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Kenana: A Large-scale Sugar Project in the Sudan; An Economic Evaluation*

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Commercial and Social Appraisal of the Kenana Sugar Project

1. Introduction

Usually appraisal studies for development projects are carried out for a future project to decide on the viability and feasibility of an investment within the framework of an optimal allocation of resources. But in that case the projected measures are often mere guesses. However, an ex-post analysis does not necessarily indicate which decisions have to be taken for future allocation of resources; nonetheless it can lead to a wider insight into the factors which are crucial for the success or failure of the project under consideration. With regard to Kenana at least three factors are responsible for this reappraisal. Firstly, little is known about the role of the project to savings and to the consumption of poorer groups which is a linking theme of plans to date. Secondly, there is a lack of knowledge about the contribution of each of the quantitive development measures in the package to the success or failure of the project. Thirdly, as will be seen in this paper, the major base of the export effort, the Kenana complex, was negotiated around a commitment by the Sudan government to a guaranteed price for part of the output. As foreign interests are involved in the plant itself, a serious attempt to clarify the "costing" of this guarantee is required both to assess the project and even, possibly, for renegotiation of the guarantee. Moreover, for proper evaluation studies, reliable statistical data are often lacking in the Sudan. This study will certainly not only stimulate the discussion on methodological problems, but will also point out the data deficiencies and the sensitivity regarding certain assumptions which had to be taken in any systematic calculations.

The study will highlight the importance of reliable statistical data and the importance of the price guarantee for its social viability. A brief background is provided immediately highlighting relevant considerations, followed by an assessment of the viability of the project. the overall appraisal analysis which follows is based on the UNIDO (1972) approach.[1]

2 The Project Background

The industrial production corporation was established by the Sudan government to co-ordinate efforts for industrial development. It controls six subsidiary corporations. One of them is responsible for sugar and under these auspices sugar factories owned by the government are managed: Gunned (1963), Girba (1965), Sennar (1977), Assalaya (1978), Melut and Mongella (construction stopped in 1982).

The seventh, Kenana, is an exception in both respects and is the subject of the appraisal which follows.

In addition to the new sugar development - projects (including Kenana), the already existing factory at Girba is having its capacity extended by 50% and two additional sites (setit and Rank) are under consideration for development.

Comparison of experience between Girba based on plantation organisation and Gunned where tenant farming was relied upon for supplies, has suggested the superiority of the plantation method in terms of productivity. Accordingly, the above mentioned mills are based on plantation.

Nonetheless the recent expansion, in comparison with the two earlier mills, has been a major leap in capacity leading to complaints of staff of maintenance inadequacy.

Kenana, on the other hand, possibly the world's largest sugar project, is aimed essentially at export markets and both ownership and management have been organised along different lines. The estate consists of 84,078 acres and the factory is designed to crush 17,000 tons of sugar cane daily throughout the 218-day season. This would suggest a capacity for producing 330,000 tons of white sugar per annum. The scale of this operation is indicated with reference to the other Sudanese projects in Table (1). (It should be noted that this large land area was previously scrubland used at most for camel, cattle and sheep grazing by nomadic tribes.)

The history of the project from preparatory work in 1972 by Lonrho, the British trading firm who was to manage Kenana to its actual operation, was characterised by two developments. Firstly, the widening of participation in the ownership and financing of the project, and secondly, partly necessitating the former, a rapid cost escalation. As to the shareholdings, the registration of the company (completed on 6th March 1975), indicated that the Sudan Government held 61% of the equity. Of this 61%, 10% was provided by the Sudan Development Corporation, whereas 51% was to be financed by a loan from Lonrho to be repaid at commercial rates. Lonrho itself would hold a further 12%. Gulf Arab interests were to hold the bulk of the remainder.

A few days after the initial registration of the company with these shareholdings, an agreement was signed by the Sudan government and the Kenana Company stipulating that 150,000 m.t. of white sugar was to be purchased annually by the government at a guaranteed price of $665.3 per ton, compared with the then market price of $664 per ton.

Table (1):
Working Sugar Factories designed capacity
(million metric tons per annum.)

Gunned	60,000
Girba	75,000
Sennar	110,000
Assalaya	110,000
Kenana	330,000

Source: Sudan Sugar Corporation

By 1977 it was clear that the factory costs were rising rapidly above those suggested by Lonrho's initial feasibility study as Table 2 indicates.

Table (2):

The Cost of the Factory
($ Million)

Item	Feasibility Study 1972	Actual Cost (1977)	% increase	Contractor
Manufacture and ocean freight to Port Sudan	43,5	170	290%	Technic ($130m) Nissho-Iwai ($40m)
Preparation of the factory site	11,9	19,5	64%	McAlpines
Erection and Commissioning	8,2	42,5	418%	Capper-Neill
Transport from Port Sudan to the site	2,2	2,0	Nil	Robert Wynn
Escalation allowance	5,0			
Total	70,8	234,0	230%	

Source: Sudanow, August 1977

Similar cost increases were experienced in the land irrigation work. Fortunately, it proved possible to interest the Kuwait government in the project and an agreement of participation was signed on February 19th 1976.

As a result of the Kuwaiti participation, the share of the Sudan government fell to 50%. Kuwaiti interests took 25%. The share of Lonrho fell to 5.5% and criticism of that firm's role in the cost escalation was made clear in a report commissioned by the Kuwaiti government.

In money terms, the Kuwaiti government was to provide $46 million, half as equity and half as loans, and this represented the enthusiasm at the time for "triangular" co-operation in the post-OPEC environment. Western technology was to be combined with OPEC money to expand productive potential in the Arab world. This view of a joint Arab interest in the food potential of Sudan was fortunate since, as costs continued to rise, Saudi Arabia was induced to provide (in autumn 1978) a further $29 million of equity and a similar loan. Final shareholdings at the time of inauguration of the plant (March 3, 1981) were as displayed in Table (3).

Table (3)

Total Shareholdings in Million S£

Equity Holder	M.S£	% of Total
Sudan Government	112,5	34,2
State of Kuwait	109,3	33,2
Kingdom of Saudi Arabia	39,1	11,9
Arab Investment Co.	39,1	11,9
Sudan Development Corporation state owned	18,1	5,5
El Nilein Bank (State owned, Sudan)	6,8	2,1
Lonrho Ltd (U.K.)	2,6	0,8
Nissho-Iwai (Japan)	0,9	0,3
Gulf Fisheries (a subsidiary of Gulf International - based Khartoum	0,9	0,3
Total	330	100%

Source: KSC (1981) "Green Gold at Kenana"

These shareholdings are connected with the remaining sources of finance in Table (4) while Table (5) displays the assets to which they relate. The latter table breaks down the local and foreign currency component of the expenditure for later references.

Table (4)

Kenana Sugar Project: Sources of Finance
(Million S£)

1.	Authorised share capital	S£ 330,00
2.	Supplier credits:	
	(i) France	S£ 47,52
	(ii) Japan	S£ 22,80
	(iii) Austria	S£ 9,12
3.	Infra-structure Loans (Kuwait and Saudi Arabia)	S£ 80,00
Total		**S£ 479,44**

Source: Kuwait Arab Fund for Economic Development "A Report on Kenana Sugar Project", Jan. 1978, Khartoum, and Kenana Sugar Company "Green Gold at Kenana", Feb. 1981.

It may be further noted at this stage, that part of the reason for the severe costs escalation for the project was attributed to the boom in the Arab oil states which had drawn away skilled Sudanese labour in considerable numbers. In addition, bottlenecks caused by acute shortage of foreign exchange within the Sudan were significant factors (cf. Financial Times, February 27th, 1981). An example for the latter type of difficulty is illustrated by the supplies of cement for the project. The local factory (at Rabak) had been an added inducement for selection of the Kenana site.

Unfortunately, capacity was inadequate and whereas a costing of $38 per ton had been employed in the feasibility study, most of the Kenana requirements had to be imported at $175 per ton. The critical nature of the foreign exchange implications of the project will clearly need to be taken into account in the social cost benefit analysis to follow.

On the more positive side, the net result has been that Sudan has acquired a "state of the art" sugar complex, including "long furrow" irrigation and a single factory with a 17,000 ton per day crushing capacity. This is intended to obtain maximum economy

of steam use and optimum power generation from the available bagasse. These advantages are said to be considerable in comparison with the alternative of two or more smaller mills serving the same plantation. Whether optimum results will be achieved and maintained by this unique production strategy or not it is too soon to say. But "Experience has shown that optimum results are achieved with a combined plantation and factory having a production and processing capacity of about 2,000 tons of cane per day for a production run for about 150 days."

(OECD, 1968 Vol. 1, P.93). See also Hagelberger (1979) p.894 and 897 and Robson (1977) p.13 as quoted by Oesterdiekhoff (1982).

Certainly, initial operating experience appears to have been favourable for this concept. At full capacity the plant could supply 40% of the 1980 consumption requirements of the Arabian peninsula or 25% for the Arab countries as a whole.

Table (5)

The Structure of capital cost estimates in Jan. 1978
(in million S£)

Item	Domestic Currency Component	Foreign Currency Component	Total
Factory	24,96	189,44	214,40
Infra-Structure	76,16	77,84	154,00
Agricultural Works	11,2	24,16	35,35
Administration	10,72	9,68	20,40
TOTAL	123,04	301,12	424,16
Renewal & Replacement cost	1,36	3,28	4,64
Working Capital	6,88	16,00	22,88
Interests during execution	8,24	19,44	27,68
Total	139,52	339,84	479,36
The total in Dollar Terms	174,4	424,8	599,2

Source: Kuwait Arab Fund for Economic Development "A report on Kenana Sugar Project" - Khartoum, Jan. 1978.

Appraisal of this major project commences below with the commercial view point where existing market prices and forecasts are utilised. The social appraisal will make significant adjustments to the prices used in the initial examination.

3. Commercial Appraisal

Data on the initial capital cost together with estimated fixed and variable costs of production are present in Tables (6) and (7).

In addition to these figures, the land has been rented for about 12 US cent per acre per annum over a period of 30 years, liable to extension, irrigation water is given free of charge throughout the project lifetime. Furthermore the company is exempted from Income Tax for a period of ten years from the start-up date, i.e. 1979; thereafter an income tax of about 50% of net profit (see Appendix (1)) will be in operation.

Additional costs are transport to the port and debt servicing. As shown in Table (4), despite the 1980 capital raising operation which converted a large amount of shareholders' loans into equity, about S£ 150 m of capital costs was still accounted for by supplier's credits and relatively cheap loans from Kuwait and Saudi Arabia. Terms are shown in Table (8). Assuming that equal annual instalments are to be paid over the full terms of amortisation of each loan, repayments of these loans totalled as follows:

	1978	1979	80-81	1982	83-91	1992	93 - 2000
Debt Servicing (Millions S£)	6,24	2,24	11,39	17,56	18,11	8,87	7,72

The transport cost from Kenana to Port Sudan was estimated, after the completion of the 30 km. railway spur, by Kuwait Arab Fund as follows:

	1980	1981	1982	1983	84-2004
Transport Cost (Millions S£)	1,92	4,64	6,32	7,6	8,16

'Table (6)

'Total Project Capital Costs (Thousand S£)

Item		Domestic Currency Component	Foreign Exchange Component	Total
A	The Factory			
1.a	Factory Equipment (from France and Japan)	0,800	118,150	118,960
2.a	Civil Engineering Works	1,600	16,000	17,600
3.a	Erection Works	8,000	25,600	33,600
4.a	Electrical Equipment	-	11,200	11,200
5.a	Additional Works in the factory (including grease, oil & lubricants	4,000	2,400	6,400
6.a	Transport Costs from port 'Sudan to the site	6,400	3,840	10,480
7.a	Various tools & light equipment	0,800	2,320	3,120
8.a	Consultants' fees	1,600	9,120	10,880
9.a	Contingencies (Inventory Accumulation)	1,360	0,800	2,160
	Total	24,960	189,440	214,400
B.	Infra-Structure			
1.b	Civil Engineering Works for irrigation	25,840	49,040	74,880
2.b	Pump Stations Equipment	-	11,200	11,200
3.b	HQ buildings	0,960	0,160	1,120
4.b	Welfare and housing	27,680	6,240	33,920
5.b	Water purification plants	-	0,240	0,240
6.b	Electrical Engineering Works	0,320	1,600	1,920
7.b	Construction of 30km railway spur	2,000	-	2,000
8.b	Civil works for transport of cane	11,520	2,400	13,920
9.b	Miscellaneuous works	1,200	0,400	1,600
10b	Consultants' fees	0,640	5,360	6,000
11.b	Contingencies (Inventory Accumulation	6,000	1,200	7,200
	Total	76,160	77,840	154,000
C.	Agriculture			
1.c	Harvesting & cane transport vehicle & equipment	0,400	1,640	16,800
2.c	Maintenance works	-	2,320	2,320
3.c	Trucks, Tractors and workers transport vehicles	-	5,440	5,440
4.c	Survey & Land preparation works	5,840	-	5,840
5.c	pilot scheme & nurseries	4,960		4,960
	Total	11,200	24,160	35,360

Table (6) continued

D.	Administration			
1.d	Cars, office furniture and DC 3 aircraft	0,880	1,120	2,000
2.d	Sugar storage at Port Sudan	0,080	0,720	0,800
3.d	Preliminary expenses	9,360	7,280	16,640
4.d	Contingencies	0,400	0,560	0,960
	Total	10,720	9,680	20,400
		123,040	301,120	424,160
E	Renewal & replacement cost	1,360	3,280	'4,640
F	Working capital	6,880	16,000	22,880
G	Interests during execution	8,240	19,440	27,680
		139,520	339,840	479,360

All Data in the table are in thousand Sudanese pounds (S?) which which were derived from US$ equivalents. NOTE: Kenana will use US$ in all it's transactions.

Source: Kuwait Arab Fund for Economic Development "A report on Kenana sugar project" - Kartoum, Jan. 1978.

(Table 7)

Total Costs of production (in Sudanese pounds/metric ton)

Variable Costs		
A. Agriculture	S £ /m.T.	S £ /m.T.
'1.a Land preparation	5,904	
'2.a Nurseries: crop husbandry	0,816	
'3.a Plantation: Crop husbandry	34,080	
4.a Irrigation	8,055	
5.a Electricity	3,750	
6.a Materials (Transport included)	1,072	
Total	53,688	53,688
B. Harvesting & Cane Transport		
1.b Harvesting Cost	10,944	
2.b Transport Cost	11,168	
3.b Materials	0,304	
Total	22,335	22,335
C. The Factory:		
1.c Materials & Transport Cost	15,448	
2.c Salaries & Wages	4,880	
Total	20,328	20,328
Total variable costs		96,352
Fixed Costs		
1. General expenses (Agriculture)	7,472	
2. General expenses (factory)	6,520	
3. Administration		
i - salaries & wages	3,895	
ii - civil works	3,680	
iii - materials & transport	8,448	
iv - other expenses	5,632	
Total fixed costs	35,648	35,648
Total costs of production (excluding depreciation)		132,00

Source: Kuwait Arab Fund for Economic Development "A report on Kenana sugar project" - Jan. 1978. NOTE: The base of data is Kenana Sugar Company - Project files

Note: For the rest of the paper, all statistical informations are taken from this source unless stated otherwise.

Table (8)

Kenana sugar project: Terms of Credits and Loans (Millions S£)

	Date of Agreement	Loan	Rate of Interest	Grace Period	Recovery Period
Suppliers Credits					
France	14/5/76	47,52	7,5	4	12
Japan	8/11/76	22,80	8,5	4	12
Austria	10/7/75	9,12	8	5	13
U.K.	1/4/78	4,4	8	5	13
Infra - Structure					
Loans (Kuwait & Saudi Arabia)	1/10/78	80,00	6	4	19

Source: ibid and personal communications

On the revenue side, the agreement between the government and the company (mentioned earlier) stated that 150,000 metric tons of white sugar was to be sold to the government (for consumption or export) at a guaranteed basic price of 137.5 US$ per metric ton (110 S£ per metric ton). The rest of the production (180,000 metric tons) will be exported by the company to the world sugar market. After addition of cost estimates to the basic price the company estimated the guaranteed price as follows:

	1979	1980	1981	1982	83-2004
Guaranteed Price (S£/MT)	378,2	399,4	445,0	489,0	532,4

In dollar terms, the guaranteed price is equivalent to the 1974 world record price of sugar which was around 654 $/MT.

Taking the average world sugar price over the period (1970-1987 394.4 S£/M.T.) for our projections, the guaranteed price seems to be considerably higher than the expected world market prices. The difference between the guaranteed price and the expected market price, which we shall refer to as the "potential subsidy" from the government to the company, appears to be substantial.

The technical feasibility study and the subsequent reports on Kenana estimated that with proper maintenance the major factory equipment would last for 30 years. Assuming a linear depreciation allotment of 4% per annum[2] on the major factory and agricultural equipment, the terminal value of this fixed capital could be about 83.5 M S£, whereas buildings and structures are assumed to collapse, at the end of the period, with no residual value. Terminal value of working capital estimated at around 22.88 million S£ has been included in table (5).

This gives a terminal value of around 106 M.S£.

Table (9) gives the cash flow account for each year of the project. In the first five years, there is a net cash outflow from the project. The excessive delays in the construction stage

which led to the loss of two cane-crushing seasons clearly compounded the problem of cash outflow. The net outflow was particularly high in 1977 and 1978. From 1980 onwards a net cash inflow is forecast. During the period 1981 - 1987, a reasonable net cash inflow is forecast partly because of the exemption from income tax. In the year 1989, when the income tax begins, the net cash inflow is expected to decrease from an average of 85 million S£ to around 60 million S£ and stay around this level till the end of the period.

Further detail on the exact status of the subsidy to be provided by the Sudan government is unfortunately not available and two calculations have been conducted in relation to the data in Table (9). These are the internal rate of return on the project with and without the subsidy and are approximately 12% and 8% respectively. It should be emphasised that these figures refer to the expected market return on the project as a whole.

The calculation for the private cash flow of the project in Table (9) suggests that the subsidy is rather crucial in order to generate a reasonable rate of return.

To explore further the merits of this project from the standpoint of the economy of the Sudan, the remainder of the paper concentrates on a social cost-benefit appraisal.

4. Social Appraisal of the Kenana Project: Introductory Points

The project was undertaken in the context of continuing attempts by the Sudan government to promote economic growth through the agency of development planning. A ten year plan was initiated in 1961 - 62 followed by a five year plan for 1970 - 75, introduced in 1969. This five year plan was amended by the Interim Programme of Action (1972/73 - 1976/77) and it was this programme which contained provision for the kenana scheme.

A linking theme of the plans to date, in common with most other LDC's, has been the need to promote economic growth and the

(possibly) conflicting objective of more equitable distribution of wealth.

These concerns imply that the project's contribution to savings and to the consumption of poorer groups, be given direct expression in the analysis. In this appraisal we adopt the 'numeraire' advocated in the UNIDO (1972) manual of aggregate consumption benefits. The technique involves the 'weighting' of consumption by different groups.

One of the important decisions to be made in the analysis concerns the treatment of the capital costs of the project. Since a substantial part of these costs is to be met by foreigners' equity investment (cf. Table 3), these capital funds will be treated as if they had no opportunity cost for Sudan. This would be the usual assumption for foreign direct investment, since the alternative for the foreign firms of the project in question would be to invest in another country and not another project in the same country. A complication in this case, however, is that the political conditions of the time suggest that the Arab governments may well have been willing to invest similar amounts in other projects in the Sudan. If the volume of funds could be regarded as freely available to the Sudan, it would be sensible, from Sudan's viewpoint to channel them to the relatively lower yielding public sector projects with Sudan taking a larger share of the most profitable ones. This would be analogous to the situation where a country is contemplating the alternatives of a purely foreign owned direct investment and the possibility of doing the same thing from its own financial resources. It is argued, for instance, by Little and Mirrlees (1974, p. 121, Little & Mirrlees, 1990) that in these circumstances the government would choose the latter if the expected rate of return on the foreigners' equity participation appeared to be higher than the country's own accounting rate of interest (by which it discounts returns on their public sector projects). In the Sudan's case, this suggests that the project should be penalised if it is expected to produce such a premium for foreign shareholders since they would be receiving a higher return on their funds than the implied cost of capital for the

Sudan economy.[3] This appears unlikely given the acute shortage of foreign exchange faced by the country, to which further reference will be made when foreign exchange premia are introduced.

Before conducting the full analysis the following points may be noted.

(1) In addition to the value of the 'conventional' output from the project a further indirect benefit of some significance is generated by housing and welfare facilities for about 11,600 Sudanese employees.[4] In assessing these benefits we impute a 16% rate of return on investment of S£ 33.92 million in these facilities. This in turn suggests an annual 'social' return of around S£ 5.2 million.

(2) Table (10) provides further details of the information given in Table (9) in the form of local and foreign currency costs which will be the foundation of the analysis. Of further importance is the breakdown provided of skilled and unskilled labour. The former refers to engineers, surveyors and all employees with higher education. Semi-skilled workers, such as drivers, are regarded as unskilled since the error of undervaluing their opportunity cost is probably small and since some will receive 'on the job' training[5] for which the project should receive credit.

Unfortunately, full details of the breakdown of labour skill and domestic and foreign exchange cost of materials used in production were not available and assumptions have had to be employed.

Table (9)

Kenana Sugar Project: CASH FLOW ACCOUNT (MILLIONS S£)

(Part 1)

		Capital costs*	Total costs	Transport cost to Port Sudan	Renewal & Replacement cost	Debt Servicing	Income Tax	Total
1975	1	6,4						6,4
1976	2	70,4						70,4
1977	3	139,6						139,6
1978	4	119,4	11,76			6,24		137,4
1979	5	72,88	14,8	1,92		2,24		91,84
1980	6	36,8	21,8	4,64	4,64	11,39		79,3
1981	7		44,4	6,32	5,12	11,39		67,23
1982	8		47,2	7,6	5,6	17,55		77,96
1983	9		50,8	8,2	6,09	18,11		83,19
1984	10		50,8	8,16	6,08	18,11		83,15
1985	11		50,8	8,16	6,08	18,11		83,15
1986	12		50,8	8,16	6,08	18,11		83,15
1987	13		50,8	8,16	9,08	18,11		83,15
1988	14		50,8	8,16	6,08	18,11		83,15
1989	15		50,8	8,16	6,08	18,11	26,6	109,7
1990	16		50,8	8,16	6,08	18,11	109,7	
1991	17		50,8	8,16	6,08	18,11	26,6	109,7
1992	18		50,8	8,16	6,08	8,87	32,1	106,0
1993	19		50,8	8,16	6,08	7,72	32,8	105,6
1994	20		50,8	8,16	6,08	7,72	32,8	105,6
1995	21		50,8	8,16	6,08	7,72	32,8	105,6
1996	22		50,8	8,16	6,08	7,72	32,8	105,6
1997	23							
2000	-26		50,8	8,16	6,08	7,72	32,8	105,6
2004	27							
	-30		50,8	8,16	6,08		32,8	97,8
2005	31							

* including working capital

Table (9)

Kenana Sugar Project: CASH FLOW ACCOUNT (MILLIONS S)

Receipts

(Part 2)

		Equity capital and loan alloc.	Domestic Sales	Foreign Sales*	Terminal Val + Reclaimed Working Cap.	Potential Subsidy	Total (incl. Subsidy)	Net Cash Flow with Subsidy
1975	1	2,35						-4,05
1976	2	25,9						-44,5
1977	3	51,3						-87,7
1978	4	43,9						93,5
1979	5	26,8	18,9			11,84	18,9	-46,1
1980	6	13,5	59,9	31,36		7,04	91,3	31,46
1981	7		66,7	52,8		13,84	119,5	52,46
1982	8		73,4	63,2		21,8	136,6	58,5
1983	9		79,8	61,8		29,2	141,6	58,8
1984	10		79,8	60,1		29,8	139,9	57,6
1985	11		79,8	61,2		28,8	141,0	57,06
1986	12		79,8	62,6		27,8	142,0	58,2
1987	13		79,8	58,7		27,0	138,5	60,5
1988	14		79,8	60,3		27,0	140,0	55,4
1989	15		79,8	60,3		27,0	140,0	30,4
1990	16		79,8	60,3		27,0	140,0	30,4
1991	17		79,8	60,3		27,0	140,0	30,4
1992	18		79,8	60,3		27,0	140,0	34,2
1993	19		79,8	60,3		27,0	140,0	34,6
1994	20		79,8	60,3		27,0	140,0	34,6
1995	21		79.8	60,3		27,0	140,0	35,6
1996	22		79,8	60,3		21,0	140,0	41,6
1997-	23							
2000	-26		79,8	60,3		21,0	140,0	40,6
2004	27							
	-30		79,8	60,3		21,0	140,0	42,4
2005					106,4			106,4

* Sugar sales to the Government

(Table 10)

BENEFITS, COSTS AND CASH TRANSFERS OF KENANA SUGAR PROJECT

(Million S£)

(Part 1)

Year	1	2	3	4	5	6	7	8	9
Price (FOB Port Sudan)									
2. Repatriated profit (Foreign Exchange)					0,1	20	26	28	27
3. Repatriated Equity (Foreign Exchange)									
4. Scrap Value (Foreign Exchange)									
5. Reclaimed Working Capital:									
'5.a Foreign Exchange									
'5.b Domestic materials									
6. Indirect Benefit:									
Welfare & Housing (Domestic Materials)		5,2	5,2	5,2	5,2	5,2	5,2	5,2	5,2
7. Capital Costs	6,4	70,4	139,2	120	56,8	30			
7.a Foreign Exchange	2,9	32,4	64,2	54,8	26,2	13,8			
7.b Foreign Personel	1,6	16,8	33,4	28,6	13,6	7,2			
7.c Domestic Materials	1,1	12	23,4	20	9,6	5			
7.d Skilled Labour	0,45	5	10	8,5	4	2,2			
7.e Unskilled Labour	0,32	3,6	7	6	2,8	1,4			
8. Costs of Production				11,8	14,8	21,8	44,4	47,2	50,8
8.a Foreign Exchange				1,8	2,28	3,2	6,4	7,3	6,6
8.b Domestic Materials				3,2	4.0	5,8	12	12,8	13,6
8.c Skilled Labour				1,2	1,3	3,4	6,9	7,2	6,6
8.d Unskilled Labour				5,6	7	10,2	20,8	22,8	23,8
9. Transport to Port Sudan						1,92	4,6	6,3	7,6
9.a Foreign Exchange						1,4	3,2	4,4	5,4
9.b Unskilled Labour						0,4	1,0	1,2	1,6
9.c Skilled Labour						0,2	0,46	0,54	0,8
10. Renewal & Replacement Cost					4,64	5,12	5,6	6,08	6,08
10.a Foreign Exchange					3,5	3,8	4,2	4,6	4,6
10.b Skilled Labour					1,16	1,28	1,4	1,52	1,52
11. Cash Transfers									
11.a Income Tax									
11.b Potential Subsidy (Foreign Exch.)					11,8	7,0	13,8	21,8	29,2
12. Working Capital					16	6,9			
12.a Foreign Exchange					16				
12.b Domestic Materials						6,9			

Table 10

BENEFITS, COSTS AND CASH TRANSFERS OF KENANA SUGAR PROJECT

(Million S£)
(Part 2)

Year	10	11	12	13	14	15	16	17-30	31
1. Output at World Sugar Price (FOB Port Sudan)	112	110	112	115	108	110	110	110	-
2. Repatriated profit (Foreign Exchange)	27	26	27	28	25	11	11	13	-
3. Repatriated Equity (Foreign Exchange)									191,4
4. Scrap Value (Foreign Exchange)									83,4
5. Reclaimed Working Capital:									22,8
5.a Foreign Exchange									16
5.b Domestic Materials									6,88
6. Indirect Benefit:									
Welfare & Housing (Domestic Materials)	5,2	5,2	5,2	5,2	5,2	5,2	5,2	5,2	-
7. Capital Costs									
7.a Foreign Exchange									
7.b Foreign Personel									
7.c Domestic Materials									
7.d Skilled Labour									
7.e Unskilled Labour									
8. Costs of Production	50,8	50,8	50,8	50,8	50,8	50,8	50,8	50,8	-
8.a Foreign Exchange	6,6	6,6	6,6	6,6	6,6	6,6	6,6	6,6	-
8.b Domestic Materials	13,6	13,6	13,6	13,6	13,6	13,6	13,6	13,6	-
8.c Skilled Labour	6,6	6,6	6,6	6,6	6,6	6,6	6,6	6,6	-
8.d Unskilled Labour	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	-
9. Transport to Port Sudan	8,16	8,16	8,16	8,16	8,16	8,16	8,16	8,16	-
9.a Foreign Exchange	5,72	5,72	5,72	5,72	5,72	5,72	5,72	5,72	-
9.b Unskilled Labour	1,64	1,64	1,64	1,64	1,64	1,64	1,64	1,64	-
9.c Skilled Labour	0,82	0,82	0,82	0,82	0,82	0,82	0,82	0,82	-
10. Renewal & Replacement Cost	6,08	6,08	6,08	6,08	6,08	6,08	6,08	6,08	-
10.a Foreign Exchange	4,6	4,6	4,6	4,6	4,6	4,6	4,6	4,6	-
10.b Skilled Labour	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	-
11. Cash Transfers									
11.a Income Tax						26,6	26,6	32,8	-
11.b Potential Subsidy (Foreign Exchange)	29,8	28,8	27,8	27	27	27	27	27	-

The principle being followed here is to give approximate breakdowns to all social costs and benefits and to use the overall percentages throughout the project life span in the hope that pluses and minuses cancel or nearly so (a point of view also expressed in the UNIDO, 1972, and by Little and Tipping, 1972, in their case study of the Kulai oil palm estate).

Luckily the foreign exchange component of capital costs which represents about 70% of the total investment cost proved to be relatively easy to split between imported materials and foreign personnel. Also costs of production have been reported in a helpful manner by putting expenditure on materials and on wages and salaries separately. In the absence of any relevant information, we guessed the breakdown of wages and salaries, but this is a very minor item. When it came to a domestic currency component, matters become somewhat more complex and consequently our procedure is a rough-and-ready method. We believe that little damage was done to our evaluation by this procedure since the capital expenditure in terms of local currency was rather small (29% of the total). Moreover, the disaggregation process will hopefully minimise the errors.

The last items which deserve some explanation are the breakdowns of rail transport and replacement costs. Following Little and Tipping (1972, p. 84), where their calculations were based on a Malaysian input-output table, we have put transport costs from Kenana to Port Sudan into the following proportions:

60% foreign exchange (e.g. fuel and spare parts)
30% unskilled labour and 10% skilled labour.

With regard to renewal and replacement cost, an attempt was made to separate the cost of equipment from that of buildings. In the end we have settled for the assumption that maintenance and repairs of buildings is rather

insignificant since about 78% of Kenana's workforce (i.e. semi-skilled and unskilled employees) live in grass cottages and huts. Renewal and replacement of equipment is obviously a heavy consumer of fuel and spare parts and a user of skilled manpower. The split between them was guessed as follows:

75% foreign exchange (imported materials)
25% skilled labour.

(3) It should be noted finally with regard to Table (10) that foreign equity participants are assumed to repatriate their share of anticipated future profits. This is shown as item 2 in the table. Moreover, capital costs under Item 7 will be reduced by 60% of S£ 330 million being the foreign equity contribution of the project in line with the discussion above.

4.1 Evaluation of Aggregate - Consumption Benefits

Our evaluation will be in successive stages of approximation. The first step is to assess the social benefits and social cost under the assumption that market prices adequately reflect the consumption benefits and cost involved. On this basis the benefits of Kenana consist of items (1), (4), (5) and (6) in Table (10) and the consumption costs (i.e. sacrifice of consumption possibilities) include items (2), (3), (8), (9), (10) and (12).

All these cost items represent payments for resources that could have been used elsewhere in the absence of the project.

The first approximation of net aggregate-consumption benefits in any given year will be measured as follows:

$$A = (1) + (4) + (5) + (6) - (2) - (3) - (7) - (8) - (9) - (10) - (12) + 0.6\ (S£\ 330\ m) \qquad (10.1)$$

To proceed to the second approximation, we have to relax our assumption of prices truly reflecting scarcity. We introduce market distortions which necessitate the adjustment of the market prices of specific resources wherever these prices do not represent the real contribution of the resources to our objective of aggregate-consumption benefits. Since imperfect market prices can occur in a number of ways for simplicity and clarity we shall assume that all resources other than foreign exchange, skilled labour and unskilled labour are correctly priced by the actual market prices.

With regard to foreign exchange, Sudan has had a two-tier exchange rate system since June 1978 to encourage inflow of foreign exchange remittances. Arrears of unpaid commercial debt amounted to $ 3.6 billion and since summer of 1978, the development programme has been slowed down due to balance of payment problems. Sudan has exercised strict quantitive import controls and export subsidies to maintain the dollar value of its pound. As the Sudan pound is clearly overvalued we apply a positive foreign exchange premium which be represented by ϕ. The opportunity cost of foreign exchange relative to the official exchange rate of the pound can be denoted by $(1 + \phi)$.

Skilled labour is fully employed in the Sudan. However, the fact that 1988 alone witnessed a number of strikes over payment disputes by Engineers, Doctors, Accountants, University Teachers and Agriculturalists Trade Unions may point to a wide recognition of underpayment. There we assume that the marginal skilled worker contributes more to aggregate-consumption benefits than the salary he/she commands. The social premium on the market wage of skilled labour can be denoted by x.

Finally we come to the case of unskilled labour which is assumed to be surplus in the Sudan. Obviously the case of surplus unskilled labour is opposite to the two previous cases. The social premium on unskilled surplus labour, which is negative, can be symbolised by λ and the opportunity cost - relative to the market wage rate - will be denoted by $(1 + \lambda)$.

Before we proceed to the formula of the second approximation we have to make one more correction. Foreign exchange in our case falls into materials and salaries to foreign personnel as part of capital costs. It is sensible to assume that foreigners will consume part of their salaries in the Sudan and repatriate the rest. For the part consumed in the Sudan there is no need for correction, since the dollar value of this part is converted at the official exchange rates and thus Sudan does not lose the extra value of the foreign exchange. We shall denote the portion of the salary consumed in the Sudan by δ. δ is between zero and one and the repatriated portion is $(1 - \delta)$.

Assuming that all the correct factors (opportunity cost premiums) will remain constant throughout, we can have our second approximation as follows:

$$B = A + \phi F + \lambda L + XW \qquad (10.2)$$

where

$$F = (1) - (2) - (3) + (4) + (5.a) - (7.a)\ (1-\delta)\ (7.b) - (8.a) - (9.a) - (10.a) - (12.a) + 0.6\ (S£\ 330\ m) \qquad (10.2a)$$

$$L = -(7e) - (8.d) - (9.b) \qquad (10.2b)$$

$$W = -(7.d) - (8.c) - (9.c) - (10.b) \qquad (10.2c)$$

The term ϕF corrects A for the opportunity cost of foreign exchange by multiplying benefits and costs component of foreign exchange by the positive foreign exchange premium ϕ. The term λ corrects A for the opportunity cost of unskilled surplus labour, L, by the negative labour premium, λ; and the last terms, XW, corrects A for skilled labour with the positive premium X.

We now come to the third and final approximation which is to account for the fact that in developing countries development is normally given a priority to the extent that the value of finds

devoted to investment exceeds the social value of the same amount of funds devoted to consumption. This phenomenon is clear in the Sudan. The fact that Sudan has accepted in principle the terms of assistance dictated by the IMF which includes severe cuts in public expenditure, lifting of subsidies on petrol, sugar and some other food items and devaluation of the Sudanese pound may all point to the inability of the government to bring about optimal savings deemed necessary for development (see also Wynn, (1980) and the World Bank, (1990)). Moreover, it can be assumed that aggregate savings in the Sudan will remain suboptimal in the near future.

This requires the adjusted net benefits in equation (10.2) above to be 'allocated' to the groups that will gain or loose from them. For this purpose, three sectors are assumed, the government (GO), the private sector (V) and unskilled labour (L) for which the net effects have to be specified.

The 'government' (including El-Nilein Bank and the Sudan Development Corporation) controls the foreign exchange market so that the net benefits of the project may be allocated to the three sectors as follows:

$$B = B^{GO} + B^{L} + B^{V} \qquad (10.3)$$

Where:

$$B^{GO} = A + \phi F - (6) \qquad (10.3a)$$

$$B^{L} = \lambda\,[(7.e) + (8.d) + (9.b] + (6) \qquad (10.3b)$$

$$B^{V} = -XW \qquad (10.3c)$$

The important points here are that unskilled labour gets two benefits. First its 'excess' payment over marginal product (the proportion λ and the further benefit of the investment in housing (6)d. The private sector, however, loses the 'surplus' it has previously enjoyed from the underpayment (by proportion X) of skilled labour drawn to the project.

B^{GO}, B^{L} and B_V must now be amended to adjust for the proportions which each group will consume or save (since savings are assumed to be at a premium;).

For instance, if the marginal savings propensity of unskilled workers is S_L then the social value of net consumption benefits flowing to unskilled labour is as follows:

$$C^{L} = [(1-S_L) + S_L P^{INV}]B_L \qquad (10.4)$$

Where:
P^{INV} = The shadow price of investment.

The same equation applies if S_{GO} and S_V are the marginal savings propensities of (GO) and (V) respectively.

On the preceding information we may write the final approximation as follows:

$$C = C^{GO} + C^{L} + C^{V} \qquad (10.5)$$

4.2 Benefits to the Sudan

In order to throw light on the question of how profitable Kenana could be for the country, we have to establish numerical values for the various national parameters which we have been specifying throughout the course of the discussion on this section. Obviously the parameters we have been discussing are essential for the assessment of the desirability of proposed public sector projects in the light of the national interests. Consequently, in estimating them, information that pertains to the state of the economy and the policies of the government are essential.

Naturally, the required information is of both factual and normative nature. Presumably this is the main reason that the two manuals presented by the UNIDO in 1972 and that by Little and Mirrlees in 1974 for evaluation of industrial projects in developing countries suggested some specific roles for a central office for project appraisal and planning as part of the Ministry

of Economy. Unfortunately this office has no counterpart in the Sudan. Accordingly we have to resort to some reasonable assumptions about these parameters based on the available information on the country and the economy. On this basis we put forward the set of assumptions in numerical value. The range of values given is believed to be appropriate to the Sudanese economy. A few comments are in order.

In view of the fact that Kenana is making use of land which was bare savannah a few years ago and where "... people used to live the same nomadic lives which their forefathers had followed for centuries" (KSC, 1980, p. 33), it may not be unreasonable to regard the opportunity cost of unskilled labour as equal to zero. A further support to this point of view can be gained from the fact that Kenana province is one of the relatively densely populated regions in the country; thus it is not expected that local production will be adversely affected by the project. On the contrary, it is almost certain that the nomads of the area will find a lucrative market in the township of Kenana for their milk, meat, etc. In any case it is to be noticed that unskilled labour costs represent a surprisingly small proportion of the total costs (7% of capital costs and 15% of the total costs of production).

In contrast, the opportunity cost of skilled labourers is estimated at between one-and-a-half and twice the market wage rate. We have already mentioned that a number of strikes took place.

In discounting the social costs and benefits we adopted the fairly safe assumption of i being 0.08 and 0.13. With regard to S and q, we followed the rule of upper and lower limits. Namely of $q > i$ and $i > Sq$ which is consistent with the UNIDO (1972) procedures. Within these limits and in the absence of any information we regard our set of values for S and q as a reasonable guess. Having numerical values for i, S and q, the shadow price of investment is calculated by the aid of the following formula.

$$p^{INV} = \frac{(1-S)q}{i-Sq}$$

As for propensities to save it is assumed that while the government may devote its savings to investment, the unskilled labourers will consume all their wages. Also it is tentatively assumed that the private sector will consume between 40% and 50% of its profit.

As for the foreign exchange premium the formula for estimating the Shadow Exchange Rate (SER) suggested by the UNIDO[6] (p. 215 onwards) is considered by many including the authors themselves as possibly, but certainly not necessarily, correct, especially if the traded goods in question are intermediate products subject to varying tariffs or quotas or both. In the absence of any reliable operational procedures on the issue we have guessed ϕ as 0.2. This is a very conservative estimate suggesting a 20% implicit premium on foreign exchange. Our narrative so far indicates that this is probably a considerable underestimate. For foreign personnel we have assumed that they will consume between 40% to 60% of their salaries on the Sudan. We have guessed these last two percentages with the high rate of inflation in mind.

All the parameters listed in Table 11 are assumed to be constant. Consequently the time flows shown in Table 10 are converted into their present value in the base year (Table 12) since that is equivalent to making separate calculations for each year of the project. Having the values in tables 11 and 12, we set in the equations given earlier. The results are given in table 13.

TABLE 11

Values of National Parameters: Assumptions Set

(1)	Foreign Exchange Premium	$\phi = 0,2$
(2)	Domestic Skilled Labour Premium	$X = 0.5$
(3)	Unskilled Labour Premium	$\lambda = 1,0$
(4)	Marginal Rate of Return to Investment	$q = 0,20$
(5)	Marginal Rate of Savings	$S = 0,25$
(6)	Social Discount Rates	$i = 0,08;\ 0,1;\ 0,13$
(7)	Shadow Price Investment	$P^{INV} = 5,0;\ 3,0;\ 1.8$
(8)	Marginal Propensities to Save (MPS):	
	(a) Government	$S^{GO} = 1,0$
	(b) Unskilled Labour	$S_L = 0,0$
	(c) Private Sector	$S_V = 0,6$
(9)	Proportion of Foreign personnel salary Spent in the Sudan	$\delta = 0.6$

Table (12)

Present value in Year 1 of items in Table (11)

(Million S£)

Item	Social rate of discount		
	8%	10%	13%
(1) Output (foreign exchange)	801,40	620,80	439,1
(2) Repatriated profit (foreign exchange)	123,20	97,45	70,3
(3) Repatriated Equity (foreign exch.)	17,60	9,97	70,3
(4) Scrap value (foreign exch.)	7,70	9,97	4,3
(5) Reclaimed working capital	2,10	1,20	0,52
(5.a) foreign exchange	1,50	0,83	0,4
(5.b) domestic materials	0,6	0,37	0,12
(6) Welfare & Housing (domestic m.)	53,4	44,2	34,3
(7) Captial costs	320,5	302,7	276,1
(7.a) foreign exchange	145,2	137,12	125,07
(7.b) foreign personnel	80,1	75,67	69,58
(7.c) domestic materials	55,3	52.06	47,49
(7.d) skilled labour	23,15	21,79	19,88
(7.e) unskilled labour	16,07	15,13	14,08
(8) Costs of production	363,71	280,75	199,33
(8.a) foreign exchange	56,37	43,52	30,89
(8.b) domestic materials	82,20	63,45	45,05
(8.c) skilled labour	57,10	44,08	31,29
(8.d) unskilled labour	167,31	129,14	91,69
(9) Transport cost to Port Sudan	49,7	39,34	27,00
(9.a) foreign exchange	29,82	23,60	16,2
(9.b) unskilled labour	14,91	11,80	8,1
(9.c) skilled labour	4,97	3,93	2,7
(10) Renewal & Replacement Cost	42,3	32,74	26
(10.a) foreign exchange	31,72	24,55	19,5
(10.b) skilled labour	10,57	8,18	6,5
(11) Cash Transfers			
(11.a) Income Tax	94,93	64,7	32,7
(11.b) potential subsidy	184,5	142,06	99,06
(12) Working Capital	15,25	13,82	11,99
(12.a) foreign exchange	10,89	9,93	8,68
(12.b) domestic materials	4,35	3,89	3,31

Table (13)

Present Value of Net Benefits in the Base Year Under Assumptions in Table 11 (Millions S£)

Item	Equation	Social Rate of Discount		
		8% $p^{INV} = 5$	10% $p^{INV} = 3$	13% $p^{INV} = 1,8$
A	(10.1)	+130,34	+91,73	+58,80
ϕ	ϕ(10.2a)	+112,35	+89,50	+67,30
λ (n.b. $\lambda < 0$)	λ(10.2b)	+198,29	+156,07	+113.87
XW (n.b. X > 0)	X(10.2c)	-47,89	-38,99	-30,18
B	(10.2)	+393,09	+298,31	+209,79
B^{GO}	(10.3a)	+189,29	+137,03	+91,80
B^{L}	(10.3b)	+251,69	+200,27	+148,17
B^{V}	(10.3c)	-47,89	-38,99	-30,18
C	(10.5)	+1035,32	+525,58	+286,74

The final line of the table represents the effect of adjusting the net receipts in line 1 for foreign exchange premia (line 2), unskilled, and skilled labour scarcity indices (lines 3 and 4). These add to the total benefits in line 5. The allocation of these benefits to the three sectors is shown in lines 6,7 and 8.

The final adjustment for each of these benefits is that for the investment premium attached to saving (eg. equation 10.4). Thus for the government, the value B^{GO} is multiplied by 5 (ie $p^{INV} = 5$), since all government benefits are assumed available for saving. The consumption equivalents so derived to add to the final C in line 9. At each discount rate used the project appears from these calculations to be socially worthwhile.

5. Summary and Conclusions of the Analysis

Although certain of the assumptions employed and shown in Table 11 are undoubtedly favourable towards the project, most notably that the government's MPS is unity, the modest foreign exchange premium must be regarded as an adequately offsetting factor.

The conclusion we draw from Table 13 is therefore a relatively optimistic one suggesting that if the productive potential of the plant at Kenana is in fact realised then the social return will be very satisfactory. Of course, this underlying assumption is critical. Fortunately, however, with the viability indicated, some room is available either for output, or indeed world price, not to realise the forecasts being used here. It also permits the (likely) eventuality that the government will not in fact save all the marginal income received from the project.

If recent experience with the world sugar price reflects, however, a substantial price fall which will be sustained significantly in the future, the optimistic conclusion will be weakened. Table (14) reproduces the exercise for a world price of 5 cents/lb (well below average) throughout the remainder of the project life. The profitability of the project becomes much more marginal at the interest rates used.

Table (14)

Present Value of Net Benefits in the Base Year Under Assumptions in Table 11

(Output at 5 cents/lb - Millions S£)

Item	Equation Number	Social Rate of Discount		
		8%	10%	13%
		$p^{INV} = 5$	$p^{INV} = 3$	$p^{INV} = 1,8$
A	(10.1)	+79,8	-74	-121,15
ϕ	ϕ(10.2a)	+101,7	+86,5	+74,5
λ (n.b $\lambda < 0$)	λ(10.2b)	+198,3	+153,1	+113,9
XW (n.b X > 0)	X(10.2c)	-47,89	-38,9	-30,2
B	(10.2)	+331,9	+129,7	37,05
B^{GO}	(10.3a)	+207,9	-31,7	-80,95
B^{L}	(10.3b)	+251,69	+200,3	+148,2
B_V	(10.3c)	-47,9	-38,9	-30,2
C	(10.5)	1128	19,62	-42,9

Postscript

We have assessed in Table 14 the effect on the social benefit cost analysis of a sustained 5 cents/lb price of sugar in the world market. On this more gloomy prediction the project becomes marginal for society as a whole.

In this context the fears expressed in the concluding section concerning the efficiency with which capacity is utilized becomes absolutely crucial. While export marketing should not be a problem given the evolution of net import demand in the Arab World, (Gumma 1988), the social profitability of the activity may be small or even negative.

On a priori grounds, this would be an odd outcome given Sudan's evident comparative advantage as a sugar producer in this part of the world. Global supply-demand mismatch would be indicated unless Sudan's costs turn out to be substantially greater than her underlying endowments suggest should be the case.

Capacity utilization and plant breakdowns would be the most obvious potential culprits. How has the plant operated so far?

The latest status report available was dated, January 31st, 1988. The general tone of it is optimistic concerning the achievement of planned output though by that time the full level of capacity utilization had yet to be achieved.

Notes

1. Other project appraisal methods include little & Mirrlees (1974), Bruno (1975), Harberger (1977), Sjaastad & Wisecarver (1977), Helmers (1979), Squire and van der Tak (1975), Hansen/UNIDO (1986) and UNIDO/IDCAS (1986). For a critical review, see Little & Mirrlees (1990).

2. This rate is in use by KSC in its Annual Status Report.

3. For distribution of bargaining power between the foreign owners of capital and the government of Sudan, see Wohlmuth (1983).

4. For non-economic assessment of Kenana's social costs (slums, drugs, ecological devastation...), see, for example, Hassaballa (April 1987) & (Nov. 1987).

5. In a recent report by KSC (summary of Training Department Activities for crop year 1989/90), it is stated that in 1989/90 alone 60 semi-skilled employees had on-job training in boilers operations, hand tools, sugar boiling, evaporation, switchgear ..... etc., and 20 employees attended training courses abroad.

6. $$SER = \sum_{i=1}^{n} f_i \frac{P^{Di}}{P_i Cif} = \sum_{i=n+1}^{n+h} x_i \frac{P^{Di}}{P_i fob}$$

Where f_i = the fraction of foreign exchange allocated to imports of the ith of n commodities at the margin. X_i = the domestic currency amount by which each of h exports falls in response to earnings of foreign exchange. P_i^P = the domestic market clearing prices of imports and exports that is inclusive of trade taxes and subsidies. $P_i cif$ and $P_i fob$ are border prices of imports and exports respectively.

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Appendix (1)

Estimates of profit and Income Tax (Million $)

(Part 1)

	1975-1977	1978	1979	1980	1981	1982	1983	1984	1985
	1-3	4	5	6	7	8	9	10	11
Domestic sales	-	-	18,80	59,40	86,70	73,60	79,80	79,80	79,80
Foreign sales	-	-	-	31,60	32,08	63,30	61,76	60,80	60,10
Total Revenue	-	-	18,80	91,30	119,50	136,70	141,60	140	141
Variable Costs of production	-	-	1,92	25,60	23,80	31,60	35,20	35,20	35,20
Fixed Costs of production	-	11,76	12,96	14,24	15,60	15,60	15,60	15,60	15,60
Pre-production expenses	-	0,8	1,6	1,6	1,6	0,8	-	-	-
Depreciation	-	-	-	4,0	19,6	25,60	26,90	26,90	26,90
Total costs of production	-	12,96	16,50	43,30	64,30	71,30	77,60	77,60	77,60
Profit (Loss)	-	(12,76)	2,4	47,40	56,70	66,30	64,00	63,20	62,40
Debt Servicing	-	2,24	2,24	11,39	11,39	17,56	18,11	18,11	18,11
Net Profit Before Tax	-	(15,00)	0,16	36,01	43,31	47,24	45,39	45,10	44,30
Income Tax	-	-	-	-	-	-	-	-	-
Net Profit After Tax	-	(15,00)	0,16	36,01	43,31	47,24	45,90	45,10	44,30

Appendix 11

Estimates of profit and Income Tax (Million SE)

(Part 2)

	1986	1987	1988	1989	1990	1991	1992	1993	1994
	12	13	14	15	16	17	18	19	20
Domestic Sales	79,80	79,80	79,80	79,80	79,80	79,80	79,80	79,80	79,80
Foreign Sales	61,20	61,40	55,70	60,32	60,32	60,32	60,32	60,32	60,32
Total Revenue	141	141	135,60	140,12	140,20	140,20	140,20	140,20	140,20
Variable Costs of production	35,20	35,20	35,20	35,20	35,20	35,20	35,20	35,20	35,20
Fixed Costs of production	15,60	15,60	15,60	15,60	15,60	15,60	15,60	15,60	15,60
Pre-production expenses	-	-	-	-	-	-	-	-	-
Depreciation	26,90	26,90	26,90	26,90	26,90	26,90	26,90	26,90	26,90
Total costs of production	77,60	77,70	77,70	77,70	77,70	77,70	77,70	77,70	77,70
Profit (loss)	63,30	64,20	60,80	62,40	62,40	62,40	62,40	62,40	62,40
Dept Servicing	18,11	18,11	18,11	18,11	18,11	18,11	18,11	5,87	7,72
Net Profit Before Tax	45,30	46,70	42,70	44,30	44,30	44,30	53,50	56,70	54,70
Income Tax	-	-	-	26,60	26,60	26,60	32,10	32,50	32,50
Net Profit After Tax	45,50	46,70	42,70	17,70	17,70	17,70	21,40	21,90	21,90

Appendix I

Estimates of profit and Income Tax (Million $)

(Part 3)

	1995	1996	1997 2000	2001 2004	2005
	21	22	23-26	27-30	31
Domestic Sales	79,80	79,80	79,80	79,80	-
Foreign Sales	60,72	60,72	60,72	60,8	-
Total Revenue	140,52	140,52	140,52	140,52	-
Variable Costs of production	35,20	35,20	35,20	35,20	-
Fixed Costs of production	15,60	15,60	15,60	15,60	-
Pre-production expenses	-	-	-	-	-
Depreciation	16,90	16,90	16,90	16,90	-
Total costs of production	77,70	77,70	77,70	77,70	-
Profit (loss)	62,40	62,40	62,40	62,40	-
Debt Servicing	7,72	7,72	7,72	7,72	-
Net Profit Before Tax	54,70	54,70	54,70	62,40	-
Income Tax	32,80	32,80	32,80	32,80	-
Net Profit After Tax	21,90	21,90	21,90	21,90	-

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