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NIGERIA

Technical Report: Rehabilitation and Development of the Sugar Industry in
Nigeria: A Survey to Determine the needs for the Restructuring and
Development of Sugar Production in Nigeria*

Prepared for the National Sugar Development
Council of Nigeria

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* The views expressed in this document are those of the authors and do not necessarily reflect those of the Secretariat of the United Nations Industrial Development Organization (UNIDO). Mention of company names and commercial products does not imply the endorsement of UNIDO. This document has not been edited.

Abstract

This report presents a review of the present level of development of sugar cane production and processing in Nigeria, and analyses the potential for expanding the output of the Nigerian sugar industry to attain self-sufficiency in sugar supply in the nearest future. The team of experts of CARGILL Technical Services Ltd. investigated the substantive and economic preconditions of development and profitable investment in sugar cane plantations and sugar mills.

The findings and conclusions of the experts aim at defining the actions to be taken by the government, the existing sugar industry, new private investors, and the financing institutions, towards attaining the targets set by the Federal Government of Nigeria in its pertinent National Sugar Policy Act under which the National Sugar Development Council has been established and mandated to organize and coordinate the expansion of the agricultural and industrial production, as well as trade of the entire sugar sector of the Nigerian national economy.

ABBREVIATIONS AND ACRONYMS

ADB	African Development Bank
AGM	Assistant General Manager
FCT	Federal Capital Territory
NIDB	Nigerian Industrial Development Bank
NISUCO	Nigerian Sugar Company Ltd.
NNDC	New Nigerian Development Company Ltd.
SSCL	Savannah Sugar Company Ltd.
T/A	Technical Assistance
TOR	Terms of Reference
UNIDO	United Nations Industrial Development Organisation

When required an exchange rate of N22 to US \$1 has been used.

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EXECUTIVE SUMMARY

1. This short mission was carried out right at the end of 1993 and with the time available was not able to cover as much ground as had originally been envisaged and intended if the mission had taken place as planned in mid 1993.
2. Nigeria may not at present offer the best investment climate for potential investors, whether they be bankers, financial institutions, public or private companies, or entrepreneurs; additionally for local national investors in an industry such as sugar with an extended first "pay back" period the inducement is not great where their money can attract a very high interest rate of return being offered by many local financial institutions. However, since the study was undertaken, the subsequent economic measures taken by the Federal Government of Nigeria in its 1994 budget, and thereafter, and through the articles of the Sugar Council, will improve the investment climate in the long run and therefore mitigate the issues raised above.
3. Possible bilateral financing may be considered and this is expanded upon in the report.
4. Nevertheless it is important to frankly show the state of the Nigerian sugar industry so that potential investors are fully aware of the problems and can then be in a position to consider how they might address them and assist.
5. The basic facts show that Nigeria is a major consumer of sugar - in excess of 1 million tons of which only about 5 per cent is produced locally - the remainder being imported.
6. In a country such as Nigeria with an abundant land resource, adequate water, reasonable infrastructure and trained labour force it is important - even if only for import substitution purposes - that the sugar industry be developed as soon as possible towards self-sufficiency.
7. With the above in mind the NSC has been set up and charged by government with the development of the industry. Throughout its stay in Nigeria the mission has been very conscious of this requirement.
8. Finally the help, professionalism and enthusiasm of all who work in the industry must be acknowledged - often working under very severe constraints.

1. INTRODUCTION

At request of UNIDO in Vienna, Cargill Technical Services Limited provided a consultancy team for a survey of the sugar industry in Nigeria.

Originally it had been envisaged that the mission would take place in mid 1993. However with the election in June and some uncertainty about the position thereafter the mission was continuously postponed. It was finally decided that the field visit had to be made to Nigeria before the year end, effectively a few days before the 1993 Christmas holiday period. A report was to be submitted early in January 1994. This requirement was necessary in order to comply with UNIDO budgetary rules and for the duration of the mission the four nominated consultants became UNIDO staff members. At mobilisation it became apparent in the time available the very full Terms of Reference would not be fully satisfied. However UNIDO and NSDC (Nigeria National Sugar Development Council - only recently gazetted officially in early September) urgently required an independent survey of the industry in Nigeria. It was agreed that the study would be as wide ranging as possible and the format of the report would take account of views expressed by the NSDC. The main objective as to assist and lay down the "way ahead" for the newly formed NSDC. A full programme of visits and discussions was undertaken (see Annex A, Itinerary in Nigeria).

In view of the time constraints, UNIDO agreed that the mission could be mounted without a sugar factory specialist, and that the other team members would cover the general factory aspects in the report.

2. BACKGROUND

Sugar is a strategic commodity; it is consumed as a food item and as industrial raw material in virtually all food, beverage and pharmaceutical industries; consumption has grown rapidly from 43,000 tons in 1995 to over 2 million tons today - an average growth rate of 8 per cent.

Local production accounts for approximately 5 per cent of consumption necessitating considerable foreign expenditure payments on importation.

Realising how critical the position has become the Federal Government has set up an autonomous executive body, namely the Nigerian National Sugar Development Council, which has been operational since early 1993 but only became officially gazetted in early September this year. Funding for the council and its activities is intended mainly for investment in new plant and essential activities to enable production of sugar to increase and is to come from a 10 per cent levy raised on the price of imported sugar.

UNIDO is producing this report in order to assist and support the future "agenda" and "action plan" for the sugar industry in Nigeria, and to suggest actions that should be taken in the short, medium and longer term to assist the industry's development.

A considerable number of reports and studies have been made over the years on various sites for sugar estates and for development opportunities in the industry. Apart from Savannah Sugar Corporation (SSC) and Bacita (NISUCO) no major development or project has been forthcoming for a variety of reasons, which are discussed later in the report. Most of these are outside the control of the industry, but are a very major constraint to attracting investors for what is a long term investment before it is likely to show any return.

A certain amount of cane is grown on a commercial basis at Sunti, Niger State (see map; ANNEX J); a recent feasibility study put forward a technical and financing proposal to go ahead and develop a sugar producing complex at this site but for various reasons potential investors were not in the end prepared to proceed. The cane grown, therefore, is transported for processing some 100 km to Bacita (NISUCO) for processing which increases costs and involves considerable logistical/transport problems.

In 1976 a full feasibility study was undertaken for Lafiagi (see map), but again this was not proceeded with due to political uncertainties at the time and it has not been pursued since. Commendable, however, a mini-factory has just been installed, which can cope with the cane currently grown there instead of it being transported to Bacita, (see map; ANNEX J). The question of mini-mills is covered in Chapter 3.1.3 Factory Production; suffice to say at this stage that a huge number (at some very considerable cost) would be required to equate production to three or four large sugar producing complexes.

A comprehensive pre-feasibility study of potential sugar lands in Nigeria was carried out in 1974, 1975 and 1976 by HVA International. Virtually all that is stated in that report holds good today and the mission used their findings particularly for those areas specifically mentioned in the Terms of Reference for this study.

Apart from visits to Bacita and Savannah the following sites were visited Lafiagi: Sunti, Lau, Hadei and Shonga (adjoining Bacita); another potential site at Abaji FCT (Yaba), not covered by the HVA report, was also visited.

Recommendations, priorities and the suggested way ahead are given in Chapter 4, and section 3.2 discusses possible new sites.

A period of real stability is necessary in order to attract capital investment to Nigeria. Policies are required to address the inflation, exchange rate and interest rate problems which are having a stultifying effect on growth. Another national issue is the hydrological and water regime. This must be stable in the long term as any investor in the sugar industry has to consider the very heavy capital investment involved. Any changes in the water supply pattern can prove absolutely crucial to the whole operation; without water no sugar can be grown, but that water must be managed for both irrigation and drainage.

3. FINDINGS AND CONCLUSIONS

3.1 EXISTING

This section covers the findings and conclusions relating to the existing operations and to the general situation pertaining at present in Nigeria.

3.1.1 Economic/Financial

The major findings and conclusions are as follows:

a) Investment Climate

The Government of Nigeria set out its Industrial Policy document of January 1989 as part of its Structural Adjustment Programme. In particular, this detailed the Policies, Incentives Guidelines and Institutional Framework under which industrialists (including external investors) could operate. The Government, also set out its intention to privatise, either wholly or partially, a number of parastatal organisations (including Savannah Sugar Company).

However this did not specifically relate to foreign/external investment. Foreign investment is vital to the Sugar Industry due to the huge capital requirements. Furthermore, Nigeria has a different investment profile when compared to other economies on the African Continent. In the normal scenario, foreign exchange investment is injected in the country to generate foreign exchange earnings. These earnings are often maintained in offshore accounts outside the local economy or within the local economy in foreign denominated and controlled accounts. This has two major advantages:

- foreign exchange is ensured for spare parts and other operating expenditure (viz fertilisers);
- the foreign investor has the assurance that his capital repayments and dividends are readily available when required and in a currency which is likely to maintain its value in the long term.

The local economy, whilst not directly benefitting from the foreign exchange earnings, benefits indirectly from job creation and from the multiplier effect of the investment in the economy.

The Nigerian economy with its large and growing population means that there is always a demand for local consumption which will more than satisfy the production capabilities.

Foreign investment in products for the domestic market generates local currency, which recently in the Nigerian context means a depreciating currency. In this scenario foreign exchange resources normally diminish leading to a scarcity of foreign exchange. The investor no longer has the assurances of foreign exchange for spares, etc. and also has the added concern of the future value of the Naira for dividends and capital repayments.

Conclusion

With the worldwide shortage of investment funds and with the present overall situation in Nigeria, the foreign investor will require certain guarantees and commitments from Government to ensure adequate maintenance and servicing of his investment.

b) Interest/Exchange Rates

The value of the Naira to the US Dollar has been steadily depreciating since the mid 1980s from 0.81/US\$ in 1985. However, the rate of depreciation has increased in recent years leading to the present rate of N22/US\$. An active parallel market is in existence and the premium is around 100 per cent (N45 to US Dollar).

Interest rates are also increasing rapidly and at present interest rates for commerce and industry are between 30 per cent and 40 per cent. This results in higher operating costs for companies' use of funds. It also results in a higher opportunity cost for competing funds. In other words, an investor must be convinced of higher returns on his investment than he can obtain by investing his funds in a risk-free savings account. As the savings rate increases the required returns increase proportionally thus eliminating projects with returns lower than the investors' hurdle rate.

Conclusion

As the internal cost of money increases, the difficulty of obtaining funds for new investment increases. Given the high capital requirements of the Sugar Industry (see below) this means that raising new funds for investment will be that much more difficult and new incentives will have to be created to stimulate such new investment. Coupled with the foreign exchange position set out in the previous section, this creates a difficult investment climate for the investor.

c) Economies of Scale

The conventional ranges of sugar complexes (2,400 to 10,000 tonnes cane per day -tcd) require high initial capital expenditure (US \$ 25 to US \$ 250 million) see Annex I. Because of this level of investment, the fixed cost element results in a high Break-Even Point (BEP) i.e. the level of production at which all variable or fixed costs are covered - resulting in a nil profit.

This calculation has been done for Savannah Sugar Company (on a historic basis and after the financial restructuring of 1991) and is set out in Annex H BEP is +/- N109 million meaning that this level of turnover is required to break even i.e. cover costs and generate nil profit. Given that a turnover in the last five years has gone from N21 million to N149 million in 1992 operating losses would have been incurred in every year except the last, since in these years turnover was less than the Break-Even Point of N109 million.

This illustrates the crucial relationship between volume and profitability and highlights the need for continuous high volume production with minimal stoppages of the factory. It also tends to negate the use of mini-mills in all but isolated and atypical locations. Although capital expenditure is reduced, operating profitability is negative because of low volume.

Conclusion

Because of the high level of fixed costs and the BEP profile, high volume throughput is essential to the factory operation to secure an adequate return on the capital expenditure. In the case of new sites this has implications for power availability, cane yields and production availability and foreign exchange/spare parts availability. Furthermore, access to an adequate and suitably productive labour force also is important. Whatever assurances can be given to the investor will be of benefit in attracting new investment, but it is important that issues relating to the high Break-Even Point (BEP) be addressed at the initial planning stage; due consideration must be given to such possibilities as full utilisation of the possible grinding season and the early introduction alongside the nucleus estate of cane farming out-growers.

d) Infrastructure Costs

The infrastructure cost involved in setting up a new sugar factory with a nucleus estate are also huge. Because of the nature of the operation the most ideal sites tend to be fairly isolated and distant from the normal infrastructural supports i.e. power, water etc. Therefore, in planning a new facility, roads, power access, water availability and social amenities need to be included, in effect a small town must be built.

In the short to medium term at least, it is impossible for a sugar factory to cover the financial/operating costs of the infrastructure. This was illustrated in the 1980s at Savannah Sugar Company where the infrastructure of Kiri dam development costs were included in the operation.

Losses by 1985 had reached in excess of N150 million at a time when the exchange rate was US \$ 0.81 - i.e. losses in dollar terms of 187 million. This was recognised and restructuring took place - the infrastructure assets and liabilities were removed from the Balance Sheet leaving the sugar operation as an operating entity.

Conclusion

In any future new facility the infrastructure must be provided by the Government through its parastatals, e.g. River Basin Authorities and not be included as an operating cost. Furthermore, in order to attract new private investment, Government needs to be in a position to guarantee adequate infrastructural facilities and the required finance to erect them; the Council should coordinate the provisions of such facilities for any of the sites agreed with a potential investor. The Council should also be responsible for coordinating with different Government Ministries and agencies the provision of such facilities as access roads and electricity among others, which are not the responsibility of any project investor.

e) NSDC Finances

NSDC finances derive from the 10 per cent levy on imported sugar at CIF value. Based on present prices imported sugar of 1 million tonnes will generate NSDC of +/- N700 million. At present, although separate cheques are made out by the importer for this levy and the duty and surcharge, the levy is still paid into the Central Treasury via the Accountant General. NSDC must then apply for funds from Treasury to finance its operations.

The calculation of the value of the 10 per cent depends largely upon the declaration of the importer who can under-declare on tonnages or on value. This is common practice elsewhere in Africa. SGS, the Swiss organization, responsible for verifying international shipments, attempts to prevent both of these exercises, but as it is impossible to check every single shipment for weight, product description and value, its success is built largely upon its deterrent effect. NSDC has recognised this aspect and does intend to have its own inspectors at the port in time.

Finally, it is the intention to develop NSDC by further recruitment of specialists, i.e. finance, planning, research etc. Given that funds for development are limited, consideration should be given to using existing staff within the sponsoring ministry by way of temporary secondment. Furthermore as the goal of self-sufficiency begins to be achieved, NSDC revenue will diminish in line with reduced imports. The finances of the Council will be augmented with proceeds from additional tariffs on sugar imports (or any grant from the Government) and support from operating sugar producers.

Conclusion

The funding and future staff complement of NSDC should be considered as part of an operating plan which NSDC must produce for its own Council in line with its own Terms of Reference. The existing sugar producers should support NSDC.

3.1.2 Cane Production

A number of studies were made several years ago by different Consultants. Their reports concluded that sugar cane can be grown in the Numan and Bacita area with cane yields of 90-100 tons cane per hectare. About 30 other locations were found to be potential areas to grow cane in Nigeria of which five were visited by the UNIDO Team between 4-11 December 1993.

When the two sugar estates of Savannah Sugar Co. Ltd and the Nigeria Sugar Co Ltd (Bacita) started production, fairly good yields of 70-85 tons cane per hectare were achieved in both sugar estates. In 1979, the cane yields started to decline until the present time, averaging only 45-50 tons cane per hectare (see Annex D). The two estates in Numan and Bacita were adversely affected by poorly trained management staff and inadequate financing, and the lack of much needed spare parts for agricultural equipment.

The two sugar estates in Numan and Bacita need urgent redevelopment and rehabilitation to be able to increase satisfactory cane and sugar production.

The climate in both regions of Numan and Bacita is well suited for growing cane under irrigation (see Annex C). There are ample water resources for the sugar estates and for further developments in the future. Two basic soil types under sugar cane cultivation are heavy vertisols and light clay loam. These soils are fertile but require proper irrigation and drainage management.

The present cane varieties need urgent replacement with foreign high yielding and non-flowering varieties if high cane and sugar production yields are to be expected. The major varieties in the estates are B 47419, moderately flowering, and Co 957 which is a heavy flowering variety. The first-mentioned variety occupies 82 per cent of the area in the Savannah Sugar Estate and the latter 44 per cent and NISUCO, respectively. Most varieties introduced in the area are heavy flowering and this characteristic has an adverse effect on the purity and tonnage of the cane plant.

The pest and disease situation in the estates is not serious. Smut is reported to occur mostly in the ratoon crops and rogued out immediately from the affected cane field.

Fertilisation for both plant and ratoon cane crops needs to be reviewed by conducting fertiliser tests in conjunction with new varieties imported and introduced in the area. Soil analysis can also indicate the level of NPK requirements but at present the Soils Laboratory is not functioning properly due to lack of the necessary apparatus.

Harvesting cane is usually done at 11-12 months of age and 80 per cent is cut manually. The constant break down of the old mechanical harvesters, due to lack of spare parts and repairs/maintenance, made the estate management decide to adopt manual harvesting, lack of labour at the time of commissioning particularly of Savannah at Numan was seen as a major constraint, but this has not proved so.

The existing central workshops in both estates are totally inadequate and ill-equipped. Both estates should have a new covered central workshop constructed and provided with proper offices for the staff, maintenance tools for repairs, spare parts, stores and technical support services. Practically all of the agricultural machinery and equipment are parked in the open and are exposed to the elements. The fleet of agricultural machinery for land preparation, fertilisation, planting, cane haulage and transport need to be rehabilitated to ensure timely operations in the fields.

The Agronomy Section of the estate management must be well organised to be able to function in synchronising field and processing activities of the out-growers who are at present being encouraged to join the scheme to grow sugar cane outside the estate boundary.

Conclusion

Scope exists for a significant increase in yields through improved varieties, fertilisers and field supervision. This could result in a doubling of yields over the next 3-4 seasons. In the short term a number of measures have been taken with regard to the rehabilitation work at Bacita and Savannah, however the medium and long term requirements in this filed are of the utmost importance and will be of considerable importance for the Sugar Council particularly with regard to training and development of Nigerian staff; in fact, realisation of this problem was instrumental in the launching of the plan to set up the Sugar Cane Research and Development Centre. Sugar cane out-growers should be encouraged right from the onset of any new estates. Government to provide irrigation infrastructure and water, while the Sugar Council should develop the land where it was not provided.

3.1.3 Factory Production

Current Position

Both the major factories at Savannah and Bacita are operating way below installed capacity for a variety of reasons; a mini factory installed at Lafiagi is currently coming on stream.

The African Development Bank is providing substantial funding to assist in the rehabilitation of the two complexes for infrastructure, field and the factories - the intention being to get the two factories back to at least their original installed capacities; provision has also been made for considerable T/A input.

Savannah was commissioned in 1980 and the maximum annual output achieved has been 21,117 tons. Bacita was commissioned in 1964 and achieved reasonable outputs in the early years after commissioning but since then output has declined substantially.

When the factories were originally erected allowance was made for the factory production to be uprated to 100,000 tonnes in respect of Savannah (installed capacity 65,000 tonnes) and 50,000 tonnes in respect of Bacita (installed capacity 40,000 tonnes).

This should undoubtedly be the first goal in any rehabilitation plan, and as adequate potential cane growing land is available in close proximity to the two factories, as the next stage in the development their capacities should be very substantially increased to enable them to process all cane grown in their proximity.

This could as a first stage lift the production level of these two factories to well in excess of 100,000 tonnes and there is no reason why these two complexes need not become very major industrial complexes among the largest factories on the continent. Provided cane of adequate quality is delivered to the factory it then becomes a technical production matter and economics of scale will come into action with the proposed considerable production increase.

Conclusion

Consideration should be given to the question of mini-mills; the mission was fortunate enough to see the first one in Nigeria in the process of being commissioned at Lafiagi. It must be stated at the outset that these are not in the mission's opinion the answer to the Nigerian's mega-production needs. The cost of the mini-mill factory is in the region of \$1 million with a grinding capacity of 12 tonnes of cane per hour - say 100 tonnes per shift; on a two shift basis and taking 10 tonnes of cane per ton sugar this will only give a production on a crop period of 150 days of 3,000 tonnes maximum - and this does not allow for stoppages and other delays. To make any real impact on Nigeria's requirements one is therefore talking of in the region of 200 mini-mills when one could have two or three major complexes producing the same amount.

However, carefully chosen sites for a few mini-mills will do no harm particularly in regions and areas where a major sugar complex might be developed in the future, as apart from anything else it will act as a catalyst and training ground for future large production units.

It is suggested that a mini-mill be installed at the proposed cane, research and training centre which will be able to cope with the on-site cane production and participate in the station's trials.

3.1.4 Hydrology, Land and Water Resources Planning

Most present and potential sugar cane projects are located in Savanna ecosystems with a negative moisture balance for most of the year. Although some rain-fed production is possible, most sites require at least some supplementary irrigation. The basins of the Benue and Niger rivers, in which most (potential) sites are located, have ample water resources but because of the rather flat nature of the terrain, diverting water for irrigation purposes tends to lead to profound changes in the regional hydrology making either irrigation or drainage difficult. For example, the construction of the Jebba and Kainji dams near the Bacita project have recently lowered the dry season flow of the river Niger making the existing pumping installations obsolete. On the other hand, the construction of the Kiri dam upstream from the Savannah Sugar Project has improved the water intake for irrigation purposes. However irrigation in Savannah has raised water tables, both on the estate and downstream, making drainage difficult.

Conclusion

It is highly recommended that the design of future irrigation and drainage projects is fully integrated into an overall regional development plan for the area (river basin; catchment area; district) in which the project is located rather than to design the project in isolation from its surroundings which has hitherto been the case.

However, in most cases a regional development master plan is not yet available. Detailed design of new sugar cane projects should thus often be postponed until such master plans are made. Ideally, such plans should include the final location and design of dams and barrages, dikes, sluices and drainage canals since detailed design of a cane farm can only be done after it is known what the future river flows and regional water levels are going to be. In addition to the hydrological information mentioned, regional land-use plans and detailed plans for regional physical infrastructural development need to be developed since a sugar cane project has to fit into an overall regional development master plan. The establishment of the Ministry of Water Resources will determine how and where developments are sited and will provide a coordinating platform for all the agencies involved in the use of water for development projects which will fit into the original development plan.

3.1.5 Sustainability and Environmental Considerations

There are indications that unless remedial actions are taken, the sugar industry might not be sustainable. Since the beginning of the Savannah and Bacita schemes, per hectare cane yields have been decreasing (Annex D) which, if allowed to continue, will eventually lead to uneconomical production systems.

Measures that can lead to higher yields and sustainable production include improved crop management practices, particularly rational soil fertility management, scientific irrigation water management based on actual crop water requirements, and use of improved varieties. Easy access to fertilisers at economical prices and availability of suitable varieties are thus prerequisites for a healthy, sustainable sugar industry.

Any sugar project that includes clearing of virgin land and utilisation of hitherto untapped water resources has potential negative environmental impacts which might become so severe that they will eventually lead to unsustainability. In Savannah about 2,000 ha have already become unproductive because of drainage problems, most probably caused by over-irrigation and other erroneous water-management practices. These practices lead to changes in the regional hydrology which not only negatively affect cane yields, but also have negative environmental impact downstream such as siltation, waterlogging and accumulation of leached-out fertilisers and other agro-chemicals.

Conclusion

In the present and possible future sugar schemes all the problems mentioned can be reduced to acceptable levels through overall improved management practices. However, in Savannah, part of the irrigation infrastructure will have to be re-designed to enable environmentally-friendly agriculture. Lessons from past projects will be used in designing new projects to ensure both optimum sustained operation with minimal change to the environment.

3.1.6 Markets/Pricing and Tariffs

The major findings and conclusions under this heading are:

a) Nigerian Sugar Market

The Nigerian Sugar Market is dominated by imports. In general terms, Nigeria is importing +/- 1 million tonnes against local production from NISUCO and Savannah of +/- 50,000 tonnes - this despite the fact that Nigeria has an abundance of suitable land to produce huge amounts of sugar.

In terms of end-use, consumption is split evenly between household consumption and industrial consumption. The former is divided among numerous wholesalers who have little unified negotiating power. Of the latter +/- 80 per cent is used by the soft drinks market which is dominated by the two major bottlers (Coca Cola and 7Up/Pepsi). The remaining 20 per cent is divided between beer producers, confectionary producers and bakers (Source: American Embassy, Lagos). Thus the major bottlers have considerable influence in sugar policy.

Imports are dominated by two major importers (Dangote and Churchgate). Currently, importers have large stocks of imported sugar purchased prior to the latest round of Naira devaluations.

Finally, the source of imports by country is set out in Annex H. as stated in the annex +/- 75 per cent of all imports come from Brazil and UK.

The major observation which can be made and which differentiates the Nigerian market from other markets is the dominance by two differing parties in the distribution chain. It is normal for a channel of distribution to be dominated by one party (often the manufacturer at one end or the retailer at the other). However it is unusual to have a channel dominated by two parties - in this case the importers and the industrial end-user.

The effects of this dual domination can be illustrated by considering the duty of 40 per cent. In March 1992 *ad valorem* duty was reduced from 40 per cent to 5 per cent to alleviate some of the price increases resulting from the Naira devaluation. This was meant as a temporary measure until December 1992.

Rumours of reversion to 40 per cent were rife under pressure from importers who held large stocks (at 5 per cent). The tariff did revert to 40 per cent for two weeks but under pressure from the bottlers tariff was again reduced to 5 per cent which still pertains at this moment.

Conclusions

The sugar producers exist as small players in a market dominated by two importers and two end-users whose objectives are competing and often divergent. In considering future moves towards self-sufficiency in whatever degree, consideration should always be given to the nature of the market and the competitive response which could occur from either party. With deregulation of the economy there are likely to be further changes in marketing practises and these should be monitored by the Council.

b) Pricing

The sugar importers operate on a mark-up on cost in excess of 100 per cent (see Annex G). This is after allowing for the duty, surcharge and 10 per cent levy to NSDC. They are therefore making substantial returns on their investment even after allowing for inventory holding costs.

The local sugar market sets its selling price according to the export price, thereby also making substantial profits. A cost per bag comparison between importers and producers reveals that the importers have much greater leeway and leverage in pricing policy than the producers. This is due to the greater flexibility the importers have versus the producers who have a huge sunk cost which they must service. Also because of their vastly greater volumes the importers are more able to affect the market than the producers.

Conclusion

In moving toward increased production and self-sufficiency, the effects of price in the local market need to be evaluated. A drop in price in the market due to increased supply could have a rapid adverse effect on the profitability of existing sugar factories and on the planning of new facilities.

c) Tariff Protection

As stated above the present situation favours importers and end-users. Effectively, duty has been reduced from 40 per cent to 5 per cent with the additional imposition of the 10 per cent sugar levy to NSDC. Normally, tariffs are imposed to protect local producers against foreign imports and also dumping.

In this case however, the local producers are able to produce only a small fraction of the local requirements but also actually benefit from following the pricing policy of the importers.

As new facilities come on stream there will be a genuine need for protection for the industry in its gestation period, but at this stage the issue of tariff protection seems redundant, other than as a means of fiscal collection.

Conclusion

A clear strategy for the Sugar Industry as regards Tariff protection needs to be formulated and introduced over time. This needs to be related to the planned increase in local production -both from the rehabilitation of the existing facilities and the planned new facilities elsewhere. The sugar Council is to advise on this aspect of the industry with periodic reviews.

3.2 POSSIBLE NEW SITES

After the existing schemes (Savannah and Bacita) are rehabilitated and production is brought back to at least their designed capacity, two to three new plantations could be developed. The council should however, focus their attention, in the first instance, on the two existing companies NISUCO and SSCL, where it will supplement both on the ADB expansion programme. There will be two stages to their plan of action:

- i) Assistance to both companies in the development of the estates to enable them to reach their full rated capacities and in the case of NISUCO development of further land to allow for the proposed expansion of the mill to 70,000 tonnes.
- ii) Assistance to the companies in a scheme to expand factories to 100,000 ton capacity and to expand basically the Shonga area at Bacita and the Levee at SSCL to enable production of sufficient cane to cover the expansion. Although several studies have already been done of potential sites, the data in some cases available is, as yet, insufficient to enable a priority rating and full appraisal of their feasibility.

However, Lafiagi and Sunti have both had full feasibility studies carried out - Sunti only this year and Lafiagi some 15 years ago.

As mentioned earlier the HVA report of 1974-75-76 covered some 30 sites and it is now a matter of using agreed criteria to assess which might be developed or considered for a full feasibility study.

The mission was specifically asked to look at potential sites at Lau (and if time Cassol - the time available this did not prove possible, but enough data was obtained in discussion to form an opinion), Sunti, Shonga, Lafiagi, Hadeija and a site at Abaji in FCT; all were visited and discussed with appropriate monitor and management teams; additionally potential cane growing areas close to Savannah and Bacita were visited, which could well provide further cane for these two factories (the Shonga area would fall into the latter category in the case of Bacita).

The contents of the HVA 74/76 report are in the main as true today as when the report was produced. The Abaji site was not, however, covered in the HVA 74/76 report and even today the site has not been clearly defined or investigated in any depth. The main influence on this report could be the changes since that date in the rivers' hydrological regimes and this is dealt with elsewhere in the report.

As a first priority for expansion of cane production, feasibility studies, should be carried out for the lands around Savannah and Bacita to include Shonga in the latter; this area (or part of it) is already being farmed on an out-grower basis and this should be expanded.

It would seem sensible to proceed next with a full feasibility of the Lau site. The criteria "pro's" and "con's" should be assessed, but it would seem the "pro's" outweigh the "con's". Since the HVA report Savannah has been commissioned and a modicum of skilled labour will be available in reasonable close proximity - and in turn this could lead on to a detailed look at Gassol. One of the main criteria now satisfied is guaranteed adequate water supply, although consideration and thought must be given to any developments carried out on the Benue in neighbouring Cameroon; the Kiri dam on the Gongola river should ensure adequate flow in the Benue throughout the year to take care of Lau and Gassol future requirements.

Sunti has been the subject of a recent feasibility study and if funds can be found and potential finances attracted this might be considered (apparently the proposed funding fell apart at the last moment). It must be pointed out that the proposed cane growing area will certainly need extremely careful development as regards irrigation and drainage control with the large areas of water by way of ponds, small lakes and rivers already within the planned site.

The distance to the main road is considerable and it then joins a particularly dangerous section of the main south/north trunk road: the water regime for the Niger river should also be resolved and this is dealt with elsewhere in the report. Sunti currently transports at considerable cost, any cane it over grows to Bacita for grinding. This site has been studied and considered over many years, on numerous occasions, by Cubans, Brazilians, Tate and Lyle and others and there is the most recent feasibility study: for various reasons no proposal has got off the ground or been pursued.

Lafiazi (and Shonga to supply out-grower cane to Bacita) should go ahead. An in-depth feasibility study was carried out by the Indian Mehta Group in 1976, and only a certain amount of political uncertainty at the time, we understand, stopped the development going ahead. It is felt that the possibility of developing Lafiazi into a major sugar complex be pursued. Multi-national finance in the present climate as discussed elsewhere may prove difficult - as will probably be the case with private financing. Another avenue to be pursued should be bilateral financing and NSDC might initiate and approach along these lines - in this case to the Indian Government.

Hadeia Development Project was visited, and the phase currently under construction and being developed was certainly impressive.

However, all connected with the River Basin Authority including farmers and those residents in the scheme area are keen to develop a sugar complex and NSDC should now vigorously pursue with the River Basin Authority, the building-in and design (field layout, drainage and irrigation, canals, factory sites etc.) for a major sugar complex in the next phase. Assurance must be obtained regarding the maintenance for the next three or four decades of adequate water as this development will be taking place in a predominantly arid zone.

Finally the Yaba (Abeija) proposed site was visited; three separate areas of land were shown to the mission, but virtually no basic information was available and before consideration is given to any further investigation of this site a rudimentary pre-feasibility investigation should be carried out at least along the lines of what HVA produced in 1974/76 for some 30 sites. The mission only managed to have a cursory look at the area - with the main proposed area being on the banks of a perennial river (subject in the rainy season to major flooding) which flows into the Niger near Lokoja many kilometres down stream. Firstly it will have to be decided which would be the "optimum" site on this river for the sugar complex.

For sites of sugar complexes, the criteria list produced by the Technical Committee and backed by all previous studies should be adhered to.

Cane farming and out-grower production should be encouraged from the beginning of any development rather than letting the estate be developed and then split up into out-grower and cane farming areas.

3.3 SITE DEVELOPMENT PRIORITIES

1. Bacita and Savannah

These two estate cane growing areas should be expanded as soon as possible and feasibility studies should be undertaken for this to tie in with a feasibility study to expand factory production, to tie in with the increased cane availability. Shonga, due to its proximity to Bacita should solely be a cane producing area (rather than having a factory of its own) and should have its cane ground by Bacita.

2. Lau

A full feasibility study is recommended here.

3. Sunti

The proposed financiers should be approached again to see if agreement can be reached - possibly by use of bilateral country agreement.

4. Lafiagi

The producers of the original feasibility study should be approached again - and the possibility of some bilateral financing arrangement should be pursued.

5. Hadejia

Ascertain T & L's full intentions and commence discussions with the RBA at this early planning stage for incorporation of a sugar complex into phase II.

6. Yaba

Necessary to look at whole length of river.

7. The HVA programme (74/76) could be updated in light of developments over the last twenty years; again we would stress that the two extant estates at Savannah and Bacita be developed into very major sugar producing complexes - and we are thinking in the region of 150,000 tonnes production each.

4. RECOMMENDATIONS AND ACTION PLAN

The recommendations and resulting action plan are detailed under short, medium and long term and incorporate all the findings and conclusions set out in section 3.1.1.

4.1 SHORT TERM

Short-term recommendations include those which can be actioned, at least in part, almost immediately - although resolution of the problem areas may stretch into the medium term. These include:

- a) Development of an explicit and consistent National Sugar Policy for Nigeria. This will include the following:
- appropriate fiscal guarantees for potential investors in addition to the existing industrial incentives (e.g. pioneer status, tax relief, etc.);
 - assured foreign exchange availability for spares and fertilisers for investors in the sugar industry;
 - assured foreign exchange guarantees (both availability and rate) for the foreign investor for capital redemption and interest costs;
 - grace period for taxation payments appropriate to the gestating period of a sugar facility;
 - guarantees, as to land tenure;
 - guarantees related to infrastructure provision and financing;
 - an appropriate tariff protection policy related to existing market situation of dominant importers and end-users.

In effect, the Sugar Industry in Nigeria must be accorded strategic status (as in other countries) and thereby be afforded governmental guarantees far outweighing all other industries with the exception of the oil industry. This effectively recognises the increased risk, longer lead times to profitability and huge capital investment of the investor and attempts to adequately compensate for this risk. As in other countries, the investor in a strategic industry will be given preference over all other industries in provision of foreign exchange, taxation levels, investment write-offs (both initial and annual), infrastructure costs, etc.

- b) Review the 10 per cent levy in light of the above. The levy could be increased providing additional revenue for NSDC, since with the lower tariff, importers are paying less.

- c) Apply for an export quota with EC, USA and Commonwealth. Although producers are only satisfying 5 per cent of local consumption there is still an argument for exporting a small amount (perhaps 10,000 tonnes) based on two factors:
- creation of a reserve of foreign exchange for spares, fertilisers, capital redemption etc.
 - generally higher price (subsidised) for exports than local price.
- This is consistent with other countries who regularly import and export product, e.g. Zimbabwe sells most of its premium Burley tobacco for export and imports lower grades for local consumption. Tanzania both exports and imports sugar.
- d) Pursue vigorously the rehabilitation of Savannah and Bacita. Given the long lead time of any new factory (+/- 4 years), it is far more practical to rehabilitate the existing facilities. This would involve removing as a priority any impediments to the granting of the Savannah loans with ADB and pursuing the on-going rehabilitation of Bacita.
- e) Institute a Research/Development and Training facility using present NSDC finances from the 10 per cent levy. In particular, this would involve:
- Research unit to immediately investigate new varieties (non-flowering) and test improved cultural practices;
 - Training School to teach in all levels of supervisory skills (both field and factory) and technical skills in cooperation with the Research Unit;
 - Installation of a mini-mill at the Training School for teaching purposes.
- f) Develop linkages with other facilities elsewhere in Africa. In particular, this should include the operation at Mumias in Kenya, the largest out-grower operation in the world, and various cane breeding institutes.
- g) Development of a full strategic operating plan incorporating these action plans. This will not only give increased focus to the NSDC but will assist it in justifying funds requests from Treasury. The collection of the levy should also be investigated with Accountant General to secure funds directly from port authorities.

The staffing levels of the NSDC should also be clarified together with costs, bearing in mind the need for supervision over levy collection at port and also the possibility of internal secondment rather than new recruitment.

- h) Obtaining all information on existing development plans from River Basin Authorities, Regional Development Authorities, line Ministries, etc., and evaluate whether sugar cane schemes can be accommodated in those plans. In case no detailed plans are as yet available, they should be initiated since no fully-fledged feasibility studies can be commissioned unless detailed development plans giving the siting for new dams, major bridges and roads are available.

4.2 MEDIUM TERM

In the medium term the following strategies should be pursued:

- a) Commission two fully-fledged feasibility studies on new sites and provision of funding to carry out these studies. As it is envisaged that each study will take up to one year to complete, appropriate steps need to be taken now to secure funding. It is believed that funds will be more readily available for these studies with UNIDO backing.

The previous studies although in some cases up to 20 years old, still have validity and could be used as a basis for the proposed full feasibility studies.

Based upon the analysis of the new sites, it is proposed that studies to be commissioned include for Lau and Lafiaji as being the best sites of those visited.

- b) Commence discussions with Hadeija re Phase II Development to ensure that the NSDC is involved in the initial planning phase. This will avoid the present *fait accompli* situation re Phase I where constraints exist to sugar production (see 4.1.h).
- c) Revise Suntı proposal and re-approach sponsors. Provided the short-term steps have been taken as above it may be that a rapid resuscitation of the project can be undertaken.

4.3 LONG TERM

The long term measures essentially represent goals or targets which should be borne in mind at all times. The major long-term goals would be to:

- a) Continue to pursue the strategy of some major degree of self-sufficiency in say the next 10-15 years. Due to the long lead time of a new factory (+/- 4 years) it is impractical to imagine self-sufficiency of 70 per cent by 2000. This target should therefore perhaps be modified to a more general/less quantitative level as a long term goal.

b) Pursue Hadeija Phase II development.

4.4 IMPLEMENTATION SCHEDULE

Taking into consideration lead and preparation times, the following implementation schedule would apply for the measures and action proposed in the previous section ; however priorities can be adjusted depending in which areas potential investors show particular interest.

ANNEX A

ITINERARY

Mon 29/11/93	Mission assembles in Vienna for briefing.
Tues 30/11/93	Flies to Kano, Nigeria via Amsterdam.
Wed 1/12/93	By car to Abuja Federal Capital; meet with Executive Secretary and officials of NNSDC.
Thur 2/12/93	Meeting with Director-General, Ministry of Industries; proceed by car to Savannah Sugar Co Ltd. Numan, Adamawa State.
Fri 3/12/93	Full day with officials of Savannah Sugar Company.
Sat 4/12/93	Visit to Lau and Jalingo, Taraba State; viewed possible site and held discussions with Acting State Administrator and officials.
Sun 5/12/93	Return to Abuja.
Mon 6/12/93	Team split; financial analyst/economist stays Abuja for discussions with authorities. Remainder of team proceeds to Bacita estate (NISUCO), Kwara State via Sunti Sugar Co, Niger State.
Tues 7/12/93	Full day with officials of Bacita estate.
Wed 8/12/93	Visist Shonga and Lafiagi, Kwara State and held discussions with project and distric officials.
Thur 9/12/93	Proceeded to Abuja visiting Yaba (Abaji) site en route.
Fri 10/12/93	Proceeded Kano via Kaduna; held discussions with NNDC Kaduna and Deputy UK High Commissioner, met senior officials of Hadejia Jama'are River Basin Development Authority in Kano.

- Sat 11/12/93 Visited Hadejia and met officials of project and consulting engineers Enplan, who are effecting Phase I Stage I of development; returned to Kano.
- Sun 12/12/93 Wrap up meeting with Exec Secretary NNSDC, Ministry of Industry officials and representatives of the sugar industry.
- Mon 13/12/93 Departed Kano (0010 hrs) for Vienna (via Amsterdam) for debriefing; mission members returned to UK for report completion.

During the 12 day period in Nigeria the mission covered some 4,600 kilometres (2,860 miles).

ANNEX B

LIST OF PERSONS MET

The mission would like to thank everyone whom they met for their unfailing courtesy and assistance, and also for the open and forthright manner in which they discussed the industry and its many facets.

Special thanks are due to the Executive Secretary NNSDC and officers in the Ministry of Industry who accompanied the mission. This enabled them to meet a large number of people and to cover so much ground in such a brief in-country mission, in such a large country as Nigeria.

If anyone has been omitted from the list hereunder, the mission offers its apologies, but during the visit many people were met who were involved in one way or another with the industry.

Federal Ministry of Industry

Alhaji Abdullahi Ma'aji, mni	Director-General
Alhaji Isa Yusuf Tata	Executive Secretary, National Sugar Development Council
Mr. F. J. Osemekeh	Deputy Director - Agro Division
Mr. J.M. Juma	Principle Industrial Officer - Agro Division
Mr. N.N. Onyema	Principle Industrial Officer - Agro Division
Mr. Dasin	Industrial Officer II, Agro Division

Savannah Sugar Company Ltd

Alhaji Suleiman Abdullahi	Managing Director
Mr. T.A. Todi	General Manager (Operations)
Mr. John D. Maiwuyaa	Financial Controller
Mr. Godfrey M. Amoruwa	Agric. Manager
Mr. N.A. Atiku	Factory Manager
Mr. J.A. Wathlarda	Estate Manager
Mr. P.C. Nonyelu	Training Manager
Mr. M.B. Gadzama	Extension Services Manager
Mr. Bakari Buba	Construction Manager, Irrigation & Drainage Division
Mr. Aliyu Kilba	Personnel Department

Taraba State and Lau District Officials

Mr. Y.Y. Tarfa (Police Commissioner) Dr. Y. Magaji	Acting Administrator, Taraba State Chairman, Taraba State Civil Service Commission
Mr. J.R. Musa	Acting Director-General, Ministry of Finance, Commerce and Industry
Mr. Babale Maikidi	Acting Director-General, Ministry of Agriculture
Mr. Sam A. Saidu	Acting Director-General, Lands and Survey Department
Alhaji Tanimu A. Zaka	Acting Sole Administrator, Lau Local Government Area

Sunti Sugar Company Ltd.

Alhaji M.G. Alhassan	Project Manager
Alhaji S.A. Liman	Chief Accountant
Mal. Ahmed A.M. Lwa'afu	Admin. Officer/Sec
Mal. Moh'd Mamman Kpakiko	Senior Field Supt.
Mal. Moh'd Tswanlle	Area Field Supt.
Mal. I.M. Sunti	Area Field Supt.
Alhaji Ibrahim Towobola	Stores Officer
Mr. B. Makinde	Snr. Accounts Officer
Mal. Abdullahai Isa	Transport Officer
Mr. N.I. Oscar	Agronomist

Bacita Estate, NISUCO

Engr. Suleiman Abdullahi	Managing Director
A.M. Abdullahi	A.G.M. (P. & A.)
Mamman Ndatsu	Coy. Secretary/Legal Adviser
Mr. Chidi Eze	Financial Controller
Mr. F.J. Makanjuola	A.G.M. (Agric. Operations)
Mr. R.O. Olayemi	A.G.M. (Factory Operations)
Dr. S.B. Agbana	A.G.M. (Outgrowers)
Alh. M.B. Bello	A.G.M. (Marketing)
M.A. Adamu	Personnel Manager
Musa M. Makwando	Admin. Manager
Mr. John Kamalu	Admin. Officer (Minutes Recorder)
Alhaji Adisa A. Suleiman	Quality Control Chemist

Lafiagi Sugar Company

Mr. Yisaku Sanuel	Project Manager
Mal. Aliyu Kpatako	Project Accountant
Aihabi Umaru Umaru	Personnel Officer
Mal. Abdulsalami Ndagi	Plant Maintenance Manager
Alhaji Issa Gboro	Sectional Manager (Field)
Mal. Shehy Ottan	Workshop Manager
Mr. I.J.I. Mosugu	Factory Manager

Engineers from Bacita temporarily assisting at Lafiagi

Mall. Y. Abubakar
 Mall. Issa Jibril
 Mall. Umaru Abdullahi
 Mr. F. Omotosho
 Mail. Issa Fanagun

Abaji Area Council (YABA)

Y.T. Maman	Ag Deputy Mayor
Musa O. Ozaki	Principal Forestry Superintendent
Salihu A. Muhammed	Head of Department (Agriculture)
Alhaji Aliyu B. Adamu	Principal Personnel Assistant II
Mai-Anguan Gade Biyu	Member

Hadejia Jama'are River Basin Development Authority

J.O.A. Abifarin	A.G.M. (Services)
Mr. Ibrahim Usman Hadejia	Chief Agric. Officer
Faruku Bashir	Prin. Agric. Supt. I.
Zakar Jubairu Abubakar Hadejia	Prin. Tech. Officer I.

Enplan Group - Consulting Engineers

Kennedy K. Chikwendu	Resident Site Engineer Hadejia
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HVA International bv

Emile van de Spek	Agricultural Advisor - Director HVA
W. Leo Suk	Project co-ordinator - SSC
Mr. Tonnie Hasselt	Irrigation and Drainage Engineer

F.C. Schaffer and Associates Inc.

Stephen C. Price
Michael Kilbride

Director - Training Services
Director - Marketing and
Management

Nigerian Industrial Development Bank Ltd.

S.K. Adeduyin

Controller/Area Administrator - ABUJA
office

Cameco Ltd. of Thibodaux, Louisiana, USA

Quicy Gaudet

Technical Representative at Bacita

New Nigerian Development Company Ltd.

Alh. Malam B.U. Girei

Executive Director

British Deputy High Commission, Kaduna

Geoffrey Fairhurst

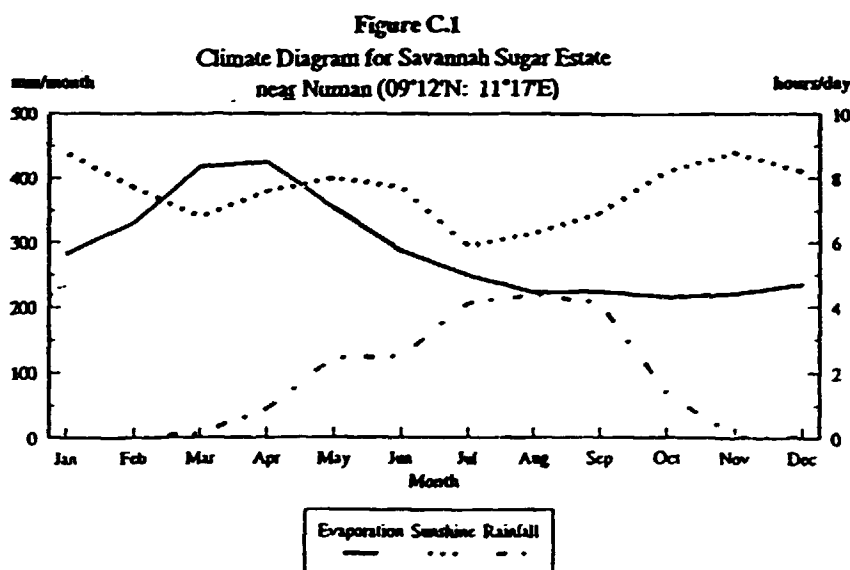
First Secretary

ANNEX C

AGRO-CLIMATE AND SUGAR CANE PRODUCTION POTENTIAL OF
DIFFERENT ZONES

The climate in the middle belt of Nigeria is considered good for sugar production while the southern part of the country tends to be too wet. There are two regions which have high potential: the central eastern part of Nigeria around the river Beduie near Numan and the central western zone near Mokwa. A third area northeast of Kano also has potential. The central eastern zone is located on the border of the Northern Guinea Savanna and Sudan Savanna ecological zones which have a mean annual rainfall of 700-1,100 mm and a wet season of 160-190 days per annum. The central western zone is located on the border of the southern Guinea Savanna and northern Guinea Savanna ecological zones which have a mean annual rainfall of around 1,000 mm and a wet season of around 200 days. The area northeast of Kano is located on the border of the Sudan and Sahel Savanna ecological zones with a rainfall of 500-700 mm per annum and a wet season of 110-120 days.

The climate diagram of Savannah Sugar Estate near Numan given as Figure C.1 is representative for the central eastern zone.

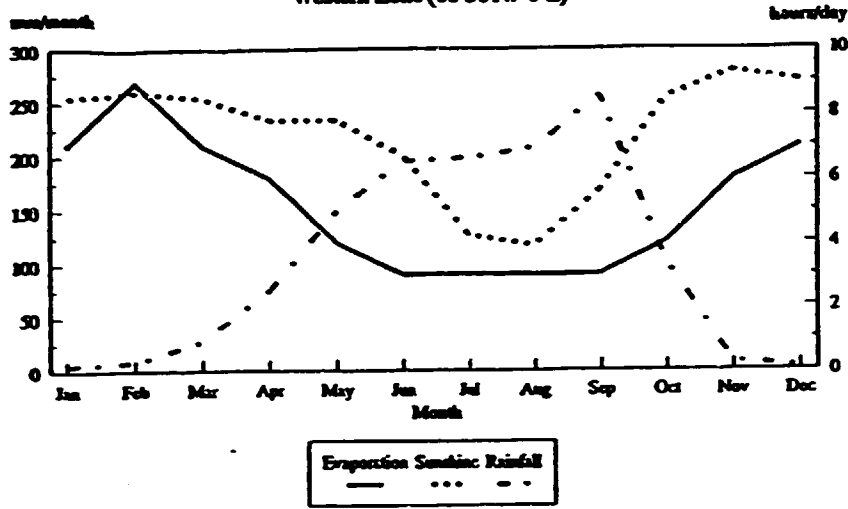


Although rainfed cane production is possible in this zone, high yields can only be obtained with supplementary irrigation. The diurnal temperature range and sunshine duration is generally sufficient for acceptable sucrose content. The length of the milling season is estimated at 195 days.

Rainfall in the Central Western Zone (Figure C.2) is higher with Rainfall exceeding Potential Evapotranspiration for at least five months.

C-1

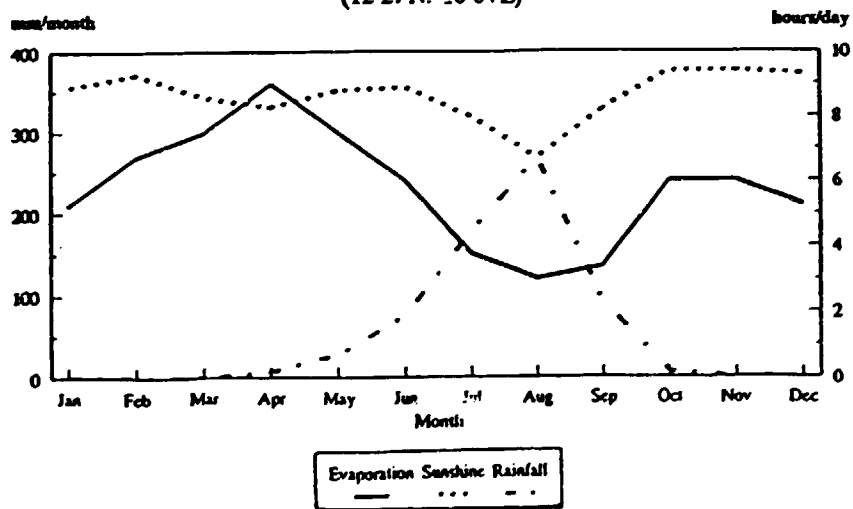
Figure C.2
Climate Diagram for Lafagi Site in the Central
Western Zone (08°50'N: 6°E)



Rainfed sugar cane is quite possible in this zone, particularly on the better soils, but as in the Eastern Zone, high yields can only be obtained under irrigated conditions. Temperature and sunshine duration are quite favourable. The length of the milling season is expected to be 180 days.

Conditions in the third zone, north of Kano, are more extreme (Figure C.3) since this area is located near the Sahel and Classified as semi-arid. Diurnal variation is larger than in the other zones and minimum temperatures are lower. Sucrose content is expected to be 11 per cent. The length of the milling season is expected to be around 255 days.

Figure C.3
Climate Diagram for Hadejia
(12°27'N: 10°04'E)



ANNEX D

SUGAR CANE YIELDS

High yields of sugar cane containing high levels of sucrose are necessary to make sugar projects in Nigeria feasible. As shown in Annex C, the agro-climate, soil and water resources are highly suitable for high yields in the middle belt of Nigeria. Trial planting of cane and the first years of sugar cane production in Bacita and Savannah have shown that reasonable high yields can be achieved under prevailing conditions (see figures D.1 and D.2). However, it has not been possible to sustain yield levels resulting in shortages of cane at the factories and overall uneconomical production.

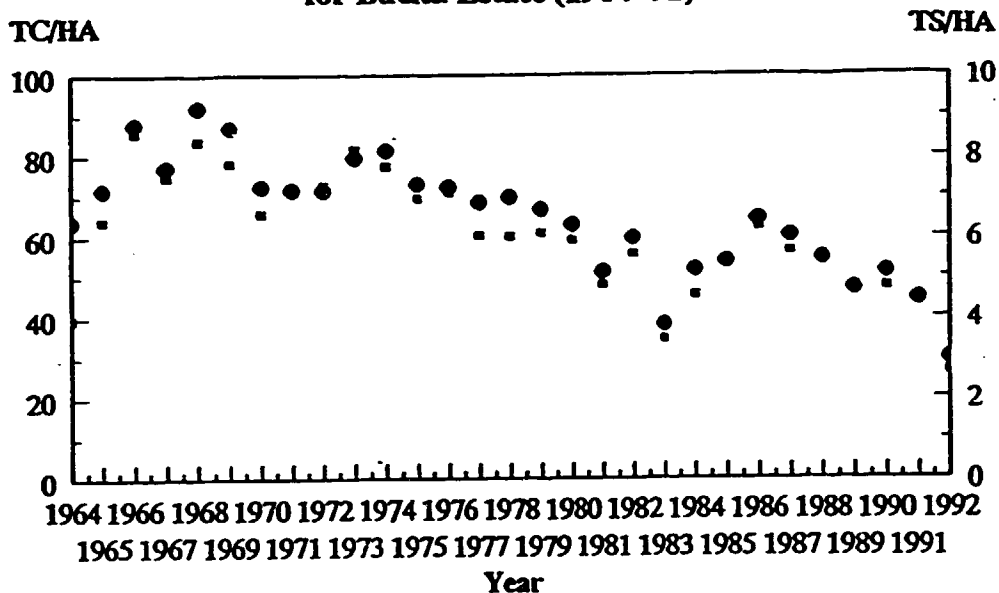
Agronomic research is necessary to determine the exact reasons for the consistent yield declines, but with available data it is possible to determine that the most likely causes include:

- i) Over-irrigation coupled with poor drainage resulting in stunted cane growth;
- ii) Unbalanced and erratic fertilisation resulting in steadily declining soil fertility and poor cane nutrition;
- iii) Widespread use of inappropriate (flowering) varieties;
- iv) Sub-optimal weed control; and
- v) Deficient land preparation and cultivation practices, particularly for ratoon crops.

All mentioned deficiencies can be rectified with overall improved management and husbandry practices. However, in many cases these can only be introduced after rehabilitation and modification of physical irrigation infrastructure and after necessary fertilisers have been made readily available at economical prices. Sometimes, more mechanisation equipment will also be a prerequisite.

Together with the TA-Consultants in Savannah, the mission estimates that overall yields in Savannah can be doubled (from about 40 t.c per ha to 80 t.c per ha)

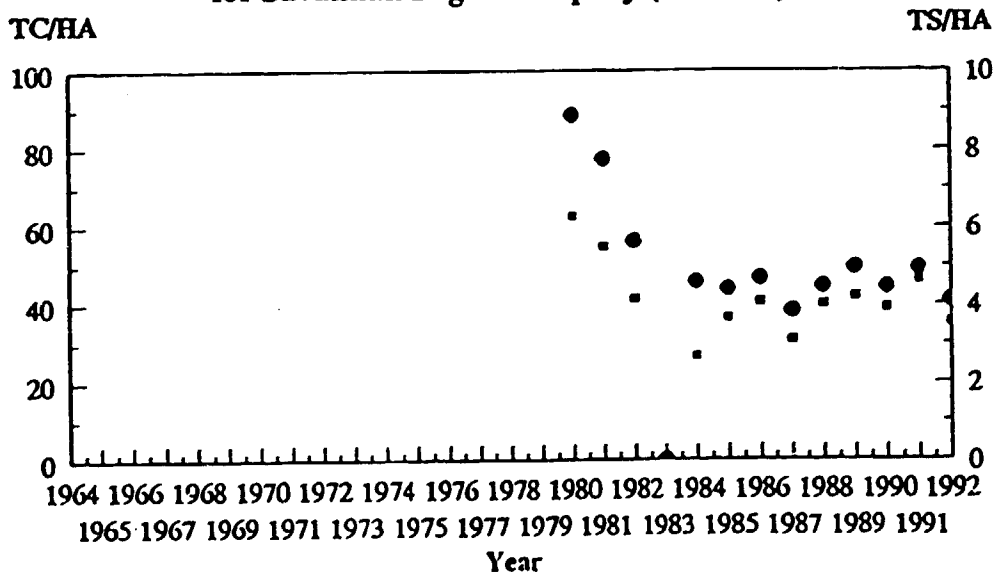
Average Sugar Cane and Sugar Yields for Bacita Estate (1964-92)



TC/HA TS/HA
● ■

Note: Average yields from 1,235 ha in 1964 to 5,261 ha in 1992

Average Sugar Cane and Sugar Yields for Savannah Sugar Company (1980-92)



TC/HA TS/HA
● ■

Note: Average yields from 1,596 ha in 1980 to 5,103 ha in 1992

ANNEX E

DIFFERENT SUGAR CANE PRODUCTION MODELS FOR NIGERIA

Depending on land availability, local cane production requirements and prevailing socio-economic conditions, different production models can be considered. All schemes should have a centrally managed nucleus estate surrounding the factory which supplies at least 30 per cent of the factory's cane requirements. Apart from supplying cane to the factory, the role of the nucleus estate includes production of high-quality seed cane for distribution to out-growers and provision of services such as mechanisation, transport and agricultural extension.

Surrounding the nucleus estate different types of out-growers can be considered. In irrigated areas, rational crop selection is particularly important since the irrigation infrastructure as well as road system has to be designed for a particular crop or a combination of different crops. Depending on soil suitability and water availability, certain areas could best be designed for monoculture cane production, while on others mixed enterprises would be more relevant. The nucleus estate would thus be surrounded by dedicated cane growers with farm sizes varying from 1-2 ha to perhaps 100 ha, out-growers that grow cane on part of their farm in rotation with other crops (e.g. cotton or soya beans) and farmers who do not grow cane, for example in areas where the natural conditions are more suitable to another crop, e.g. rice. Detailed, but at the same time, flexible planning would thus be needed before sugar cane factories are sited.

A model that could be considered at a later stage that is, after the cane industry is better established - is a model that utilises the by-products of the cane industry. For example, cattle fattening using chopped-up cane tops mixed with molasses and leucaena leaves. In this model specialised out-growers would purchase trash cattle from Felasi herders and fatten the animals using locally available products mentioned above. In this model multipurpose trees such as leucaena would be grown in rotation with sugar cane: the leguminous trees would improve soil fertility, would provide protein-rich fodder for cattle fattening as well as fuelwood.

In line with government policy the sugar industry, and particular out-growers, should as much as possible adopt a labour-intensive approach because of the socio-economic benefits of this approach and because of the shortage of forex for importation of sophisticated technology. Certain cane operations should, however, always be mechanised, notable land preparation and cane haulage (National Sugar Policy Study 1989).

ANNEX F

THE PROPOSED RESEARCH AND TRAINING CENTRES

A national sugar cane research centre is a pre-requisite for a healthy sugar industry. Although such a centre can borrow and adapt technologies from other countries, conditions in Nigeria are sufficiently site-specific to warrant a national, dedicated research centre that develops and tests technologies specifically adapted to local conditions.

The programme of such a centre should initially focus on selecting and breeding cane varieties suited to the different parts and conditions of the country. Improved crop husbandry and irrigation management should also be high on the research agenda. It is recommended that a small TA study is commissioned to work out detailed proposals for the centre under the guidance of the NSDC.

A sugar cane training institute also seems required, preferably linked to the research centre. Training is required in the areas of varietal breeding, sugar cane agronomy, agricultural engineering and factory management. For the latter it seems appropriate to build a mini-mill near the research and training facilities. This mill could also be used to crush the cane produced at the research centre.

The initial setting up of the research and training centres could be funded by the NSDC while the further development of the centres and operational costs could be funded by the sugar industry through a levy on production throughput.

ANNEX G

SOME FINANCIAL ASPECTS

Cost Per Bag Comparison		
Cost per tonne landed Lagos		\$350
10% levy	\$35	
5% Duty	\$17	
7% Surcharge	\$24	\$76
Landed Cost		\$426
Landed Cost per 50kg		\$21.3
@22		N469 per bag
S.P. (Savannah)		N500 per bag
Mark up on cost (Importation)		7%
Savannah Total Cost of Production 1992		131381000
Cost per tonne production (%21580)		6088
Cost per bag (%20)		N304
S.P. (Savannah)		N500 per bag
Mark-up on cost (Production)		64%

Calculation of NSDC Revenues	
CIF Lagos Price Sugar	\$350 per tonne
1 million tonnes	\$350 million
10% levy	\$35 million
@22	N770 million

ANNEX H

IMPORT STATISTICS

Summary of Imports	
Imports for 1991 from:	
US	39
Brazil	182,000
United Kingdom	124,069
Belgium	42,000
Germany	18,000
France	15,000
Netherlands	5,322
Other Europe	60,524
Singapore	1,900
China	890
Total of Others	449,744
Others not listed	36
Grand Total	449,780

Break-even Point Calculation (Savannah)

Fixed Costs = 48349
 Gross Margin % 44.5%

= N109 Million

ANNEX I

BREAKDOWN OF CAPITAL COSTS OF SUGAR FACTORY AND NUCLEUS ESTATE

Cost of developing a sugar production complex will obviously vary depending on site, location, topography and many other variables not least of course the factory capacity.

The most recent costing was carried out in December 1992 by Inter-American Transport Equipment Co. in association with Arkel International Inc, when putting together the Sunti Sugar Project Feasibility Study.

The estimated capital development cost of 6,250 ha of land with linear irrigation to produce 500,000 tons of cane, together with a raw sugar factory with a refining capability of 3,000 tons cane per day to produce 50,000 tons of sugar annually is as under:

	US Dollars	Naira
Factory and Refinery	81,866,000	214,246,000
Agriculture and Irrigation	39,867,000	407,122,000
Infrastructure	4,567,000	78,532,000
Total Product Cost		
In US Dollars	\$ 158,072,727	
In Naira (Conversion Rate)	N 3,477,600,000	

It would seem prudent to add a 10 per cent contingency to the above figures; additionally there will be considerable additional infrastructure costs, which should not form part of the project - this figure could certainly be as much as 15 per cent additional to the project cost. The actual costs will be dependent on siting, but will include approach road to site from present public road if off main highway, hospital, schools and other infrastructure costs not directly chargeable to the project.

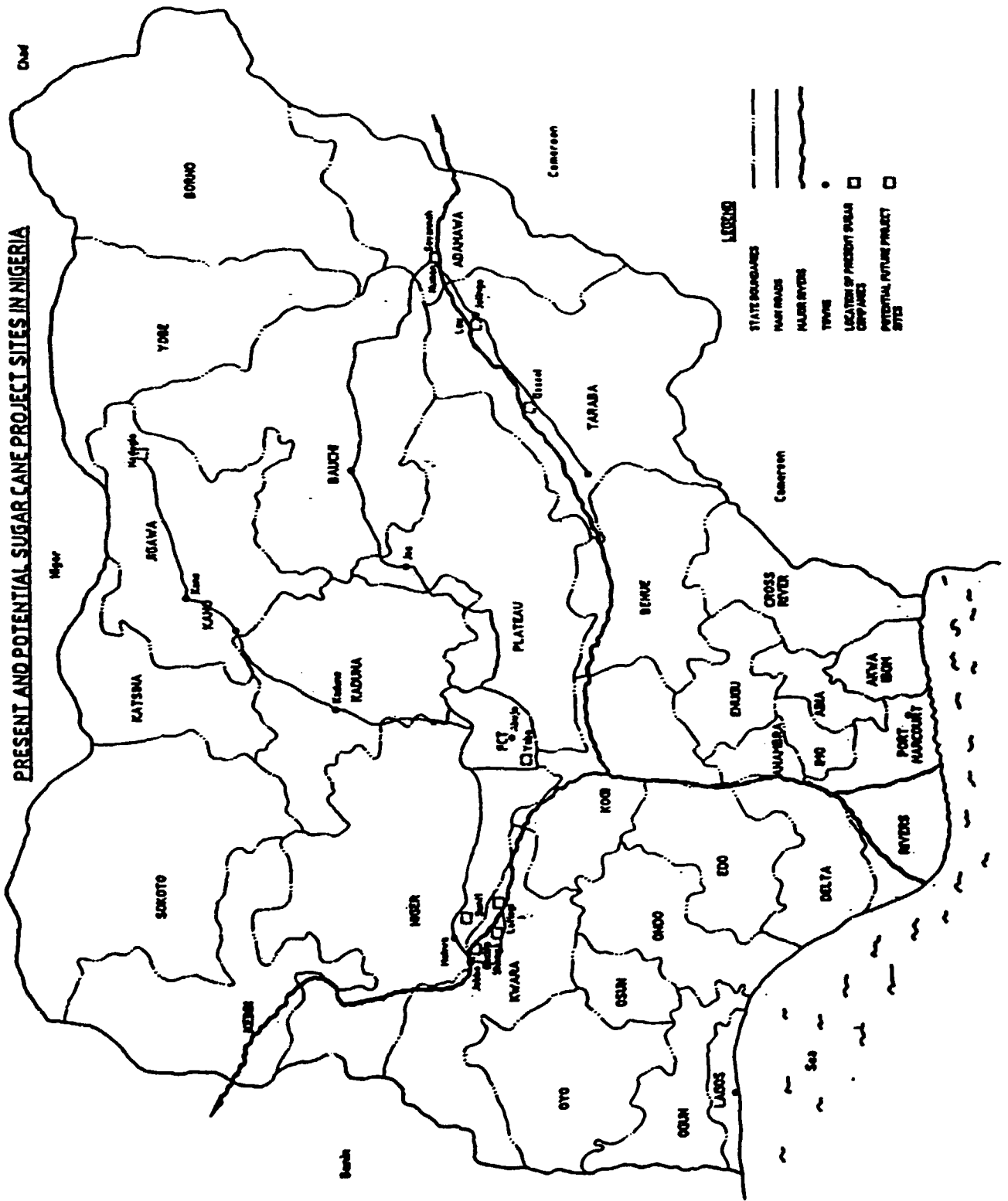
To summarise:

Total Cost	US \$ 158,072,727
Contingency 10 per cent	15,880,000
Total	173,880,000

To this should be added the non project-chargeable infrastructure costs bringing the total to in the region of \$200,000,000.00. This is for a complex of the capacity stated above, but for economy of scale and due to the fact that it seems more than adequate land is available a larger complex should probably be developed with a cost more in the region of US \$ 250,000,000.

ANNEX J

PRESENT AND POTENTIAL SUGAR CANE PROJECT SITES IN NIGERIA



The boundaries shown on maps do not imply official endorsement or acceptance by the United Nations Industrial Development Organization (UNIDO).