mill or to diffuse. Opinions vacillated frequently between the alternatives and the final decision to opt for milling was the result of management considering that milling trains were more flexible in terms of appreciable changes in rate of throughput. In addition, it was considered that stoppages for reasons either within or outside the factory, would be less deleterious from the point of view of sugar loss with a mill than a diffuser.

One must say that the remainder of the factory designed for an average throughput of 250 tch (Table 5) is entirely

orthodox with the possible exception of the automatic and semi-automatic cane bin unloading gear. Thought was given to installing SMRI rapid clarifiers but in the end SSE decided to play safe with clarifiers of conventional juice residence time. In common with Swaziland and South African practice, VHP sugar will be produced by a three boiling system, re-melting C sugar, and the final export grade sugar prepared by mingling crystals with molasses. The factory is designed to operate with a crew of about 80 per shift with an overall staff and labour force of about 380.

Comprehensive treatment for factory effluents will be installed in order to preserve the environment and conform with the best standards applicable to the sugar industry.

Factory construction has been entrusted to four main contractors and is currently on schedule to permit commercial trials of sugar production in June 1980.

Training

SSE's training strategy is to help employees comprehensively from the time of their induction through operator and technical training on the job training and later their development as supervisors and managers. The Training Centre is nearing completion and will operate as the focal point for all training, especially that catering for apprentices. The training manager who will head 4 training superintendents and instructors has already started work and is developing company action plans and policies to include:

- (a) Induction training for all new employees.
- (b) Basic theoretical and practical training for all administrative, operating and technical employees.
- (c) Supervisory and management training and development.
- (d) The training of supervisors in the techniques of job instruction.
- (e) Co-ordinating "on the job" training in all departments with line managers.
- (f) Counselling on outside study courses, which would be of benefit to the company, and for which the company would provide assistance.
- (g) Promoting educational and cultural extra-mural activities.

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TABLE 5

Design Parameters for Simunye Factory

Parameter	Range	Average	Units
Cane Analysis: Sucrose	11,5-15,0	13,4	%
Fibre	12,5-16,0	14,3	%
Crushing: Season	190-240	230	Days
Capacity	—	250	Tons/hour
Extraction	—	95	%
Raw Sugar Quality	96,0-99,0	98,5	° Pol
Boiling House Recovery		88,5	%
(M.J. 84,5% purity)			
Overall Recovery		84	%
T.C.T.S. (98,5° Pol)		8,8	° Pol
Time Efficiency Overall		75	%
Annual Milling Cane		1 050 000	Tons
Annual Sugar Production		120 000	Tons