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Workshop on Measures to Improve the
Competitiveness of the Sugar-Cane Processing
Industry in Africa

Port Louis, Mauritius, 7-10 December 1993

REPORT*

* This document has not been edited.

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INTRODUCTION

1. The Workshop on Measures to Improve the Competitiveness of the Sugar-Cane Processing Industry in Africa was held at Port Louis, Mauritius, from 7 to 10 December 1993. It was attended by 18 participants from 9 countries (see annex).
2. The Workshop was jointly organized by the United Nations Industrial Organization (UNIDO) and the Mauritius Sugar Authority.
3. The meeting addressed the core issues related to the productivity, efficiency and competitiveness of the sugar-cane processing industry in Africa; it also examined the major gaps between domestic and international practices in terms of technology, organization, management and market intelligence. It aimed at developing a strategy for the long-term viability and profitability of the African sugar-cane processing industry.

CONCLUSIONS AND RECOMMENDATIONS

4. Over the past few years, both enterprises and governments have recognized the key role played by the sugar-cane industry in the socio-economic development of most African countries. As a result of persistent stagnation and slow and, in some cases, negative growth in African countries, governments are now searching new ways to mobilize resources in order to restructure the entire economy in pursuit of greater industrial efficiency and faster economic growth.
5. The participants at the Workshop recognized that problems facing the development of the African sugar cane-processing industry are similar. Factors which seem to have played a dominant role are lack of a policy framework, financing, advanced technology, managerial and organizational know-how etc.; erratic supply of raw material of good quality; insufficient market information and marketing skills; and inadequate training services, including human resources development in most African countries.
6. In view of the above, the participants agreed on some elements of an operational strategy for raising productivity and efficiency of the subsector. This strategy should focus on growth-oriented, competitive and dynamic enterprises and address vital issues related to low capacity utilization of most plants.
7. Appropriate varieties of sugar cane should be continuously introduced according to the conditions of each country and the type of final products to be produced. Close cooperation should be established between growers and breeders to select the most appropriate varieties. A system of exchange of information is to be established for the use of individual countries by developing their own strategies. More specifically, there is a need for establishing a cane-breeding and selection programme; import real seed-cane (as specific crosses) from an established cane-breeding station and implement

cane- breeding centres and test them in variety trials. The choice of the best option will depend on a number of factors such as the size of the industry; ability to finance research; technical expertise to run the programme; and variation in the environment.

8. To achieve the above objectives, a survey of the industry should be undertaken by a team of experts headed by a cane agronomist and comprise of a breeder, a pathologist, an irrigation agronomist, an economist and a technologist. At the end of this exercise, a report should be prepared containing problems, prospects and recommendations.

9. The system for buying cane should be based on the sucrose content. Apparatus for measuring the sucrose content are available, and their applications should be promoted.

10. Due to the lack of information on equipment and machinery, including farm machinery manufactured in developing countries, this machinery is imported from developed countries at high costs. To reduce these costs, a compilation of machinery and equipment produced in developing countries should be worked out containing the profiles of the products, their suppliers, sales conditions, spare parts supply systems, training and maintenance potentials. Information related to the supply of equipment should be available for each country through a systematically working network.

11. Governments and policy-makers in African countries are encouraged to prepare plans and strategies for the development of their sugar industries. These measures should assist sugar producers to design their own financial, economic and technical policies in order to avoid actions which are not in line with the overall performance of the economy.

12. To improve technological processes and to increase the productivity of the sugar industry, actions should be taken to:

(a) Establish or strengthen the control system following the technological process step by step to meet the international standard of performance;

(b) Develop an evaluating system of the processes to assist the management in taking proper measures to monitor the operational activities;

(c) Upgrade capabilities for technology acquisition through practical and intensive training at all levels from workshop to engineering and management;

(d) Prepare operational manuals related to each stage and operations of technologies describing the requirements for an infallible procedure;

(e) Apply more and more the results of research and/or adapting them to the factory's conditions.

13. An organized market information system should be established and made available to all African sugar producing countries to improve access to market

and its conditions. The speed of disseminating information is an essential factor; therefore, the necessary infrastructure is to be realized. This could be the primary task of the African Organization of Sugar Producing Countries to be established as recommended by the Expert Group Meeting for the African Region in Promoting Regional Cooperation for the Establishment of an Organizational Framework for Sugar-Cane Producers and Cooperation on Technology and Market (Vienna, Austria, June 1990).

14. Local and foreign direct investments, joint ventures and other arrangements should be explored in cooperation with UNIDO. The latter should also collect and disseminate information on facilities offered by regional and international financing institutions, private banks, donors and other financing organizations.

15. Upon request, UNIDO should assist African countries to acquire the technology which will contribute to increase the profitability and productivity of the sugar industries in Africa.

16. UNIDO should support the establishment of the African Organization of Sugar Producing Countries according to the earlier elaborated objectives and structures.

17. UNIDO should continue to support projects related to industrial rehabilitation and restructuring, with special focus on the sugar-processing industry in Africa, since this activity has an impact on the improvement of the economy of African economies as a whole.

18. The above recommendations have been put forward not only for the development of a successful sugar-cane industry in Africa but also for a better understanding of the functioning of the subsector. The restructuring of the sugar-cane industry should be complemented and supplemented by a host of other policy measures so that the subsector can carry out its responsibility of being one of the main vectors of genuine development.

I. ORGANIZATION OF THE WORKSHOP

Opening of the Workshop

Statement by the UNIDO Secretariat

19. A member of the Secretariat welcomed the participants on behalf of the Director-General of UNIDO, and thanked the Government of Mauritius for hosting the Workshop. He underlined, first and foremost, the need for a plan of action for the restructuring of the subsector matched with genuine commitment to that structural change on the part of the senior management and government authorities. The objective should be to improve the competitiveness of the sugar industry and, as a support mechanism, to endorse the establishment of the African Organization of Sugar Producing Countries agreed upon at the expert group meeting mentioned above. He stressed the need to focus deliberations, amongst others, on the identification of the key factors affecting the competitiveness of sugar-cane industries, and the major gaps

between domestic and international practices in the areas of technology, organization and management, and market intelligence. He also urged the participants to assess the need for incorporating institutional programmes that could help firms to build up skills in cane growing as well as cane milling. He concluded by saying that the aim of the meeting was to help enterprises improve their capacity utilization and enhance their productivity and efficiency, development and growth.

Statement by the Permanent Secretary of the Ministry of Agriculture and Natural Resources

20. On behalf of the Minister for Agriculture and Natural Resources, Attorney-General and Minister for Justice, the Permanent Secretary of the Ministry of Agriculture and Natural Resources expressed his gratitude to UNIDO for having chosen Mauritius to organize the Workshop with the sponsorship of the Government of his country. He stated that the convening of the Workshop was timely, for that year has been a very special one for Mauritian agriculture in general, and its sugar industry in particular. Indeed, Mauritius celebrated the 350th anniversary of the introduction of cane-sugar to Mauritius. He disclosed that the Mauritius Chamber of Agriculture regrouping all producers was now 140 years old, and that the Mauritius Sugar Industry Research Institute (MSIRI) was set up forty years ago. All these activities were implemented within the context of the 100th anniversary of organized research in Mauritius.

21. The Permanent Secretary recognized that to achieve objectives such as competitiveness, efficiency and productivity for African sugar industries represents a real challenge, taking into consideration the numerous changes which were taking place on the international scene. Several activities were undertaken by Mauritius to face these economic and structural changes. They included an ambitious project on rehabilitation and modernization of its sugar industry which began in 1983. In addition, in 1985, following a study carried out by local and international consultants, a five-year plan of action was elaborated and published and the Sugar Sector Package Deal Act was passed in Parliament. Similarly, in 1986/87, another paper on sugar industry efficiency was prepared. This study focused on six areas of investigation, namely:

- (a) Accounting systems and standardization;
- (b) Asset revaluation;
- (c) Policy options and pricing;
- (d) Factory plantation separation and mill ownership;
- (e) Manpower and labour productivity;
- (f) Fertilizer subsector study.

22. Based on this study, the Government endorsed the the Sugar Industry Efficiency Act in 1988. Its aim was to provide an efficient and viable sugar industry of preserved agricultural land; promote agricultural diversification

industry of preserved agricultural land; promote agricultural diversification and diversification within sugar; ensure fairness, equity and transparency within the sugar industry and that all commitments under the Sugar Protocol are met. The Act was further consolidated in 1993 to give additional incentives in order to increase the efficiency and viability of the sugar industry; enhance greater diversification within sugar and in agriculture; and ensure that all additional commitments of the country are honoured. He also mentioned that besides these studies other administrative steps were taken:

(a) In 1985, the Food and Agricultural Research Council was set up to, inter alia, coordinate research;

(b) The Government established the legal and institutional framework to ensure that the sugar industry is viable and competitive and able to diversify its activities.

23. Measures taken by Mauritius were geared to allow the country to realize the objectives set up by UNIDO which are essential for all African sugar industries as a follow-up to the recommendations of the First Interregional Consultation on the Food-Processing Industry with Emphasis on Sugar-Cane Processing held at Havana in 1988.

24. The Permanent Secretary concluded his opening statement by pointing out that the Government was devoting the required attention to the protection of electricity generation; investigation was ongoing to assess the level of pollutants and to devise cost-effective pollution abatement technologies. There has been full collaboration between the public and private sector in Mauritius.

Election of officers

25. The following officers were elected:

Chairperson:	Kassiap Deepchand, (Mauritius). Sugar Technologists, Mauritius Sugar Authority
Rapporteur:	Salih Gaafar Hussein (Sudan), Director-General, Public and Joint Venture Companies Secretariat, Ministry of Industry and Trade
Vice-Chairperson:	Abdeslam Addou (Morocco), Directeur général Sucrerie raffinerie de cannes du Gharb

Adoption of the agenda

26. The Workshop adopted the following agenda:

- (a) Opening of the Workshop
- (b) Election of Chairperson, Vice-Chairperson and Rapporteur
- (c) Adoption of the agenda and organization of work
- (d) Introduction and general discussion of the paper on measures to improve the competitiveness of the sugar-cane processing industry in Africa: Present status, problems and prospects
- (e) Assessment of the determinant factors influencing the competitiveness of the sugar-cane processing industry:
 - Cane growing and milling linkage (irrigation, transport etc.)
 - Improvement of production methods
 - Market prices
 - Diversification: Crop and sugar, market development
 - Technology improvement: Field and factory operations
 - Environmental aspects
- (f) Financing (cane growing, modernization of plants):
 - Cooperation (intra-African trade agreement, training and research)
 - Role of the government and of the private sector
 - Role of UNIDO
- (g) Technical Visits
 - Deep River Beau Champ (field)
 - FUEL SE (factory)
- (h) Contacts among participants for possible UNIDO joint venture arrangements
- (i) Adoption of conclusions and recommendations of the Workshop
- (j) Closure of the Workshop
- (k) Additional visits (facultative):
 - Mauritius Sugar Industry Research Institute (MSIRI)
 - Food and Agricultural Research Council

II. SUMMARY OF DISCUSSIONS

General debate

27. A member of the UNIDO Secretariat introduced the paper on measures to improve the competitiveness of the sugar-cane processing industry in Africa (IPCT.160(SPEC)). He gave a short outlook on the world situation of the sugar industry with special reference to Africa. He stated that production and consumption of sugar had shown an increase in the last three years, mainly in 1990-1992; however, the same could not be said in the case of Africa. Production and consumption practically stagnated in most of the African countries. Per capita consumption of sugar remained practically at the same level which meant that it had not improved, taking into account the population increase. He pointed out that uncertainty of the market situation all over the world revealed by the recent discussions at the General Agreement on Tariffs and Trade (GATT). Liberalization of agricultural trade and transformation of the former centrally-planned economies would have to be considered in any drive to develop medium- and long-term strategies in order to improve the performance of the subsector in most African countries. In this context, he mentioned that the primary objectives of the international sugar agreement were in line with the main target of the Workshop. He then described and analysed the various factors and their impact on the improvement of productivity in African sugar industries. These factors were:

- (a) Agriculture-industry linkage (growing and milling);
- (b) Technological improvement in cane growing and milling;
- (c) Necessity of rehabilitation and modernization of existing factories;
- (d) Diversification of production in the broad sense, namely diversification of agricultural production and utilization of by-products;
- (e) Management improvement and human resource development and need for adequate training and research programmes;
- (f) Financing of the sugar industry, involvement of local and international investors, development banks and other relevant institutions;
- (g) Market promotion prospects for African countries, organizational activities, exploration of new markets and more active participation of the African countries in the international market network.

28. This presentation had the advantage of stimulating discussions. Indeed, participants disclosed their country experiences and focused their presentations on specific issues such as technology, rehabilitation and modernization of enterprises, production and efficiency bottlenecks, training and research, diversification (utilization of sugar by-products), high cost structure, financing etc.

29. More specifically, participants explained that their industries were faced by one or several of the following constraints:

(a) Lack of irrigation; many plantations were rain-fed resulting in low cane yield;

(b) Low recovery rate at the mill due to poor maintenance and production practices;

(c) High cost of imported machinery and lack of spare parts for mill machinery and transport equipment;

(d) Low capacity utilization owing to shortage of raw materials supply;

(e) Lack of funds for research;

(f) Insufficient trained local staff;

(g) High cost of expatriate managers and skilled technicians;

(h) Absence of cane breeding facilities;

(i) Problem of weeds which in some cases reduced yield up to 30 per cent;

(j) Early flowering problems;

(k) Cheaper imports of sugar from neighbouring countries or from the world market.

30. With reference to cane cultivation, it was noted that one of the major problems was the production of raw materials and its quality. A strategic approach had to be adopted regarding the use of genetic engineering and other technical innovations in order to increase yield. Other issues to be considered were post-harvest handling, mechanization of cane and transportation. Some participants emphasized the need for establishing a compendium of farm equipment and potential sources of spare parts. The introduction of a network to share experience among African countries was also suggested.

Cane breeding

31. It was further noted that in most of the countries, imported varieties were cultivated. In one case, one variety had been in cultivation for more than 30 years, leading to low cane yield and saccharose content. Only Mauritius and South Africa have been greatly involved in cane-breeding programmes. Such programmes were very expensive to set up. It might cost up to US\$1 million to produce a sound variety. It was stressed that varieties could not be assessed on the basis of their saccharose content only. The yield of sugar per unit area and resistance to disease were important. In such a situation the best alternative for African countries was:

- (a) To plant varieties which had already been tested abroad;
- (b) To import cane-seeds and to set up their own selection system which was less costly than a cane-breeding programme.

32. However, it was recognized that the imported varieties should be adaptable to the climate and soil conditions of the importing country. In this connection, some degree of experimentation was required.

Field Mechanization

33. Due to labour scarcity and its high cost in some countries, some operations had to be mechanized. For example, in Mauritius, 35,000 small planters produced 40 per cent of sugar in some 210,000 plots of land. Due to the small size of such plots, planters had been grouped into Land Area Management Units for more cost-effective management of their plots. Within such units, cane and sugar yields were higher than for other growers.

34. One participant pointed out that field mechanization had been more successful in larger sugar estates. Cane-loaders and chopper harvesters had been introduced. However, some problems remained to be solved. These problems included:

- (a) Need for thorough derocking of the land prior to mechanization;
- (b) Volume of residues remaining in the field;
- (c) Sloppy land;
- (d) Reclining cane varieties;
- (e) Soil compaction;
- (f) Damage to cane tools; and
- (g) Operations on humid and muddy soils.

Milling

35. Another participant stated that 19 mills were in operation in Mauritius; crushing capacity ranged from 60 to 270 tons of cane per hour. The crushing season lasted for five months. Millers were entitled to receive a share of 24 per cent of sugar produced. The level of maintenance was very high. All factories had conventional mills, except one which was equipped with a Saturn diffuser. There had been many investments in cane preparation equipment which explained the high mill extraction rate. Losses were kept low and generally performance was comparable to countries such as Australia and South Africa. Mill control data were widely circulated so that partners of the industry could compare their performance.

36. Many participants expressed the view that African countries should exchange performance figures and technological information which might lead to improvements in milling in the African countries.

Marketing

37. Participants agreed upon the need to build up market intelligence. The potential for inter-African trade should also be considered. The use of modern telecommunication methods (fax, electronic mail etc.) to improve contact between partners and diffuse market information should not be neglected. Communication difficulties were recognized as a major problem for some African countries.

Financing

38. A member of the UNIDO Secretariat introduced and circulated an industrial investment project profile to be filled in by the participants to identify projects which could be considered for financing. Possibilities of cooperation with European countries were also mentioned, covering areas such as technology transfer, technical assistance, training, utilization of by-products etc.

39. Another member of the Secretariat informed the participants that, at present, funds could be made available by various banks and lending institutions, but viable projects were scarce, especially in a situation of over-production and uncertain markets and prices.

40. It was agreed that the governments' task was to support the development of the sugar industry at the very initial stage. African sugar industries would have to try to make greater use of the know-how of other sugar producing countries; upgrade their technological background; and ensure greater dissemination of information among themselves.

Training

41. Training centres in the field of sugar cane already existed in some countries, some of them set up by the industry itself, and some others by international organizations such as the Regional Sugar Cane Training Centre in Mauritius, established by the United Nations Development Programme (UNDP) in 1980, MSIRI being the executing agency. In this regard, it was necessary to promote cooperation between these training centres.

Research

42. It was underlined that funds for research were not readily available in most countries. In some countries it was financed by the sugar industry itself. It was proposed that UNIDO should launch pilot projects in research in a few countries and also establish a data bank which could be accessed by African countries. The use of electronic mail for the diffusion of information was to be considered seriously.

43. Participants recognized that the sugar industry played a strategic role in their countries; thus, it was necessary to ensure its development and sustainability. They also recognized that the experience of Mauritius was very valuable to other African countries. Therefore, there was a need for developing cooperation activities with the Mauritius Sugar Authority, if possible, for mutual benefits under the aegis of UNIDO.

Role of UNIDO

(a) Investment promotion

44. A member of the Secretariat explained that the role of UNIDO was to promote industrial development and there were some 12 bureaux throughout the world engaged assisting business partners to establish contacts. A questionnaire (Industrial Investment Project Profile) was circulated to enable UNIDO to obtain as much information as possible on potential business ventures. He informed the participants that after an initial letter of intent from the partners, UNIDO could provide consultancy for feasibility studies and also seek funding from institutions such as the African Development Bank, Preferential Trade Area for Eastern and Southern African States (PTA) Bank, the World Bank and other sources. He further said that UNIDO favoured projects from the private sector with a value exceeding US\$500,000 without neglecting projects with a lower value but which were financially feasible.

(b) Mini-sugar plants

45. Participants were in favour of a study on mini-sugar plants by UNIDO specialists, but stressed that such plants could be as costly to set up and run as full-scale ones, and that the cost of production could be high. The UNIDO experts would study aspects such as technical limitations; competitiveness; and the financial feasibility of such plants to understand under which conditions they could be successful.

III. SUMMARY OF THE DISCUSSION PAPER

46. The discussion paper on measures to improve the competitiveness of the sugar-cane industry in Africa was considered by the Workshop. Its contents is summarized below for the benefit of this report. The purpose of the paper was to discuss crucial factors influencing the competitiveness of the cane-sugar industry.

Raw material supply and technological problems

47. Raw material quality, quantity and cost have a decisive effect on the viability of the sector. The starting points are the varieties of sugar cane. Disease resistant varieties are a basic condition for the use of high yields. There are well-known technologies in this respect; the selection of these depends on the local soil and climatic conditions. The introduction of mechanization in growing and harvesting is one of the most important contributions to the cost of production.

48. Close follow-up on the stages of processing from the mill to the final product is the basis for improvement. Very important is the establishment of a system of payment based on the saccharose content of cane. Mills should be self-sufficient in energy. Losses and production costs should be reduced, the increase of the average reduced overall recovery must be an overall target.

Diversification

49. It should cover both agriculture and industry. Crop alternation and interlining are the most efficient cultivation methods. Close cooperation is to be established for the dissemination of information among interested countries. Industrial diversification includes the alternative use of cane for fuel alcohol or as animal feed and industrialization of by-products. The use of by-products in Africa is still at an early stage. It is imperative to develop strategies to introduce this system into industry.

50. Some major by-products that have been commercialized with success are pulp and paper, particle board and furfural from bagasse, alcohol, animal feed, rum, citric acid and yeast. The basis for introducing diversification is a proper market.

Management, human resources and social implications

51. Rehabilitation and restructuring of the sugar-cane industry involves a series of administrative and functional changes whose economic, political and social economic effects must be foreseen when planning the restructuring of the sugar industry.

52. Optimization of the process requires training and redeployment of various categories of workers. Transferring or introducing new technologies are the most difficult tasks to be performed because of the traditional nature of the activity and scarcity of experts and labour as a whole. It is essential to establish relevant training programmes according to the various influencing factors.

53. In setting up sugar industries in African countries rural, development is considered a key factor. Indeed, an average unit of sugar production employs some 3,000 permanent and seasonal workers and affects about 30,000 people.

Africa and the international sugar market

54. The sale of sugar to the European Economic Community (EEC) by a non-member State is virtually impossible. The African, Caribbean and Pacific (ACP) group is allowed a yearly quota of guaranteed prices and access. The United States of America has never been a traditional market for African countries. The recent developments in Eastern Europe may lead to an end of the existing preferential trade agreements. Changes are foreseen.

Market Prospects in Africa

55. Average per capita consumption in Africa is lower than the world average, about 13 kg versus 21 kg. A 5-kg increase per capita would create an additional requirement of 2.3 million tons of sugar. Reunion and Mauritius represent about 13 per cent of production in Africa. Expansion of the production of the sugar industry in Africa could develop by upgrading the self-sufficiency level and developing intra-African trade.

Finance

56. Availability of resources is one of the most pressing problems of the African countries. It could be solved only by concerted dialogue to achieve negotiated agreements between the parties. The problem is valid in the case of interregional and international financing agencies.

57. The private sector has been an important source of finance which can encourage sugar industry activities in conjunction with the public sector or with foreign companies. A determining factor is the political will of governments.

Industrial cooperation

58. To improve the African sugar trade, it is proposed to establish the organization of African Sugar Producers with the assistance of UNIDO along the lines of the Group of Latin American and Caribbean Sugar Exporting Countries (GEPLACEA). This organization will provide information on African sugar trade, discuss problems hindering trade and find solutions to promote and monitor inter-African trade.

59. Further, it is vital for the sugar industry to explore the possibilities of obtaining equipment and machinery at relatively low prices through south-south cooperation.

Constraints to development

60. In general, the African sugar industry suffers from the following constraints:

- (a) Absence of a sufficient market furthering the development of this industry;
- (b) Weak institutional infrastructure to support the sugar industry;
- (c) Inadequate technological and managerial capacities and capabilities for production control and maintenance;
- (d) High cost of equipment and spare parts.

IV. SUMMARY OF THE COUNTRY PAPERS

Burundi

General information

61. The area of the country totals 27,834 km² and had a population of 6 million in 1993. Consumption of sugar was estimated at 17,000 tons in 1993. Only one sugar factory, the Société sucrière de Moso (SOSUMO), has been in operation since 1988. The capacity of the factory ranges between 1,000 to 1,500 tons per day. The average staff working regularly is 1,600.

62. The sugar season may be carried out during 5 months only, from June to November, and an annual production of 18,000 tons can be expected.

Société sucrière de Moso (SOSUMO)

63. Production by SOSUMO amounted to 4,657 tons in 1988; 8,000 tons in 1989; 10,319 tons in 1990; 14,400 tons in 1991; 16,925 tons in 1992; and 15,045 tons in 1993.

64. The decrease in the production of sugar in 1993 has been the result of climatic conditions and deficiency in the methods of cultivation and agricultural planification.

65. 99 per cent of SOSUMO's operations are financed by the Government and 1 per cent by the private sector. The factory price of sugar is US\$460 while the price of imported sugar accounts for US\$530.

66. Investment costs by SOSUMO compared to its size do not make it financially viable even if the aim of the socio-economic development of the region of Moso is commendable.

67. Agreement was reached between the Government and SOSUMO in view of a management based on the sunk-cost method to allow the smooth running of the factory. (The Government takes charge of the debt and no provision is made to recover the cost of equipment.)

68. Since 1992, management has been based on the full-cost method, subject to the same particular arrangements (writing-off of part of the debt, the rest being paid on a long-term basis).

69. A study is being undertaken to establish favourable conditions for privatization within the framework of measures to be taken for structural adjustment as prescribed by the World Bank and the International Monetary Fund (IMF).

70. In order to make SOSUMO more profitable, the following short-term measures are being considered:

- (a) Development of cultivated areas to stabilize production;

(b) Mastering technical methods of sugar cultivation to increase yields;

(c) Development of cultivated areas around villages prior to the extension of the factory;

(d) Agricultural diversification, for example development of interline cropping;

(e) Rehabilitation of molasses, unused up to now;

(f) Extension of the factory's capacity to 1,500 tons of cane per day;

(g) Intensive training of local staff in all fields (technical, management, computer technology) to replace foreign technical assistance which is very costly.

Cameroon

71. Sugar is produced by two industrial units, the Société sucrière du Cameroun (SOSUCAM) created in 1965 and the Cameroon Sugar Company (CAMSUCO) created in 1975. Installed capacity (4,000 tons per day at CAMSUCO and 2,000 tons per day at SOSUCAM) generates approximately 70,000 tons of refined sugar. Moreover, there is a factory in Douala Nosuca which produces 12,000 tons of sugar cubes per year.

72. These factories are not self-sufficient for the market which is estimated at 100,000 tons; hence, there is a need to import.

73. These factories are integrated (cultivation of cane, harvest, transport, production of sugar, refining, factory producing sugar cubes, commercialization). Cane cultivation is not irrigated in Cameroon.

74. Due to economic difficulties, the above-mentioned production capacities are not fully utilized, especially at CAMSUCO, of which 90 per cent of the capital is public. The Government has therefore decided to privatize the company. At present, conditions for rehabilitation and sale are not fulfilled and privatization cannot be effected.

Egypt

Sugar cane and beet industry and by-products of sugar-cane processing

75. The sugar-cane industry started with few sugar factories of small capacity located in upper Egypt, one factory for refinery and another for distillation, the Egyptian and Distillation Company, at Hawamdia. Today, due to the progress and development of the sugar industry, the Egyptian Sugar and Distillation Company has eight sugar-cane factories, all located in upper Egypt as shown in the table overleaf:

<u>Sugar-cane factory</u>	<u>Crushing capacity</u>
Abu-Korkas	5,000 tons of cane per day
Gurga	6,000 tons of cane per day
Naga-Hamadi	12,000 tons of cane per day
Dishna	8,000 tons of cane per day
Kous	12,000 tons of cane per day
Armant	10,000 tons of cane per day
Efdu	8,000 tons of cane per day
Kom-ombo	12,000 tons of cane per day

76. Abu-Korkas, Gurḡ and Naga-Hamadi produced 100 per cent of white sugar for direct consumption and the other factories produced white sugar for direct consumption, while raw sugar has been sent to the factory at Hawamdia for refinery.

77. The two major by-products of sugar-cane processing are bagasse and molasses. Technology for processing pulp and paper and board from bagasse has progressed in Egypt. Today, there are two operating plants producing pulp and board, the pulp factory at Efdu and the board factory at Kom-ombo. Besides the sugar-cane factories, the pulp factory at Efdu produces 22,000 tons of pulp and the board factory at Kom-ombo 20,000 tons of board yearly.

78. A plant for the production of writing paper will be installed at Efdu, and another for the production of newspaper is to be established at Naga-Hamadi. Also, technology for processing distillation and chemical products from molasses has progressed in Egypt. A large number of products is derived from molasses by two distillation factories. The plant located at Hawamdia produces:

(a) Ethanol. Ethyl alcohol is generally produced in three main grades: Industrial alcohol (96.5 GL) used as solvent, fuel and feedstock and for many chemical products; fine alcohol (96.0 GL) used mainly for pharmaceuticals, cosmetics and human consumption; and absolute or anhydrous alcohol (99.7 GL), a water-free ethyl alcohol used in pharmaceuticals, intermediates and for internal combustion engines mixed with 80 to 85 per cent of gasoline;

(b) Vinegar and citric acid;

(c) Feed-yeast;

(d) Carbon dioxide.

Apart from the sugar-cane factory located at Abu-Korkas, the other distillation factory produces ethyl alcohol and feed-yeast only.

79. The chemical factory at Hawamdia produces butanol, thinner, acetone, adhesive substances, dry baker's yeast, and sodium sulphate.

80. Citric acid is the industrial organic acid most widely used in the food and beverage industry. For that reason, technical research going on at the Assiut University is linked to the Egyptian Sugar and Distillation Company.

81. Two factories produce perfumes, one at Hawamdia and the other at Giza. Moreover, at Hawamdia, there is a factory for the manufacture of equipment for the sugar industry and plants for other industries. Equipment for the sugar industry is as follows: Steam boilers, mill rollers, diffusers, clarifiers, juice heaters, evaporators, vacuum pans, crystallizers, sugar dryers, centrifugals, valves, pumps vacuum pumps, jet condensers and barometric condensers, and equipment for the preparation of cane.

82. Equipment for and experienced technicians in the sugar industry are exported to some Arab and African countries.

Research and technology

83. There is a research station at Hawamdia, Naga-Hamady and Kom-ombo to promote scientific methods and technological progress in sugar agriculture. In addition, there are two technical process research stations (Hawamdia and Kous) for the development and technical process of sugar-cane manufacture to improve productivity and reduce production costs.

Sugar-Cane Training Centres

84. There is a Sugar-Cane Training Centre at Hawamdia, Gurga and Kous which provides host facilities, lecture rooms and libraries for training participants who are directly involved in activities related to the sugar industry. Intensive courses of 6-month duration are provided. Lecturing staff comprises of scientists and technicians from the Assiut University and the Egyptian Sugar and Distillation Company.

85. With regard to water pollution, nine waste-water industrial treatment plants will be operating shortly at Hawamdia, Abu-Korkas, Gurga, Naga-Hamadi, Dishna, Kous, Armant, Edfu and Kom-ombo to keep the water of the Nile clean.

86. The name of the Egyptian Sugar and Distillation Company has been changed recently to Sugar and Integrated Industries Company (SIIC) due to the large varieties of products produced. The number of regular employees is 30,000.

Sugar beet industry

87. The industry started in 1975 after a period of research on sugar beet. The sugar-beet factory at Kafre El Chech in lower Egypt has a crushing capacity of 6,000 tons per day. Total production of sugar (both beet and cane-sugar) is 1 million tons per year. Local consumption of sugar amounts to 1.5 million tons. There is another sugar-beet factory at Dakahlia in lower Egypt with a crushing capacity of 6,000 tons per day. The population of Egypt is 65 million.

Kenya

General

88. The estimated population of Kenya is between 23 to 25 million and expected to increase to about 35 million by the year 2000. Sugar consumption

is averaged at 500,000 tons per annum, had the highest figure of 538,000 tons consumed in 1990 which included about 25,000 tons used for industrial purposes. Domestic and industrial consumption is expected to increase to about 750,000 tons of sugar by the year 2000.

89. Domestic production varied from 100,000 tons of sugar in 1973 to 442,000 tonnes in 1989. It is currently fluctuating. At present, there are six large-scale factories operating with one small-scale plant of 700 tons of cane crusing per day. Daily cane production of the large-scale factories is thus estimated at 7,200 tons at Mumias, 2,250 tons at Muhoroni, 3,000 tons at the South Nyanza Sugar Company and 2,400 tons at Miwami. The foregoing are rated capacities achieved and exceeded by some factories such as Mumias and Chemelie. They operate for about ten months per annum. The Miwami Sugar Company and Ramisis stopped working in 1988 due to financial problems, but the Miwami Sugar Company restarted under a new management and is improving its operation.

Present situation and perspectives

90. The financial situation in most of the factories is bad except at Mumias, Chemelie and the South Nyanza Sugar Company which is also stabilizing within the rated production capacity of about 52,000 to 60,000 tons of sugar per annum. Various studies, including that prepared by Ulla, concluded that funds are needed to rehabilitate and modernize the industry for which technical know-how is available locally. But access to finance is a problem.

91. Problems faced by the Kenyan sugar industry are mentioned below:

(a) The main concern regarding cane supply has been the lack of funds for crop financing resulting in the production of low quality sugar cane and low sugar cane yields;

(b) The low sugar-cane production has caused a decline in the sugar recovery rate leading to under-utilization of available factory capacities;

(c) Inadequate research and extension services have also aggravated the industry's problems;

(d) High costs of inputs which are beyond the reach of small-scale farmers have also brought about a fall in sugar-cane yields.

Requests to UNIDO from the Kenya Sugar Authority

92. The Kenya Sugar Authority is the body charged with the responsibility to advise the Kenyan Government on technical, financial and economic aspects affecting the sugar industry in the country. Therefore, the following requests have been put forward:

(a) To continue financing training of technical staff from Kenyan sugar factories in the area of processing, engineering, agronomy and research;

(b) To help Kenyan cane-outgrower societies to form strong and technically reliable teams for growing more cane by providing funds and some technical assistance, and to use the given fund for its purpose;

(c) To assist the Kenyan sugar industry in establishing a pilot plant which can be used for training; (Such pilot plant will be equivalent to about 5 tons of cane crushing per day.)

(d) To help financing the establishment of the East African Society of Sugar-Cane Technologists (Kenya, United Republic of Tanzania and Uganda);

(e) To provide technical assistance in order to extract the following from the by-products:

- (i) Methane gas and kerosene from molasses;
- (ii) Electricity for export; and
- (iii) Use of bagasse to produce good quality papers.

Madagascar

93. There are five state-owned sugar factories having a production capacity of 125,000 tons of sugar per year. Production in 1993 was expected to reach 11,000 tons and a sugar yield of 10 per cent of cane.

94. The factories have old structures and need rehabilitation. There are frequent breaks during the season on account of technical problems.

95. The creation of new units to produce sugar is essential since its local demand, which is estimated at 80,000 tons or more, is not satisfied. The consumption of sugar per capita is assessed at about 7 kg per year. Rehabilitation and the creation of new units require funds which the country cannot afford under the present circumstances.

96. Foreign capital, private investors or partnership are needed. Conditions for cultivation of cane are very favourable, arable areas are numerous, the microclimate is advantageous, labour is at hand, and quarantine stations (glass-house and open) have been set up. Nevertheless, efforts are needed to make cultivation of cane productive; the yield is 60 tons per hectare. The quest for performing varieties and agronomical revolution (soils, diseases etc), are necessary.

97. Efforts are being made to set up an institute or a research and training centre jointly with the Ministère de la recherche au développement and the Ecole supérieure de l'agronomie. Research and long-term training were undertaken previously in collaboration with MSIRI and CFCS of Reunion.

98. The diversification of products has not reached an advanced stage; cultivation of sugar is widespread. Sometimes the land is left fallow. As regards cane processing, the by-products, apart from sugar, are alcohol and rum.

99. The crushing capacity of factories varies between 500 and 4.000 tons of cane per year. In spite of the low rate of productivity that can be improved, the sugar sector allows thousands of families to earn their living in factories and cane fields, and among independent planters.

100. The country exports sugar on the preferential markets, thus sacrificing its local need. In the past years, production has decreased for political, climatic, technical and organizational reasons. Consequently, sugar is imported to avoid stock shortage.

101. The policy for the liberalization of sugar prices has been implemented. Privatization of public enterprises is receiving growing attention. In general, the future seems promising on account of the efforts being undertaken for an appropriate long-term sugar policy.

Mauritius

102. Mauritius, a tropical island in the Indian Ocean, has no mineral resources of any kind and relies on tropical agriculture as its primary activity. Of the various crops tried from the early times when the Dutch had first settled, sugar cane emerged as the dominant one for a number of reasons. For example, the cane crop is best suited to the soils and climate and is also resistant to cyclones, droughts, pest and diseases. Mauritian sugar has enjoyed guaranteed outlets and remunerative prices through various commercial agreements. The Sugar Protocol of the Lomé Convention assures Mauritian sugar producers an annual quota of approximately 500,000 tons of sugar or around 90 per cent of total exports to the EEC, and the remainder to the United States of America and the world market. Total targeted sugar production is 700,000 tons from 85,000 ha of cane-producing land which represents around 90 per cent of the total arable area.

103. Cane production amounts to roughly 6 million tons, the best cane yield being around 85 tons and sugar yield around 9 tons per hectare. Climatic and edaphic factors favour good regrowth of ratoons whereby, with good crop management, a rotation cycle of 7 to 8 years is general practice. Since land is a scarce resource in this small island, maximum use is therefore made of the land available. Mauritius is thus one of the leaders in sugar-cane interline cropping and in making full use of rotation land between two cane cycles with the result that a number of crops, e.g. potatoes, beans, ground-nuts and maize are grown in such land with a view to reducing imports of these commodities.

104. Cane is produced from two major categories of planters. Miller planters (owning large estates associated with mills) produce 60 per cent of cane from 55 per cent of their own land. About 35,000 small planters produce 40 per cent of cane from the remaining 45 per cent of cane area.

105. Since 1993, sugar cane has been milled in 19 cane-sugar factories, of which 18 are private plants. The cane-crushing capacity of these factories ranges from 60 to 270 tons of cane per hour with an average of around 140 tons of cane per hour. The cane-milling season lasts for around 130 days, from

15 June to 15 December. Efficiency of these factories is reputed to be high by world standard with reduced overall recovery averaging almost 86.0. It is comparable to the best results achieved in a number of efficient cane-sugar producing countries.

106. Most of the sugar produced is in the form of raw sugar with a pol of 98.7°. A few factories manufacture plantation white sugar (mainly for the domestic market) and a range of special sugars for export to the European and other markets.

107. By-products of cane-sugar processing include mainly molasses, bagasse and filter mud. Most of the molasses is exported to Europe and the United States of America except for a limited amount which is used in alcohol manufacture (for use as potable alcohol, vinegar and perfume) or as livestock feed ingredient. Bagasse is normally burnt to produce live steam from which electricity and process steam are generated and used in the process of extraction of sugar from cane. In a factory which is thermally well balanced, more than 25 per cent of bagasse produced is potentially in excess of the energy requirements for sugar recovery. Such excess is being optimized and used to generate electricity for sale to the public grid. In 1992, electricity generation from bagasse amounted to 85.3 GWh or 10.5 per cent of total electricity produced in the island (or 809 GWh). A total of 43.350 tons of excess bagasse was transferred from satellite factories for firm power generation.

108. As of 1993, one factory has been equipped with a dual fuel (bagasse during crop season and coal during off season) fired boiler of 110-ton steam at 46 bars and a 21.7 MW condensing extraction turbo-alternator; it produces substantial power for sale to the grid. Two factories (one with a 10 MW and the other with a 2 x 2.5 MW turbo-alternator) produce "continuous" power generation from bagasse during the crop season. Most of the other factories generate intermittent electricity.

109. Programmes have now been formulated to maximize power generation from the cane-sugar industry. The objective is to have two additional power plants, one in the South and another in the North (around 30 MW capacity each), located next to a factory which will burn its own total bagasse and excess bagasse from a cluster of thermally optimized satellite factories. These plants will burn coal as a make-up fuel to maximize their installed capacity. These projects fall under what is known as the Mauritius Bagasse Energy Development Programme and are being implemented with the assistance of the World Bank.

110. The sugar industry operates in a highly organized institutional structure involving parastatals and private organizations. At the apex is the Mauritius Sugar Authority established in 1984 to coordinate industry groups and advise the Ministry of Agriculture and Natural Resources on sugar industry policy and planning. Other parastatal organizations are responsible for research in sugar, crop insurance, export marketing, regulation of factory areas, conduct of sucrose contents and arbitration of industry disputes. The Mauritius Chamber of Agriculture and the Mauritius Sugar Producers Association

are private sector organizations representing mainly sugar-producing interests and serving as forums for debate and policy formulations.

Morocco

111. Since the thirteenth century, the sugar industry in Morocco has been an important industry based on sugar-cane cultivated in the regions of Essaouira and Marrakeeh. This important industry, the archeological remains of which have recently been discovered, has disappeared for several reasons during the 16th century.

112. The industry was reinstated in 1963 only after positive experiments had been made from the beetroot in the region of Gharb in the North of the country and sugar-cane introduced in the same area in 1975.

113. At present, the sugar-cane industry in Morocco stands as follows:

<u>Factory</u>	<u>Location</u>	<u>Sugar production</u>	<u>Date of operation</u>	<u>Yearly capacity (tons)</u>			
				<u>Beet</u>	<u>Sugar</u>	<u>Pellets</u>	<u>Molasses</u>
Sunab	Sidi Slimane	White	1963	3,000	30,000	14,000	9,000
Suta	Souk Sebt	Refined	1965	3,500	32,000	15,000	10,000
Sunag I	Mechra Bel Ksiri	Raw	1968	4,000	42,000	18,000	12,000
Sunag II	Allal Tazi	Raw	1968	4,000	42,000	18,000	12,000
Subm	Beni Mellal	Raw	1970	4,000	42,000	18,000	12,000
Doukkala	Sidi Bennour	Raw	1971	5,000	80,000	33,000	22,000
Oulaï Aïad	Sumat	Raw	1972	5,000	65,000	27,000	18,000
Sunabel	El Ksar	White	1976	4,000	42,000	18,000	12,000
Zemaura	Zemaura	White	1982	5,500	90,000	35,000	24,000
<u>Estate</u>							
Sumacas	Mechra	Raw	1975	2,500	30,000		12,000
Surac	Dar Gueddari	Refined	1981	3,500	42,000		16,000
Sucrac	Larache	Refined	1984	3,500	42,400		16,000
<u>Mixed refinery</u>							
Sacrafor	Zaio	White	1973	1,000 (cane)	5,000		2,000
				3,000	25,000		8,000
<u>Refinery</u>							
Cosumar	Casablanca	Slice			50,000		
		Loaf		1,500	450,000		
		Granular			70,000		
Caamisa	Tetouan	Granular		150	25,000		

114. The sugar industry in Morocco, organized within the framework of the Association sucrière professionnelle (Professional Sugar Association), has two instruments available. First, the Institut sucrier d'études de recherches et formation (ISERT) takes care of training, refresher courses, enhancement of the entire personnel of factories (workers, experts, cadres) and, on the other hand, of research regarding the development of beet-sugar and the entire manufacturing process. It has at its disposal special equipment for sugar technology and pilot projects. Second, the A.G.A group, specialized in sugar engineering, which mainly undertakes studies related to conception and assembling of equipment necessary for the modernization and extension of some factories.

115. On the other hand, the role of CTCAS, a technical centre and important producer of sugar cane (70 per cent) in the region of Gharb, is to develop this culture, produce cuttings and undertake research in agricultural sphere installed capacity for the production of beet sugar which makes it possible to forecast a production of 600 to 620,000 tons. In fact, production in the past five years varied from 500 to 550,000 tons due to a certain number of factors related to agricultural production, namely droughts experienced in Morocco in the last decade. Nevertheless, ongoing hydroagricultural installations allow them to hope that the use of these installed capacities will continue with emphasis on the newly irrigated sectors in the next five years.

116. A global programme of rehabilitation and extension is in progress to allow privatization of the last 11 public sugar factories and of two refineries having been privatized since several years.

117. Finally, it should be noted that Morocco has a consumption of about 780,000 tons per year, of which 400 to 420 tons of loaf sugar, 300,000 tons of granulated sugar and 60,000 tons of lump sugar.

Sudan

Potentials of Sudan

118. In 1959, the Government of Sudan carried out extensive feasibility studies by foreign experts to investigate the possibility of establishing and developing an economic sound sugar industry in Sudan.

119. In this regard, experts were asked to survey, compile and analyse information and data required. They also examined the characteristics of the country, its meteorological features, and the fundamental principles and conditions for sugar-cane growing, viz. adequate areas of flat land; suitable climate; fertile soil (deep and permeable); adequate water supply for perennial irrigation; and availability of good field labour.

120. After finalization of the feasibility studies which included all agricultural, technical, economic and social aspects, the conclusion arrived at was viability and assured possibility of establishing large-scale sugar-cane cultivation on a sound commercial basis due to the following:

(a) There are 16,000,000 Feddan (1.00 feddan = 0.42 hectare) of agricultural crops and 80,000,000 feddan of arable land;

(b) There is a possibility of expanding the sugar industry to produce 1,500,000 tons of sugar annually which require 2.83 billion of

cubic metres of water; it represents only 10 per cent of water available from the Nile and its tributaries;

(c) To produce 1,500,000 tons of sugar annually, 250,000 ha of land and the installation of 42 cane-sugar mills are required, each having a capacity of 3,000 tons of cane per day;

(d) The Government of Sudan needs to diversify the existing agricultural crop scheme for the creation of new sugar schemes and convert some of them into-sugar cane cultivations, thus avoiding high costs of preparing the land, establishing a new irrigation scheme and giving directly to install sugar-cane mills;

(e) Apart from the meteorological conditions stated above, Sudan is geographically well situated, the meeting place of three continents, Asia, Africa and Europe. Located on the water ways (Red Sea) making the division of these continents, Sudan has benefitted from the two-way passage of oriental and occidental produce through the Red Sea. This strategic position gives Sudan good opportunities for sugar trading competition, especially in the Middle East and Arab States.

121. In securing proper investment worldwide, financiers and investors in the sugar industry have categorized the sugar producing countries into four categories according to land productivity and sugar recovery:

(a) Countries with high productivity above 70 tons of sugar cane per hectare and with 10 per cent recovery;

(b) Countries with above average land productivity;

(c) Countries with average land productivity of 52.8 tons of sugar cane per hectare and a sugar-cane recovery of 10 per cent, and 31.9 tons of beet sugar and a 16 per cent sugar recovery; and

(d) Countries with below average land productivity.

122. It has been assured that practically whoever invests in a country's sugar industry with land productivity of above average will secure a profitable return on his/her investment. Therefore, there are many financiers and investors in both private and public sectors of the sugar industry in Sudan. The best example in the private sector is the Kenana Sugar Company with an annual output of 300,000 tons of all that the investors need to know in addition to all the Government new policies for investment and production encouragement announced recently.

Contribution of the sugar industry to the national economy

123. The sugar industry's share accounts for 14 per cent of added value of the industrial sector. It contributes 14 per cent of gross national product (GNP) and employs 49 per cent of the total labour force of the industrial sector. It also contributes 37 per cent of total wages and salaries of the labour force in the food industry.

124. Past and future performance of the four public sugar factories (Gunied, New Halfa, Sennar and Assalya) under the management of the Sudanese Sugar Producing Company was and will be of the designed capacity of 31,500 metric tons per annum. Annual production in 1988/89 was 121,766 metric tons; 155,174 metric tons in 1989/90; 180,400 metric tons in 1990/91;

217,600 metric tons in 1991/92; and 205,300 metric tons in 1992/93. Expected production in 1993/94 was to be 258,000 metric tons per annum.

Objectives of the sugar industry

125. According to the directives of the State and the resolutions and recommendations of the recent economic conferences, and within the general strategy to attain self sufficiency and the establishment of local industries to substitute imports, the objectives of the sugar sector are:

(a) To produce sugar so as to secure essential food and commodities and export the surplus;

(b) To give more attention to the effective utilization of sugar by-products in animal feed production by establishing new industries;

(c) To rehabilitate the physical components of the production units in order to increase present capacities, expand field productivity and to improve the quality of the sugar produced to meet world standard;

(d) To raise the standard of employees and the labour force through better selection and provide them with practical training programmes.

The Sugar Rehabilitation Project

126. The rehabilitation project of the four public sugar factories which started in September 1986 has a total cost of US\$181.3 million, co-financed by the World Bank (IDA) (US\$64.42 million), the Arab Fund for Economic and Social Development (US\$57.14 million), the Saudi Fund for Development (US\$36.35 million), the Kreditanstalt für Wiederaufbau (KfW), Germany (US\$22.93 million) and the Government of Sudan.

127. The objective of the project (over a period of five years) is to raise cane yields and production of the four sugar factories (New Halfa, Gunied, Sennar and Assalya) through rehabilitation and strengthening the management of the sugar sector. The project components include:

(a) Physical rehabilitation of the irrigation system, agricultural machinery and equipment, and infrastructure factory process equipment and civil works;

(b) A set of measures and actions to be taken by the Government of Sudan to ensure adequate and timely provision of annual operational inputs to the production units;

(c) A phased programme of institutional and financial re-adjustment with well-established production arrangements and incentives;

(d) Research facilities to find more suitable cane varieties;

(e) Training in technical, management and accounting skills.

128. Projected production by the end of the rehabilitation project is anticipated to be 255,150 metric tons equivalent to 80 per cent of the designed capacities of the four factories.

129. The population of Sudan is 25 million. Sugar consumption in 1993/94 had been estimated at 450,000 tons and production was expected to be 523,000 tons including Kenana.

The Kenana Sugar Company

130. The Kenana Sugar Company's plantation of 35,300 ha and modern factory site constitute the world's largest integrated white sugar manufacturing complex on a single site under single management.

131. The Kenana sugar project is but one example of the rich agro-industrial potential in the Sudan and was implemented through active cooperation of interested multinational corporations and neighbouring Arab Governments. Founded in 1975, the major shareholder of the Kenana Sugar Company is the Sudanese Government with 35.17 per cent of share capital, followed by Kuwait with 30.5 per cent and Saudi Arabia with 10.92 per cent; other shareholders include the Arab Investment Company (SAA), the Sudan Development Corporation, the Arab Authority for Agricultural Investment and Development, local Sudanese banks, Lonrho PLC of the United Kingdom, Japan's Nissho Iwai Corporation and Gulf Fisheries (WLL).

132. In the past, Sudan imported most of its sugar. Apart from petroleum products, sugar has become the second largest drain on the country's scarce reserves of hard currency. Today, the Kenana Sugar Company is consistently producing thousands of metric tons, in some cases more than the stated 300,000-metric ton capacity of its American designed sugar plant. Moreover, the company's project brought about a wealth of subsidizing benefits for the Sudan, both in terms of new products and valuable expertise. In addition to sugar, the Kenana Sugar Company is now manufacturing sugar cubes, sugar syrups and special sugar, the latter at EEC standards. The plant also produces molasses for export to Europe where it is turned into industrial alcohol. In 1990, these activities brought the company a total of US\$22 million, which was about 50 per cent of its hard currency.

133. There are a number of related projects in the company's pipeline, including the production of charcoal from sugar by-products. Another product being considered for production by the Kenana Sugar Company is animal feed made from the same by-products and vitamins.

134. The Kenana Sugar Company has a wealth of expertise gained through its association with consultancies and other companies from all over the world; hence, its newest subsidiary, Kenana Engineering and Technical Services Ltd., was launched to make the company's human and material resources available to other enterprises in the agro-industrial field in both Sudan and neighbouring countries. At the same time, the company has steadily replaced most foreign workers at its modern factory by Sudanese nationals. In 1981, the Kenana Sugar Company employed 750 foreign nationals working on the site. Today, there are less than 280.

135. Since Sudan continues to develop its agro-industrial potential, the Kenana Sugar Company will provide a model of success from which many plants could benefit.

Uganda

136. Uganda has three sugar plants, namely the Kakira Sugar Works and the Sugar Corporation of Uganda where the Government holds minority shares; and the Kinyara Sugar Works, a public enterprise.

137. The first two mills are currently producing sugar below full capacity. The third one is undergoing rehabilitation and expected to start operations in 1995 under the Booker Tate Management.

138. Before the economic crisis, Uganda's sugar industry was performing efficiently and happened to be one of the largest processing industries in the economy.

139. Total capacity of the three plants is about 170,000 tons of sugar per year. Current production amounts to approximately 70,000 tons of sugar as opposed to consumption which is around 100,000 tons of sugar per year. Therefore, there is a deficit which is filled by imports from the PTA region.

140. Uganda's sugar cane is rainfed and requires 16 to 22 months to mature. Seed cane was imported from India, and due to the type of seed and high altitude, cane takes long to mature. Yield per hectare accounts for about 83 tons at a recovery rate of 10 per cent.

141. Each of the three industries have a commercial estate. The territory of the commercial firms Kinyara, Scoul and Kakira comprises of 7,400, 9,480 and 7,600 ha respectively. The crushing rate for each of the factories is around 2,000 tons of cane per day. Each of the three plants offer employment to about 8,000 people, and in addition there are 3,000 outgrower farmers who depend on the sale of sugar cane.

142. The factories crush cane for 10 months a year and stop for 2 months. Because of the commercial estates, the factories do not experience shortage of cane throughout crushing.

Marketing

143. Currently, consumption of sugar is above production level; these factories do not experience marketing problems. However, there is competition from imported sugar which is sold at a slightly lower price than locally produced sugar.

144. Problems faced by the sugar industry are:

(a) Indebtedness

The industries have received loans from the ADB and the World Bank at a lower exchange rate of the shilling to the dollar. With the fall in the value of the shilling, the industries have to spend more shillings to acquire dollars;

(b) Lack of mechanization

Most of the activities regarding the growing of cane and harvesting are done by workers. It makes work slow and costly;

(c) Old technology

The factories are not using up-to-date technologies which render them inefficient in production;

(d) Manpower

The industries have problems recruiting technicians at the factory level due to lack of a training institution in sugar technology in the country;

(e) Research and development

There is no institution in the country carrying out research in sugar; therefore, no due incentives and improvements are taking place. The country does not have a breeding centre for cane; it still depends on imported breed from India;

(f) Market prices

Owing to inefficient technologies used in the production of sugar, the unit cost of a kilogramme of sugar is high. Thus, it will be difficult to market sugar internationally due to its uncompetitive price;

(g) Financing

The sugar industry has received substantial funds for its rehabilitation activities from the World Bank, ADB and the Gulf States. Currently, the industries do not need any more loans.

(h) Joint venture

It is the Government's policy to divest all industries. The Government is therefore looking for interested individuals and companies to buy shares in the sugar industries.

Annex

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