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PROGRAMMING MISSION TO GUYANA

27 February - 15 March 1986

Report*

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I. INTRODUCTION

In view of the preparations initiated for the 4th UNDP Country Programme Cycle, the Government of Guyana invited UNIDO to review the industrial sector with a view to identifying constraints on industrialization and defining priority areas of need which UNDP/UNIDO could address during the cycle. The project DP/GUY/86/001 Industrial Sector Survey was approved to finance the mission.

A UNIDO headquarters mission was fielded from 27 February to 15 March 1986. The mission was composed of:

Mr. S. Hable-Selassie	Deputy Director, Division of Industrial Operations, Team Leader
Ms. J. Bancroft	Area Officer, Programme Development and Evaluation Branch, Division of Policy Co-ordination, Mission Co-ordinator
Mr. A. Bassili	Senior Industrial Development Officer, Agro-Industries Branch, Division of Industrial Operations
Mr. G. Mariki	Industrial Development Officer, Negotiations Branch, Division of Policy Co-ordination
Mr. P. Ryan	Senior Industrial Development Field Adviser

The mission as a whole and individual team members separately held a series of consultation meetings with various Government departments, public and private sector institutions and associations and national and multilateral financial institutions. Manufacturing enterprises and facilities were also visited. The major focus of discussions related to the strategy and action programme of GUYMIDA which was recently established for mobilizing the private sector for the promotion and development of small- and medium-scale industries. Many of the meetings were also attended by the Resident Representative, Ms. Cecile Davis.

The mission held a summing-up session under the chairmanship of DIEC and with the participation of GUYMIDA, IAST, GUYSTAC, and SPS at which is presented its preliminary findings. This report presents the conclusions and findings of the mission.

The mission takes this opportunity to express appreciation and thanks to Ms. Cecile Davis for the guidance and advice she provided to it and to her staff for facilitating its work. The mission further wishes to record its appreciation and gratitude to Mr. Clement Duncan and the staff of GUYMIDA for the depth and insights which they gave of the manufacturing sector and its needs; to Mr. Abrams and the staff of DIEC for the guidance and programming of the work of the mission; to Mr. Blue and Dr. Long for their briefs and analyses of the potentials and issues of the economy in general and the manufacturing sector in particular; and to many others for their readiness to provide information and to answer the many questions raised by the mission.

II. OVERVIEW OF THE ECONOMY

1. The basis of the national economy

Guyana is a country which is richly endowed with natural resources. Bauxite is by far the most important mineral resource currently accounting for about 45% of export earnings[1/]. Guyana's share of the world bauxite market in the 1970s was about 80%. Although in the mid-1980s this share fell to some 50%, nevertheless Guyana is still the world's largest producer of bauxite from its mines at Linden and in Berbice County. New reserves were also discovered in the Pakarima Plateau where mining is planned to be started within the next two to three years. Important reserves of gold, diamonds and manganese are also reported although their full potential are yet to be ascertained and their efficient exploitation to be ensured.

Sugar, rice and timber constitute the main agricultural resources on which the Guyanese economy is based. In 1985 between them they accounted for 40% of total export earnings, the share of sugar being 32%. Sugar and rice are produced in the coastal plain behind a sea defence system, the maintenance of which calls for sizeable outlays in recurrent Government expenditures. Guyana has vast timber resources; some 84% of the country is covered with forests, of which 20 - 30% are regarded as exploitable. Production of timber has averaged about 150,000 cu. metres over the last few years and its share of export earnings has remained constant at 2% over the period 1980 - 1985[1/]. Fish is another important resource with good export potentials. Catches of fish excluding prawns and shrimps, in 1985 amounted to 41 million kgs. thus showing an increase of nearly 45% compared to those of 1984.

The population of Guyana was 758,619 according to the 1980 Population Census. In mid-1985, it was estimated to be 780,000, while the rate of population growth is estimated at 1% per annum. The economically active population was stated to be 420,762 in the Census of which only 192,636 were gainfully employed. The unemployment level in the economically active male population was 15.2% and the female population 19.7%. The adult literacy rate is very high, being over 90%. Further 99% of the school age population attend school. The country thus possesses a reservoir of well-educated Guyanese which could be tapped to develop the requisite skills for industrialization.

1/ See Table 1.

2. Overall trends of the economy

The Guyanese economy has been experiencing serious difficulties since the mid 1970s. GDP in real terms continued , on the whole, its downward trend in the 1980s. In 1983 real per capita GDP was about 60% of its level in 1975. Over the period 1980 - 1985, decline was most pronounced in 1982 when the growth rate fell by nearly 11%[2/]. The economy recovered in 1984 which was further sustained in 1985: the annual rates of growth recorded being nearly 6% and 1% respectively.

A number of adverse and inter-related factors have contributed to the poor performance of the economy and its general decline. External developments have in particular played an important role since Guyana is essentially an open economy. The worsening of the terms of trade combined with declining outputs of the country's major export commodities led to sharp falls in foreign exchange earnings. At the same time, Guyana's import bill for fuel continued to strain import capacity. Its share rose to over 45% of imports in 1985. Thus the deficit on the current account balance rose from G$ 254 million in 1980 to G$ 405 million in 1983. There were some improvements in 1984 and 1985 but nevertheless they were still substantial in that the deficits recorded were in the order of G$ 391 million and G$ 324 million respectively[2/].

On the other hand, inflows of funds from abroad were too small to compensate for these deficits. To be sure, the net inflow of funds was negative in the period 1983 - 1985 rising to a record high of over G$ 480 million in 1985. While in the 1970s the deficits were made-up by the public corporations, they were in no position to do so in recent years as they themselves were incurring substantial losses arising out of lack of foreign exchange resources and further compounded by the operational problems encountered. In these circumstances, Guyana's balance of payments position has deteriorated and its public debt has risen sharply.

2/ See Table 1.

Table 1
Basic Economic Indicators
(1980 - 1986)

Year	1980	1981	1982	1983	1984	1985	Projected 1986
GDP (million G$)	13336.0	1350.0	1250.0	1200.0	1410.0	1630.0	1855.0
Per capita GDP (G$)	1763	1781	1612	1548	1803	2094	2354
GDP at 1980 current prices	1336.0	1306.0	1162.0	1079.0	1139.0	1150.0	1193.0
Annual rate of growth of GDP (%)	+1.83	-2.62	-10.68	-2.84	+5.56	-0.97	+3.74
Net import of goods and services (million G$)	-254.0	-476.0	-401.0	-405.0	-391.0	-324.0	-308.0
Net inflow of funds from abroad (million G$)	33.2	332.6	65.0	-121.0	-264.0	-481	N.A.

Sources: Statistical Bulletin, Bank of Guyana, September 1985.
Estimates of Current and Capital Revenue and Expenditure for the year 1986, Government of Guyana, State Planning Secretariat, Central Statistical Bureau.

Table 2

INDUSTRIAL ORIGIN OF GDP

(million G$)

1980 - 1986

Year	1980	1981	1982	1983	1984	1985	Projected 1986
Agriculture, forestry and fishing	371.0	351.0	336.0	307.0	347.0	439.0	484.0
Mining and quarrying	221.0	101.0	88.0	17.0	65.0	50.0	105.0
Manufacturing and processing	103.0	150.0	135.0	140.0	183.0	227.0	285.0
Construction	95.0	110.0	95.0	98.0	100.0	120.0	129.0
Services	546.0	638.0	596.0	636.0	715.0	794.0	852.0
GDP	1336.0	1350.0	1250.0	1200.0	1410.0	1630.0	1855.0

Sources: Statistical Bulletin, Bank of Guyana, September 1985.
Estimates of Current and Capital Revenue and Expenditure for the year 1986, Government of Guyana, State Planning Secretariat, Central Statistical Bureau.

The foreign exchange constraint is consequently critical to the stabilization of the Guyanese economy in the short-run and its sustained growth in the future. The immediate and urgent need is to restore the large productive sectors to their former status and to diversify energy sources so as to reduce the high import bill for fuel. The prospects of mobilizing savings from the domestic public sector and the banking system being limited in the short-rum, Guyana needs a substantial injection of foreign capital to induce recovery and growth.

3. Composition and structure of GDP

The primary and secondary sectors account for over half of GDP. During the period 1980 - 1985, GDP originating in the agriculture sector showed a steady decline up to 1983 and a recovery in subsequent years [3/]. The downturn of the mining sector was more dramatic in that it fell from a level of G$221 million in 1980 to G$17 million in 1983. The modest recovery in 1984 was offset by yet another fall in 1985. On the other hand, GDP originating in the manufacturing sector has generally been recording an upward trend. It rose from a level of G$103 million in 1980 to G$227 million in 1985.

The structure of GDP has consequently shifted significantly during the period. While the share of agriculture changed only moderately, i.e. from 28% in 1980 to 27% in 1985; that of mining fell from 17% in 1980 to 3% in the corresponding period [4/]. The share of manufacturing rose from 8% in 1980 to 14% in 1985, while the share of construction has, on the whole, remained constant at a level of about 7.5%. Consequently, the manufacturing sector would seem to have largerly offset the sharp decline in the share of the mining sector.

Gross fixed capital formation has on the whole also recorded a downward trend during the period 1980 - 1985 [5/]. It fell from a level of G$449 million in 1980 to G$390 million in 1984 and G$410 million in 1985. The fall was more pronounced in private sector investments, i.e., from G$115 million in 1980 to G$55 million in 1985. The share of gross fixed capital formation in GDP fell from about 30% in 1980 to less than 21% in 1985. Expenditure on consumption has on the other hand been rising steadily from a G$1232 million in 1980 to G$1771 million 1985.

2/ See Table 2.
4/ See Table 3.
5/ See Table 1.

Table 3

STRUCTURE OF OUTPUT

(Percentage)

1980 - 1986

Year	1980	1981	1982	1983	1984	1985	1986
Agriculture, forestry and fishing	27.8	26.0	26.9	25.8	24.6	26.9	26.1
Mining and quarrying	16.5	7.5	7.0	1.4	4.6	3.1	5.6
Manufacturing and processing	7.7	11.0	10.8	11.6	13.0	13.9	15.4
Construction	7.1	8.2	7.6	8.2	7.1	7.4	7.0
Services	40.9	47.3	74.7	53.0	50.7	48.7	45.9
GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Based on Table 2.

Table 4

EXPENDITURE ON GDP

1980 - 1986

(million G$)

Year	1980	1981	1982	1983	1984	1985	Projected 1986
1. Consumption	1232.0	1392.0	1311.0	1358.0	1580.0	1771.0	1733.0
- Private	(796)	(922)	(876)	(893)	(1030)	(1071)	(1001)
- Public	(436)	(470)	(435)	(465)	(550)	(700)	(732)
2. Gross Fixed Capital formation	449.0	530.0	380.0	395.0	390.0	410.0	655.0
- Private	(115)	(110)	(60)	(60)	(80)	(55)	(65)
- Public	(334)	(420)	(320)	(335)	(310)	(355)	(590)
3. Exports	1042.0	1059.0	793.0	676.0	943.0	1114.0	1232.0
4. Imports	-1215.0	-1384.0	-1038.0	-972	-1151	-1331	-1436
5. GDP at current market prices	1508.0	1597.0	1446.0	1455.0	1700.0	1964.0	2184.0
6. Share of GDCF of GDP	29.8	31.9	26.3	27.2	22.9	20.9	30.0

Source: IBID

Export performance during the period continued to be disappointing. Merchandise exports fell from G$992 million in 1980 to G$580 million in 1983, but recovered to G$910 million in 1985[6/]. The largest drop was in the bauxite sector followed by sugar, rice and timber. Merchandise imports followed a similar pattern. The fall in the imports of consumer, intermediate and capital goods were very substantial between 1980 and 1983, while that of fuels and lubricants was relatively less pronounced. Bauxite, sugar and rice between them generally account for an average of 85% of exports with the share of bauxite averaging over 40% and sugar 35%[7/]. The structure of exports has remained more or less constant over the years. With regard to imports, the share of fuels and lubricants has been rising noticeably, from 36% in 1980 to 45% in 1985. The share of other import expenditures has changed only moderately during the period.

Production of the major export commodities was lower in 1985 compared to 1980 and more so compared to the levels attained in the mid-1970s. Bauxite production in 1985 was about 87% that of 1980 and rice and sugar productions in 1985 were about 90% those of 1980[8/]. While production levels in physical terms were not particularly substantial, nevertheless the decline of their shares in GDP were quite significant: that of sugar fell from about 15% in 1980 to less than 10% in 1985 and of bauxite from just less than 17% in 1980 to just over 5% in 1985, while that of rice remained somewhat constant at about 4% during the period [9/] thus reflecting the effect of the sharp falls in international commodity prices.

6/ See Table 5.

7/ See Table 6.

8/ See Table 8.

9/ See Table 9.

Table 5

TRADE BALANCE

1980 - 1986

(million G$)

Year	1980	1981	1982	1983	1984	1985	Projected 1986
Exports							
Merchandise exports	992.0	974.0	724.0	580	831	910	1020
of which:							
- Bauxite	479.3	427.4	282.8	220	346	407	456
- Sugar	307.6	302.8	263.6	208	271	287	293
- Rice	87.5	110.0	60.7	65	80	55	87
- Timber	16.6	15.6	14.8	13	15	18	17
Services	50	85	69	96	112	204	212
Imports							
Merchandise imports	1010.0	1208.0	842.0	745	850	978	1065
of which:							
- Consumer	130.0	161.0	111.0	82	110	100	108
- Intermediate	682.0	851.0	584.4	230	175	263	278
- Capital goods	331.0	420.0	256.0	144	160	183	235
- Fuel and lubricants	351.0	431.0	328.5	290	400	436	436
Services	205	175	198	228	302	353	371
Resource Balance	-173	-325	-245	-297	-209	-217	-204

Source: IBID

Table 6

SHARE OF PRINCIPAL EXPORTS 1980 - 1986

(Percentage)

Year	1980	1981	1982	1983	1984	1985	Projected 1986
Bauxite	48	44	39	38	42	45	45
Sugar	31	31	36	36	33	32	28
Rice	9	11	8	11	10	6	9
Timber	2	2	2	2	2	2	2
Other	10	12	15	15	13	15	15
	100	100	100	100	100	100	100

Source: Based on Table 5.

Table 7

SHARE OF PRINCIPAL IMPORTS 1980 - 1986

(Percentage)

Year	1980	1981	1982	1983	1984	1985	Projected 1986
Food, beverages	7	6	5	3	.	.	.
Clothing and footwear	1	1	2	1	.	.	.
Cars	1	1	1	1	.	.	.
Fuels and lubricants	36	36	39	39	47	45	41
Textiles and fabrics	3	3	2	1	.	.	.
Agricultural and industrial machinery	11	4	9	9	.	.	.
Transport Equipment	2	3	3	3	.	.	.
Mining Equipment	3	1	.	1	.	.	.
Other	32	37	33	35	.	.	.

Source: Based on Table 5.

Table 8

PRODUCTION OF MAJOR EXPORT COMMODITIES (1980 - 1985)

(physical inputs: thousand tons)

Year		1980	1981	1982	1983	1984	1985	Projected 1986
Sugar	(000 tons)	269.6	300.8	287.7	251.9	245.7	246.9	259.1
	Index	109.7	122.4	117.1	102.5	100.0	100.5	108.3
Rice	(000 tons)	169.1	165.6	181.6	147.6	187.1	156.1	203.3
	Index	90.4	88.5	97.1	90.4	100.0	83.4	108.6
Bauxite								
	(000 tons)	1874.8	1681.0	1251.1	1085.3	1303.1	1628.3	1913.0
	Index	143.9	129.0	96.0	83.3	100.0	125.0	146.8

Source: IBID

Table 9

SHARE OF MAJOR EXPORT COMMODITIES IN GDP

(Percentage)

Year	1980	1981	1982	1983	1984	1985	1986
Sugar	14.8	11.9	9.0	8.3	9.9	9.9	10.0
Rice	3.8	4.0	5.0	4.2	4.6	3.8	4.7
Bauxite	16.5	7.5	7.0	1.4	4.6	5.2	5.1
	35.1	23.4	21.0	13.9	19.1	18.9	19.8

Source: Mission estimates.

4. The manufacturing sector

The processing of bauxite and the milling of sugar and rice are activities which the Guyanese national accounts include in the mining and agriculture sectors respectively. Exclusive of these, the Guyanese manufacturing sector is small, accounting for less than 14% of GDP in 1985 10/. Nevertheless it is a sector which has steadily increased its share in the 1980s and which has by and large succeeded in offsetting the poor performance of the mining sector in particular. Industrial production generally takes place in small units in both the private and public sectors.

A variety of consumer, intermediate and capital goods are manufactured: foods and beverages; pharmaceuticals, textiles and leather; and refrigerators and stoves 11/. Production of aerated beverages, cigarettes, sweetened biscuits, matches, textiles, footwear and stoves increased substantially in 1985 compared to 1984. On the other hand, some pharmaceutical products, stockfeed, paints and refrigerators recorded downturns in 1985 compared to previous years. To be sure, the performance of several of the industrial activities in 1984/1985 improved considerably in contrast to their performance in the period 1972 - 1982 12/. High and positive rates of growth were recorded with the exception of biscuits and refrigerators. Furthermore, beer and cigarettes production has, on the whole, been steadily increasing since the mid-1970s.

However, current production levels are either a mere fraction of installed capacities or substantially less than production attained in the mid-1970s especially with regard to garments, edible oil, margarine, flour and biscuits. Capacity utilization is generally very low and output levels erratic. A number of industries have run into a state of disrepair on account either of the general shortage of foreign exchange to retool factories and buy spare parts and/or managerial and technical shortcomings. Policies and

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10/ See Table 3.

11/ See Table 10.

12/ See Table 11.

Table 10

MANUFACTURING OUTPUT 1984 - 1986 (in physical units

INDEX 1984 = 100.00

Item	UNIT	1984	Index	1985	Index	1986 (Estimates)	Index
Rum	Litres Mn.	17.3	100.00	17.9	103.47	18.2	105.20
Beer and stout	000 Litres	7731.5	100.00	7982.0	103.21	9002	116.43
Aerated:							
Aerated	000'Cases	2083	100.00	2418	116.08	2700	129.62
Malta	000'Cases	273	100.00	342	125.27	300	109.89
Shandy	000'Cases	176	100.00	277	157.39	240	136.86
Cigarettes	Mn. Sticks	373.2	100.00	466.9	125.11	510.0	136.66
Stockfeed	Mn. Kg.	26.1	100.00	25.5	97.70	25.0	95.79
Flour	000'Lb.	..	..	..	..	..	..
Biscuits	000'Tons	..	..	..	..	..	..
Sweetened	000'Kg.	95.5	100.00	286.4	299.89	438.6	459.26
Unsweetened	000'Kg.	806.4	100.00	50.9	6.31	545.5	67.65
Pharmaceuticals:							
Liquid	000 Litres	528	100.00	438	82.95	840	159.09
Tablets	Mn.	22.5	100.00	18.4	81.77	48.0	213.33
Ointments	000'Kg.	4.9	100.00	5.0	102.04	9.6	195.92
Matches	000'Gross Ctn.	114.5	100.00	160.8	140.44	240.0	209.61
Paints	000'Gals	65.2	100.00	30.3	16.47	100.0	153.37
Textiles	Mn. Metres	1.5	100.00	1.7	113.33	4.3	286.67
Footwear	000'Prs.	216.8	100.00	233.0	107.47	305.0	140.68
Refrigerators	No.	9607	100.00	6092	63.39	10,000	104.09
Stoves	No.	1547	100.00	1635	105.69	..	..

.. = not available

Source: IBID

incentive measures have also been inadequate to induce and channel domestic and foreign investments to small- and medium-scale industries. Profitability in the sector has furthermore been limited on account of the constraints of supply and high cost of fuel and power.

The potentials of the manufacturing sector are, however, considerable, given the country's national resources base, the high level of literacy and the industrial technological and research capabilities that have been developed. Moreover, Guyana disposes of a wide range of institutions, the experiences of which could effectively be tapped to support private and public sector initiatives for widening the country's industrial base.

Table 11

PERCENTAGE CHANGE IN OUTPUTS OF MAJOR MANUFACTURED PRODUCTS

(1972 - 1985)

Period	1972 - 1982 (Av. Annual)	1984 - 1985
Textiles	3.9	13.3
Margarine	4.2	-
Flour	8.6	-
Biscuits	2.1 1/	62.6
Aerated beverages	2.8 1/	20.0
Rum	-	3.5
Beer and stout	5.7	3.2
Cigarettes	3.8 1/	25.1
Matches	-	40.4
Soap	5.0	-
Footwear	-	7.5
Refrigerators	-	36.6

1/ 1972 - 1979.

Source: Mission estimates.

5. Outlook

Guyana faces a severe foreign exchange crisis. The performance of the major export commodities plummeted to disappointingly low levels in 1983 from which the recovery has been rather slow in the subsequent years 13/. It is estimated that exports in 1986 of bauxite, sugar and rice would attain the peak reached in 1980 during the current decade. Real GDP is expected to grow by nearly 4% in 1986 compared to 1985, but its level would still be far below that of 1980. The projected upturn of exports would be inadequate to generate the foreign exchange resources needed to import industrial raw materials, spare parts and other inputs to induce sustained recovery of growth. At the same time, the worsening positions of public finances and balance of payments have limited Guyana's ability to cope with internal and external debts and consequently its ability to borrow. Another aspect of the foreign exchange crisis is that is has induced inflationary pressures on the economy on account of shortages of imported goods and high cost of production of domestic goods. The manufacturing sector is particularly adversely affected by uncertainties in and high cost of the supply of fuel and power.

Growth recovery and future sustained development are critically dependent on the success of the Government's energy policy and measures aimed at diversifying and conserving energy resources. The search for oil has been resumed. Guyana has also huge hydropower potential but the required capital of over $ 1 billion is well beyond Guyana's threshold. Research and studies are being conducted to establish the feasibility of constructing small-scale dams and mini-hydropower stations. There are good prospects for further developing new and renewable sources of energy based on agricultural waste, bagasse and forest resources.

The immediate need is the injection of substantial external capital to alleviate the foreign exchange constraint, to rehabilitate industries which have fallen into disrepair and to develop alternate energy resources. At the level of the World Bank, discussions are being pursued with a view to launching a stabilization programme in the first instance and thence proceed to a programme of medium-term growth and development.

13/ See Table 5.

In the last five years, the Government has introduced a number of measures to stem the decline of the economy including the adoption of a structural adjustment programme in 1980, the devaluation of the Guyanese dollar in 1981 and an action programme for the reform and restructuring of the public corporations. Perceptible shifts in economic policy would seem to have taken place in the process. The restructuring of GUYSTAC in 1985 provides for greater managerial accountability of individual enterprises and the establishment of GUYMIDA is one evident manifestation of the Government's desire to mobilize the private sector in the area of small- and medium-scale industries. A Private Sector Advisory Council to the President has also been set up. These augur distinct orientations towards a liberalization of economic policy.

The 1986 Budget Speech of the Minister of Finance has set out the specific tasks for the private sector in terms of Guyana's tri-sectorial economy as follows:

- increase in net foreign exchange earnings
- decrease in imports
- increase in employment
- impact on markets
- dynamism to small business activity
- contribution to new product development and for transfer of technology

These tasks are integral components of the overall development strategy aimed at raising efficiency in production, full utilization of Guyana's installed capacities and natural resources, energy conservation and diversification and the building-up of technological capacities and capabilities. Government is committed to review and introduce incentive systems to build-up the private sector within the tri-sectorial economy so that it plays a dynamic role in exports based on the country's natural resources.

The manufacturing sector is projected to account for over 15% of GDP in 1986. Given the possibilities of successfully resolving the foreign exchange and energy constraints, the sector's growth prospects are good. Guyana has the institutional and skill capabilities for the immediate tasks confronting the manufacturing sector. These are firstly the rehabilitation and revitalization of existing industries. The focus of policy is to bring these industries into full and efficient production by injecting capital to replace equipment and machinery of those industries presently in states of disrepair: speeding-up the process of technology transfer and development; streamlining production, marketing and management: and up-grading skills. Secondly, it is the vigorous pursuance of the measures introduced by the Government to mobilize the private sector in export-oriented, small and medium scale industrial development. Lastly, the provision and effective administration of incentive policies and investment promotion systems to engender confidence for investors into new productive facilities.

Guyana enjoys a high literacy rate (90%), and an adequate supply of engineers and economists from the University of Guayana to cope with the immediate tasks outlined above. There exists also a number of training institutions for upgrading skills such as the Management Institute, Guyana Industrial Training Centre (GITC), Guyana Technical Institute (GTI) and New Amsterdam Training Institute (NATI). In addition, the public corporations provide specialized training in their fields of competence. Guyana has also created and developed institutions in research and standardization in addition to Government and public sector agencies to cope with the varied issues of industrial development and administration, the most recent of these being GUYMIDA. In regard to the transfer of technology, IAST has developed the capacity needed for providing assistance to the manufacturing sector. Bilateral and multilateral assistance nevertheless stand to play a highly catalytical role in enhancing skills and institutional capabilities particularly at this critical juncture of policy and programme re-orientation to cope with the current economic crisis and prepare for future growth and sustained development.

In the long run, on the other hand, the narrow population base of Guyana may become a restrictive constraint on industrialization. Guyana may well have to opt for a capital- and technology-intensive strategy of industrial

development. Plans and programmes would need to be drawn-up now to meet this eventuality in the future. Consequently, technical assistance programmes would have to take into account not only those measures needed for short term resolution of the current economic crisis but also of future skills and technological parameters for long-term development.

Centralized comprehensive planning is not practiced in Guyana. On the other hand, while the State Planning Secretariat is well disposed to indicative planning, it does not, however, have at present the sectoral capabilities to do so. There is no central nucleus for industry either to be able to undertake the task as responsibilities for the sector are spread over several sectoral and organizational entities. The need at least for consolidating and up-dating data on existing industry irrespective of the sectoral and organizational locations of productive capacity is evident as it constitutes an essential first-step for meaningful policy analysis and coherent programming of the sector.

III. SMALL-SCALE INDUSTRY AND THE PRIVATE SECTOR

1. The role of small-scale industries

The Government of Guyana has given indications of a shift of policy towards placing greater importance on the role of the private sector in industrial development. In the Budget Speech to the National Assembly given 28 February 1986, the Government said that it will be implementing policies to strengthen the private sector in Guyana and particularly to give assistance to strengthen specific industries. The fiscal incentives programme will be restructured in terms of level and structure. In 1985 for example, the consumption tax on imported raw materials was abolished in keeping with the policy of encouraging local manufacturing industry. The Government further recognizes the need to encourage private initiative and innovation in the private sector, particularly those involved in exports.

While no industrial census has been done, there are approximately 625 firms listed in the National Directory of Manufacturers which can be classified as non-public enterprises. The small and medium sector represents approximately 20% of manufacturing sector contribution to GDP.

The breakdown by sector of operating enterprises is given in Table 12. There was no data available on number of employees or capital to determine the size of the firms; but many would, no doubt, be classified as small or medium firms.

The range and variety of products produced by the industrial sector in Guyana is considerable. They include the following:

(20) Food products: Jams, jellies, syrup, guava, table sauce, carambola concentrate, preserved fruits, tomato ketchup, casava stock, fish and prawns, salted fish, salted meats, sausages, ham, bacon, molasses, edible oil, curry powder, black pepper, orange juice, biscuits, cones, ice cream, plantain flour, peanut butter, plantain chips, rice flour, mustard oil, acetic acid, animal feed, vinegar, milk, bread and pastries, pickles, food condiments-spices, sweets.

(21)	Beverages:	Beer, wine, rum, spirits, aerated beverages.
(23-24)	Garments:	Shoes, sandals, bags, shirts, trousers, buttons, briefcases, travelling bags, bedsheets, pillows.
(25)	Wood:	Sawnwood, veneer.
(26)	Joinery and furniture:[14/]	Tables, chairs, beds, wardrobes, desks, prefabricated houses, doors windows, crates, beverage cases, pallets.
(27)	Chemical products:	Soap and detergent, plastic products, paint, bleach, shoe polish.
(32)	Non-metallic minerals:	Claybricks, concrete blocks, ceramics, tableware, glass.
(34-35)	Basic metals	Sheet metal, pots, buckets, pulleys, wire, nails, pipe, aluminium products, spare parts.
(39)	Miscellaneous:	Jewellery manufacture, precious stones.

2. The data base for planning and policy formulation

The definition of small and medium industries can be determined in a number of ways: One is according to number of employees:

under 10	micro
10 - 50	small
51 - 100	medium
over 100	large

14/ Other wood products include: Matches, toothpicks, clothespins.

Another definition would use "capital": - those having equipment of less than G$30,000 would be tiny and up to G$80,000 would be considered small. The exact definition would have to be worked out based on an analysis of the capital and labour patterns of existing small and medium industries. This information is yet to be collected and has been suggested as a follow-up activity to this mission.

There is a need to have more detailed information on the exact number of establishments; levels of employment by enterprise group and location; structure of the work force; use of power machines; and level of record keeping. This information could be collected by a survey by industrial subsector using a questionnaire which could then be analyzed statistically. Government is also presently conducting a study of the small and medium industry sector. When this investigation is completed, it will be possible to know some of the constraints facing the small- and medium-scale industry sector.

In the view of industry representatives, the overriding concern of industrialists in the country is the high underutilization of productive capacity and lack of foreign exchange to acquire spare parts and raw materials. In addition, a number of problems were cited such as shipping problems, poor delivery records due to breakage, supply of raw materials and lack of continuous power supply. There is a need to find ways of entering the export market in order to earn foreign exchange. The constraints to exporting are quality and design of the products and the need for adequate packaging. Joint ventures with foreign firms is a mechanism that could be explored in order to take advantage of new markets.

3. Assistance to the small-scale industry

As part of their new policy towards the private sector and small-scale industry, the Government is interested in strengthening the Guyana Manufacturing and Industrial Development Agency (GUYMIDA) which was established in December 1984 by Act of Parliament. The Agency has a staff of 40 persons and its mandate is to undertake activities leading to the establishment, expansion or rehabilitation of manufacturing enterprises. Among its key tasks are the administration of fiscal incentives, pre-investment studies, technical and managerial consultancy as well as

industrial policy formulation. Because it is a relatively new organization, there is a need for technical assistance to institutionalize proper systems and procedures and to establish high levels of proficiency for all professional staff members. The important subsectors for development are small-scale food processing, furniture, metal workshops, foundries. The promotion of subcontracting with large firms would be an important promotional task of the organization.

In relation to the investment climate, GUYMIDA plans to develop an investment manual which would include all regulations and requirements for investing in Guyana. There was support among industry representatives for strengthening GUYMIDA's capacity to provide extension services to industry and carry out investment promotion activities.

Table 12

PRIVATE SECTOR FIRMS IN GUYANA

Sector		Number of enterprises
(20)	Food	82
(21)	Beverages	19
(23-24)	Footwear, textiles, wearing apparel	104
(25)	Wood cork (excluding furniture)	136
(26)	Furniture	81
(27-28)	Paper, paper products, printing, publishing	47
(29)	Leather, leather products and other craft	34
(31)	Chemical and chemical products	25
(32)	Non-metallic mineral products	14
(34-35)	Basic metals and metal products	31
(37)	Electrical machinery, aparatees, appliances	14
(39)	Miscellaneous manufacturing	38
	TOTAL	625

Source: National Directory of Manufacturers, 1985.

IV. AGRO-INDUSTRIES SECTOR

1. Timber industry

Guyana has a wide stretch of tropical forest which covers about 70,000 square miles or some 84% of the total surface area. In spite of this valuable resource, the forests of Guyana still play only a very minor role in the country's economy. Total production of sawn-wood in 1982 was estimated by FAO to be only 201,000 m^3, valued at US$ 2.5 million being exported in log form. In 1982 production of sawn wood was 70,000 m^3, of which 14,000 m^3, valued at US$ 3.7 million were exported. According to the statistics of the Forestry Commission there are some 79 sawmills in the country with 154 headrigs installed, 55% of these are gangsaws, while 38% use circular saws and only 6% use band saws. Capacity utilization in these mills is notoriously low. According to recent statistics of the Forestry Commission the total installed capacity was 74,400 MBM per annum. Average yearly production for the period 1982 - 1984 was only 29,040 MBM, i.e., a utilization of only some 39% of the installed capacity. This can be attributed to a number of reasons, the most commonly cited being: underdeveloped infrastructure in the forest areas, old and worn out logging and sawmilling equipment, lack of transport, lack of foreign exchange to purchase spare parts and auxillary equipment and overall depressed state of economy affecting the local market. It is worth noting that, in spite of the country's dependence on imported fuels for the totality of its needs, no attempt seems to have been made to utilize wood as a fuel to any appreciable extent.

The relative lack of importance of timber in the country's exports is given by the following figures obtained from the Bank of Guyana:

	1982	1983	1984	1985
Total value of exports (G$ x 10^6)	650.10	533.12	807.66	879.15
Value of timber exports (G$ x 10^6)	14.83	13.20	14.72	17.94
Timber as a percentage of Total (%)	2.3	2.5	1.8	2.0
Unit value of timber (G$/cu ft)	11.0	18.0	21.0	27.0

One is compelled to point out that this is a surprisingly low figure, bearing in mind that forests, a renewable resource that is not as energy intensive as other of Guyana's exports, cover over 80% of the country.

Timber utilization is dominated by the use of greenheart (Ocotea rodiaei). It was estimated that in 1978 greenheart represented 80% of the value of exports of timber by species, though its occurrence in the forest is only about 3% of the merchantable logs. In 1974 greenheart represented over 50% of production. No serious effort seems to have been undertaken by the sawmillers and/or the Forestry Commission to promote, both on the local and export markets, species other than greenheart.

There is currently no production of any wood-based panels in Guyana. According to FAO's estimate, Guyana imported in 1982 1000 m^3 of plywood. The country's secondary wood processing industries, i.e., the production of manufactured wooden products, fared no better. They too suffer from the general economic stagnation, and the fact that prior to this crisis none of the existing firms had reached a level of technology and productivity enabling them to enter overseas markets (albeit the markets of the CARICOM member states) has prevented them from doing so when they have to surmount additional problems caused by loss of skilled labour to migration, unavailability of foreign exchange to import tools, auxillary materials and machines, etc., and lack of working capital.

According to a survey of the furniture industry conducted by a UNIDO expert in 1984 [15/], there were 21 factories producing furniture not on an artisanal scale, employing some 750 persons with an estimated turnover of G$ 11 million, of which 8% was exported to the Caribbean. Because of Guyana's raw material potential and the lack of timber resources in all the CARICOM countries other than Belize, and to a lesser extent Dominica, Guyana could and should - develop its furniture and joinery industries to penetrate these

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15/ Survey of a Technical Assistance to the Furniture Industry (SI/GUY/84/801), Terminal Report by Demond Cody, DP/ID/SIR.B.494

markets. Initially it could limit itself to exporting "blanks" for further machining in the other country, but, as managerial and staff skills improve and the exporting firm improves its finances, the production of assembled furniture could be envisaged.

The mission recommends that a technical assistance project to enable the furniture manufacturers of Guyana to enter successfully these markets - and, at a later stage, those of the developed countries - be implemented in the coming years.

Another potential product for export to the Caribbean countries could be pre-fabricated wooden houses and/or their components (such as roof, trussets, partitions, joinery products, beams, etc.). Successful production would call for a very detailed market survey - including a study of the building regulations in the envisaged markets - as well as developing designs incorporating sound timber engineering practices and the use of adequately graded sawnwood. At the present moment the country does not have these timber engineering skills. The development of an export oriented furniture industry calls for improvement in shipping facilities to the envisaged markets.

2. Agro-waste

Both the country's second and third largest export earners, sugar and rice and their sub-products, generate wastes (bagasse, rice husks and rice straws) which could be further processed into a wide range of products: pulp and paper; hardboard, insulation board and particle board; animal feed-stuffs; furfural, to cite only a few for bagasse; and cement bound building blocks, silica cement, etc., from rice husks, while rice straw can be used for production of building boards and for pulping.

Both these wastes have a relatively high calorific value and because of the very serious shortage of foreign currency that the country is facing, industry has decided to utilize these wastes exclusively for the generation of energy. Under the present circumstances the mission endorses this decision, but recommends that serious consideration be given, whenever possible, to utilize logging wastes (tops, branches, split logs, etc.) and trees felled and currently left in the forests to replace bagasse in the sugar estates. It

could be chipped in the forest and transported by barges at least to some of the estates. Furthermore, the rehabilitation of the sugar mills will result in less down time, which on its part will result in excess bagasse being available. At that point in time, consideration should be given to using it to replace animal feed stuffs.

With respect to rice husk utilization, it appears that the quantity available and collectable is of the order of 12,000 M.T. The mission is of the opinion that it should be used to replace the fuel being imported to dry the paddy and that studies on the utilization of the ash be carried out.

3. Food processing

The agricultural sector could contribute considerably to Guyana's economic and industrial development. The country has an excellent potential for expanding and diversifying its crops which could then be used for industrial processing. In the period of 1978 to 1983 the contribution of agriculture to the GDP was 23.1%.

Like other sectors of the economy the performance of the food processing sector has declined in recent years.

Production of rice has fallen from 211,000 tons (grown on 354,000 acres) in 1977 to 145,000 tons (grown on 188,000 acres) in 1983, while exports dropped more than half in the same period (from 86,000 tons to 42,000 tons). The land acreage used for rice in 1985 was half that available. It has been estimated that the potential for export of rice is of the order of 300,000 tons. In spite of the availability of infrastructure and technology, this is far from being reached because of poor quality control and the small percentage of the production that is parboiled. The Government has recently reorganized this sector through the creation of the National Paddy and Rice Grading Centre (NPRGC), the Guyana Rice Milling and Marketing Authority (GRMMA) with Regional Rice Authorities (RRA) to work at regional levels, and the Guyana Rice Export Board (GREB). Assistance to the sector is also available through the National Agricultural Research Institute (NARI), while the Institute of Applied Science and Technology (IAST) can also provide assistance in the development of simple equipment which could be produced locally.

The sugar sector is the second largest export earner (bringing in some 35% of the foreign exchange earned), is the second largest employer (with 28,000 employees) and generates 15% of the GDP. It is occupying some 150,000 acres. This industry is in poor financial shape because of the low prices on world markets, and this has affected adversely the availability of foreign exchange required to import spare parts and new equipment. The Government plans to diversify this sector by developing new products based on sugar cane and to allocate some of the land less suitable for sugar cane cultivation to other crops (soya beans, rice, legumes, etc.).

The country is a net importer of edible oils - currently imports are low, but there is a chronic shortage. A National Coconut Rehabilitation Programme is underway and plans exist to increase production of palm oil, rice bran oil and introduce soya oil. The cultivation of soya beans, started in the 1970s and stopped, will be reactivated on GUYSUCO estates and by a Guyana-Yugoslavia joint venture. These actions should result in the production of raw materials to justify the rehabilitation and expansion of the existing oil producing plants and affiliated industries. Good prospects also exist in the processing of fruits (citrus, pineapple and other tropical fruits) into jams, juices, pulps, etc., for the Caribbean and even North American and Western European markets. The Guyana Liquor Corporation has developed a liquor from carambola and a tropical fruit mix that can be used for pie fillings, ice cream toppings, fruit cakes, etc.

The existing food processing industry consists of the following firms that have the potential to enter the Caribbean markets:

- Quality Food Ltd., producing fruit preserves and breakfast cereals. They also process ham and bacon for domestic consumption.

- Banks DIH, produce other than beer and soft drinks, syrups of fruits and tomato ketchup.

- Ricks and Saree and Bounty Products, produce sauces, flavourings, spices and rice flour.

- Jams are produced by Adventure.

- The local biscuit industry (Popeye Foods, B.V. Biscuits, Continental Biscuits and the National Milling Co.) produce for the local market.

Raw materials problems would probably be the major obstacle to the development of this sector.

The limitations on the development of the dairy industry all relate to the availability of the milk, which is practically (95%) all in the private sector. Packaging problems and the availability of packaging materials limit the marketing to small operations near the producers.

The production of honey for export could be developed with little investment.

The fishing sector, especially the fishing and packaging of prawns and smaller shrimp for export is relatively developed. The majority (some 75%) of the production is caught by the same 3000 artisanal fishermen using some 1200 vessels (in 14 co-operatives). Industrial fishing is through 132 trawlers (some 106 of which are used exclusively for prawn fishing). The catch is estimated at some 33,500 tons of fish, 3000 tons of small shrimp and an equal amount of prawns. Exports of prawns are processed through two plants.

Aquaculture (currently 150 acres) could be expanded and play a bigger role in providing proteins.

4. Other agro-industries

These comprise leather and footwear on the one hand and textiles and garments on the other.

With respect to the leather industry, there exists a tannery in New Amsterdam that belongs to the public sector. It operates at a greatly reduced rate due to scarcity of tanning agents and chemicals and also due to the poor quality hides it has access to. Whereas the former problem could be solved by making available foreign exchange, the latter calls for a radical change in the

operation of abatoirs, the training of flayers and a sensitization of cattle breeders at large of the profits they could obtain from the hides, if those were to be processed adequately.

Local manufacture of shoes and leather goods (handbags, wallets, etc.) is still at a craft stage. Equipment for a shoe factory has been imported four years ago by the public sector, but it has so far remained in crates. (The sewing machines have been allocated to another factory).

The country has one large textile mill (Santana Textiles) with capacity of some 3 million meters per annum. It was erected with technical assistance from the People's Republic of China, but production stopped in 1982 upon the departure of the Chinese trainers and also due to lack of raw materials. Attempts were made to grow cotton in the intermediate savannah area, and some 500 - 800 acres were under cultivation at various periods. Yields were poor - about 0.3 to 0.5 bale/acre - because of poor soils, poor knowledge and unappropriate climate. Ginning capacity - at the National Service Mill - is of the order of 12,000 bales/annum, but current plans are to continue planting 200 acreas for research and development purposes before embarking on more ambitious plans.

The Santana Mills' requirements are approximately 3,000 bales per shift. It is operating currently wholly on cotton imported from China.

The plant has been managed by a team of foreign consultants under a direct contract and, as a result, its has operated two shifts and could operate three shifts when trained manpower and energy become available. Export markets for grey cloth to USA and Western Europe have been identified and some 160,000 metres have been exported. Exports are necessary to generate foreign currency for spare parts and raw material. The share of production remaining for the local market only covers one third of its needs.

Bearing in mind the direct employment generated, 780 persons for two shift operations, as well as the additional employment that could be generated in the garment industry sector, the mission feels that the technical assistance proposed (costing some US$ 700,000) should have a high priority.

V. CAPITAL GOODS AND TECHNOLOGY TRANSFER

1. The state of development of the capital goods sector

Guyana is in the process of entering the capital goods sector. At present virtually all the capital goods are imported and there is only very limited local production. Capital goods are essential for the economic growth of Guyana since they provide the means of production. The main users of capital goods are the dominant economic sectors, namely: sugar, bauxite and rice. These sectors need machinery, equipment and tools to facilitate production and processing. Capital goods account for about 20%, on the average, of merchandise imports as shown in the table below (Source: Bank of Guyana):

Merchandise Imports (Mill. G$ current)	Year			
				Projected
	1983	1984	1985	1986
Total	745	850	978	1065
Consumer	75	110	100	108
Intermediate	230	175	263	278
Capital goods	144	160	183	235
Fuel and lubricants	290	400	436	436
Other	6	5	6	8

For comparison, fuel and lubricants account for about 43%, on the average, of merchandise imports. Thus, like energy imports, importation of capital goods constitute a sizeable drain on the country's foreign exchange earnings.

The Government of Guyana recognizes the importance of developing the indigenous capacity for local manufacturing of capital goods not only for reasons of saving foreign exchange but for the technological development of the country. Metal and engineering industries have been established in both the public and private sectors. An indicative list of these industries with a brief description of the type of facilities available is as shown below:

A. Public sector Name	Facilities available
Guyana National Engineering Corporation (GNEC)	Ferrous and non-ferrous foundry, machine shop, fabrication facilities and light forgings
Mards and DPRK Workshop	Machine and press shops
Plant Maintenance and Hire Division Workshop	Metal fabrication, heavy and light machining, tool room, heat treatment
B. Private companies	
Brass Aluminium and Cast Iron Foundry	Ferrous and non-ferrous castings, medium machining
Swiss Machinery Estate	Machine shop
Industrial Engineering	Sheet metal fabrication, machine shop, injection moulding
Industrial Domestic and Electrical Appliances	Press shop, machine shop, heat treatment, injection moulding
Farall Engineering	Sheet metal fabrication. machine shop, welding
Friedship Industries	Sheet metal fabrication, machine shop.

In addition to the above industries, some of the main public corporations like GUYSUCO, GUYMINE and Santana Textile Mill operate workshops with facilities for machining, heat treatment, welding, forging, sand blasting and metal spraying.

The immediate priority of the Government regarding the industrial sector is on rehabilitation and the institution of energy conservation measures. Many industries are operating at very low capacity utilization on account of lack of spare parts required to maintain imported equipment. There is an urgent need to launch a comprehensive spare parts manufacturing programme to alleviate this critical bottleneck. Basic facilities for spare parts manufacturing exist in Guyana. These include heavy and light machining, sheet metal fabrication, heat treatment, ferrous and non-ferrous foundries, light forgings and structural engineering as has been shown above. These facilities are, however, operating at extremely low capacity utilization levels for a number of reasons including:

- lack of technological know-how
- shortage of skilled manpower
- shortage of imported raw materials
- inadequate market surveys done at the pre-investment stage
- inadequate quality control facilities

An examination of the case of GNEC illustrates further the typical status of the metal and engineering industries in Guyana. GNEC is the largest engineering entity in Guyana with a work force of about 1600. It is a public corporation established in 1976 to spearhead development of the engineering sector. As a public corporation, GNEC falls under the GUYSTAC group but it has its own Board of Directors with an Executive Chairman who is also the Chief Executive of the Corporation. GNEC has a number of technical divisions which include:

1) Heavy equipment - for supply of heavy machinery and equipment (e.g., caterpillars), parts and maintenance service. The performance of this division has been constrained due to lack of foreign exchange allocation to service the inventory and to effect direct purchase of machinery and equipment. The division has also suffered from high attrition from the ranks of senior servicemen and this has manifested itself in the inability to achieve set production targets. The main customers of the division, GUYMINE and GUYSUCO, often have to purchase their own spare parts directly.

ii) General Engineering - covers Civil Engineering, Machining and Fabrication and Electrical/Refrigeration Technology. This is a new division established in 1984. The division has experienced a period of decline induced by the depression in the construction trade, poor availability of materials and spare parts, low utilization of installed equipment - due to scarcity of adequately trained manpower as well as low material handling equipment availability due to the aged equipment in use.

iii) Shipbuilding/Ship repair - for construction of fishing trawlers and wooden cargo boats as well as repair of the same. Low inventories of critical materials adversely affect performance of the division. The division plans to introduce fibreglass construction technology to increase its international competitiveness. There is, however, a need to ensure that such a move shall not lead to increased operational problems.

iv) Factory Operations - runs a number of factories producing an assorted range of products including machetes, butt hinges, clay bricks, clay blocks, and split floor tiles. Factories experienced high percentage of downtime (due to inadequate spares) and shortage of senior staff.

v) Planning and Development - this is a key division with the prime responsibility of charting out the future of GNEC as an engineering and manufacturing entity. The division plans and implements investment projects such as the recently completed G$ 12 million Foundry Expansion Project. This project was however implemented without completion of a proper market survey. The market survey is only now being finalized with assistance from CARICOM and Commonwealth Secretariat. This relatively modern foundry includes two 6.5 tons capacity induction furnaces with an automated line for small castings. The annual capacity of the foundry is 1400 tons per shift for ferrous castings and 100 - 150 tons per shift for non-ferrous castings (mainly brass and aluminium) but the foundry has been operating at about 10% of capacity only. The foundry is also experiencing quality control problems and the corporation needs assistance for establishing a Quality Control Laboratory. The Pattern Shop for foundry is not adequately developed and this shall present a major bottleneck in efforts to diversify production and meet customer requirements.

In 1984, revenue contributions of the four technical divisions of GNEC referred to above were:

	G$ million
Heavy equipment	15.3
General Engineering	3.0
Shipbuilding/ship repair	4.3
Factory operations	7.2
Total	29.8

Other divisions of GNEC contributed G$ 9.4 million (marketing contributed G$ 6.2 million) giving a total revenue of G$ 39.2 million. As can be surmised from analysis of the above data, the trading functions of GNEC exemplified by the predominant activity of the Heavy Equipment Division and the Marketing Division still play a leading role in the operations of the corporation. The Heavy Equipment and the Marketing Division contributed almost 55% of revenue in 1984. A significant portion of the traded goods were not of GNEC manufacture. Thus the transformation of GNEC into an engineering and manufacturing entitiy requires further impetus through strengthening of the other divisions especially the Planning and Development Division. That measures are needed to revamp GNEC may be seen from examination of the declining corporate performance over the period 1980 to 1984 as reproduced below from the 1984 GNEC Annual Report.

Year	1980	1981	1982	1983	1984
Return on Capital (%)	19.8	16.1	5.8	0.01	0.6
Net surplus (G$ million)	9.1	9.2	3.5	0.007	0.348

These data should, however, be viewed in the context of the overall national economy which showed a continued decline in GDP over the period 1980 - 1983 with a slight recovery in 1984. The heavy investment in the foundry expansion project, which has yet to come into full production, has also contributed to the low values of the financial indicators for GNEC.

The Plant Maintenance and Hire Division Workshop at Coldingen is another example of extreme underutilization of machinery and equipment. This workshop with its extensive facilities, is almost grinding to a halt due to critical shortage of skilled technicians, inoperative machinery (some of which has never been commissioned although the workshop has been in operation since 1980), low working capital (the workshop being a Government division is not allowed to borrow from commercial banks) and very low morale of the workers leading to high turnover. An expansion project involving establishment of a

Crafts Training Centre has been shelved for lack of local financial resources although materials and equipment have been imported and are lying idle in the open yard. The workshop facilities could be used for spare parts manufacturing but since no qualified design engineers are available, only very simple jobs could be undertaken. IAST, to whom the workshop relies for consultancy and testing services, does not possess mechanical design engineering and manufacturing capability. This void shall have to be filled to facilitate technology transfer/development in Guyana and it is recommended that IAST should start looking into this area and play an active role now that significant achievements have been realized by the Institute in ceramics and chemical technologies.

In the private sector, under GUYMIDA's umbrella, are firms like the Brass Aluminum and Cast Iron Foundry (BACIF) which presently produces a range of products including centrifugal pumps, cylinder liners, ship propellers and a variety of castings for GUYSUCO, GEC and GUYMINE. These firms have good potential for further development provided they are given assistance in acquisition of technology and engineering and consultancy services.

2. Planning the development of the sector

The selection of the specific types of capital goods to be locally manufactured in Guyana needs to be done in a scientific manner and it should be recognized from the start that development and consolidation of capacity for manufacture of capital goods is a long process requiring careful planning and selection of technology. The capital goods sectors is both capital and skill intensive requiring special financing arrangements and often calls for government protection against foreign competition to allow its growth. Due to the necessary and intrinsic link ofthe capital goods industry with the user industries (sugar, bauxite, rice) an integrated plan must be developed around some basic questions:

(a) What are the national economic, social, political objectives?

(b) are the capabilities already existing in the country and what e the possibilities for their consolidation and improvement?

(c) What is the total future demand for capital goods considering:

- the capital goods demand of the sugar, bauxite, rice sectors in order to reach their planned production targets and by utilizing the selected technological routes;
- the capital goods demand of other sectors of the economy (e.g., transport, services and administration;
- production equipment demand of capital goods industry itself to manufacture the goods mentioned above, plus its own requirements for circular reproduction?

(d) Can the output of the existing capital goods industry meet the total future demand of (c) above?

(e) If not, what will be the additional production facilities required?

(f) What will be the additional physical, technological, human, etc., inputs required by the capital goods industry to meet the total demand of (c) above?

(g) If the required inputs cannot be provided by existing capabilities within the economy, what are the possibilities of creating new capabilities by utilizing the resources of the country?

(h) If there exists a discrepancy between the required inputs and potential capabilities of (g) what will be the strategy of selection (i.e. optimum allocation of resources)?

(i) Finally, what will be the policies and strategies to be adopted in order to reach the plan targets?

Preparation of the integrated plan for the development of the capital goods sector in Guyana shall require a detailed study and assessment of the available resources. This is necessary to ensure maximum benefits to the economy by way of elevating the technological level in the country inherent with establishment of a viable capital goods industry. However, it may be stated that even when most of the barriers to the development of the sector are removed by mobilizing immense efforts, those obstacles which are dependent on the size of the market, and the critical size of the production units necessary to ensure enconomical production runs and volumes as well as to sustain the annual rate of technological innovation would remain. The existence of these techno-economic barriers makes it inadvisable for Guyana to adopt the same production models as the industrialized countries.

One possibility to overcome the above problem is to adopt a multi-purpose production approach with facilities established to cater to the production of several different types of products. When appropriately designed, these multi-purpose production units can achieve economies of scale even at relatively low production runs. But establishment of MPUs requires elaborate planning and special training of skilled and unskilled personnel.

Technology also plays a major role in energy conservation and diversification and the urgency to apply technology for these purposes in Guyana cannot be over-emphasized. The cost of imported energy in the form of fossil fuels constitutes the single most important constraint to economic development in Guyana. Of all the major economic sectors, industry is by far the greatest consumer of energy. Over 40% by volume of imported fossil fuels is used by the bauxite industry alone. It therefore follows that the implementation of energy conservation measures in industry shall have a very significant impact on energy consumption and the import bill. Energy efficient technologies for the bauxite and alumina industry have been developed in industrialized countries and these need to be assessed for their suitability in Guyana.

The capital goods industry can also make a significant contribution to alleviating the energy problem through manufacture of equipment for exploitation of alternative sources of energy. Guyana is endowed with immense water resources with hydroelectric power generation potential. These are yet to be tapped. Establishment of large hydroelectric power stations is a costly exercise and takes several years. However, an immediate potential for micro and mini hydropower plants exists which shall provide power to gold mines, stone quarries and timber saw mills. Some components for the micro/mini hydropower plants may be manufactured in Guyana (e.g. turbines) as a way to unpackage MHP technology.

Other potential sources of energy include use of agricultural wastes like rice husks and sawdust for generation of electricity. For this purpose Guyana can learn from the Indonesian experience where the Bandung Institute of Technology in West Java has developed an electric power generator fired mostly by rice husks.

Thus, in addition to the use of these agricultural wastes for paddy drying as cited earlier, a further alternative is their use for partial replacement of diesel used for generating electricity. Before embarking on this, the availability and location of the rice husks should be studied.

VI. INSTITUTIONAL INFRASTRUCTURE AND INDUSTRIAL MANPOWER ISSUES

1. General

In terms of external assistance, firstly to physical infrastructure, the "Central Government Capital Projects", the Government of Guyana has major financial assistance projects with the IDB (G$ 14,726,000), EEC/EIB (G$ 16,870,000) mainly covering agricultural equipment loans, fisheries loans to the agricultural and bauxite sectors. CIDA is part financing artisanal fisheries (G$ 36,520,000), IDA petroleum exploration (G$ 8,630,000). Bilateral aid, in this field comes from GDR (Rice/soya, joint venture G$ 21,900,000) and from Bulgaria, Cuba, DPR Korea and Suriname.

In future, IDB will implement three major projects:

(a) Industrial credit line to sugar and rice processing rehabilitation G$ 28 million;
(b) Rehabilitation of Guyana Electric Corporation G$ 16.1 million;
(c) Human resource development at Guyana University, G$ 14.4 million.

The EEC/EID/EDF will in future provide loans for economic infrastructure (G$ 75 million), as well as continuing with civil engineering works in sea sewerage, water supplies, ferries, etc. Funds are channelled through GAIBANK for bankable industrial projects.

2. Institutional Infrastructure

Regarding institutional infrastructure, GUYMIDA will increasingly assist the small- and medium-scale industries, the State Planning Secretariat will produce a policy and strategy for this; the Guyana Management Institute and the Small Enterprise Development Council will assist in development of human resources. The National Scientific Research Council will in future co-ordinate R & D activities. GUYSTAC will act as the Secretariat to the four supervisory councils who supervise the four groups of public sector enterprises.

The Guyana Bureau of Standards co-ordinates quality control and metrology in Guyana, working with regional projects (Commonwealth Science Council, CARICOM Secretariat, UNDP/IAEA/UNIDO project on NDT).

There are no established standards in Guyana, which are essential to export, as well as to consumer protection. They are working on a National Certification Scheme, and on a Laboratory Accreditation Scheme.

The GBS has 25 staff, a 1986 budget of G$ 940,000 and is in urgent need of technical assistance to assist it to reach its objectives.

The Bureau requires assistance in evaluation of laboratories aiming towards a Laboratory Accreditation Scheme and a National Certification Scheme to improve quality standards, especially for export. Attention should be given to the creation of a national standards committee for the food industries sector.

The Institute for Applied Science and Technology will continue to work in R & D. The development of the food processing industry calls for strengthening of the R & D facilities and manpower of the IAST to enable it to cater for the industry's needs and provide pilot plant and testing facilities for the development of new processes and the modification of others to suit local conditions. It could also provide quality control inspection for exported food products. The Guyana Export Promotion Council will work with other agencies to develop a wider range of processed and manufactured exports. The National Data Management Authority runs as a service bureau to the public and private sector, in conjunction with the Statistics Bureau in the Ministry of Planning and Development, charging fees for its services.

The absence of an industrial development plan in Guyana means that there is little indication of long-term objectives regarding institutional infrastructure or industrial manpower. The main feature concerning the former is the development of the Guyana Manufacturing and Industrial Development Agency (GUYMIDA), not only through increase in their staff, but also through a major technical assistance project which is currently being processed by UNIDO in co-operation with GUYMIDA and UNDP. This brings up the question of the share of industrial production which is in future to be in the private

sector. The 1986 Budget speaks of releasing small and medium industry to the private sector as far as possible. In the public sector the main production is concentrated in bauxite, sugar and rice milling, but these enterprises made losses in 1985, although all are export oriented representing 85% of all production. Losses were:

G$ 21 million	-	Rice milling
G$ 77 million	-	Sugar
G$138 million	-	Bauxite

This has a direct impact on the national accounts, since the Government has no financial reserves and has to resort to deficit financing. Owing to the continued crisis caused by the lack of foreign exchange, it is necessary to develop other exports based on natural resources such as:

	Existing	To be developed
Sugar based	Rum Industrial alcohol Vinegar	a. Cassava starch b. Animal feeds c. Yeast products d. Rum/Carambola pie filling e. Carambola drinks (mixers)
Rice	a. Better grades through drying and other processes b. Exports - General (including barter for fuels)	a. Rice bran/animal foods
Wood-based:	a. Exports of lumber b. Limited exports of hardwoods	a. Improved drying b. Improved products c. Improved marketing d. Improved grading
Fishery:	a. Exports of shrimp b. Export of fish	a. EEC/EID loans to upgrade fisheries b. CIDA T/A on artisanal fisheries
Gold and diamonds:	Industry hampered by low prices paid to miners by the Government	a. Upgrade price paid miners b. Train more gem cutters c. Allow private industry to train more cutters/ jewellers d. Develop exports of jewellery

In view of the acute lack of foreign exchange, efforts are to be increased to produce more manufactured goods locally. In this, IAST has a leading role up to the steps of product development. IAST has research programmes in:

		Typical products
1.	Mineral sciences:	Chalk (kaolin), claybody (feldspar, lime), pottery, abrasives, paint
2.	Ceramics:	Claybodies for Vanceram ceramics, sanitary ware
3.	Natural products:	Charcoal, glue, edible oil, essential oils, dyes, insecticide, balata
4.	Food	Indigenous flours, yogurt, dried/ frozen vegetables
5.	Alternate energy:	Bio-digesters, solar driers
6.	Agriculture:	Solar dried chili, rice flours, yam and cassava flours, medicinal plants, animal feed.

IAST saves foreign currency also by providing industrial extension and analytical services to industry and also by providing technical services, mechanical, electrical, electronic, carpentry. The work of GUYMIDA involves considerable innovation in the area of small scale industries. They are active in a wide range of potential industries, categorized as:

A. Agro-industry
B. Chemical
C. General
D. Machine tools and tooling

A full list of projects under consideration by GUYMIDA is given in Annex I.

Associations of trade and industry

In Guyana, there are, in the private sector:

(a) The Guyana Manufacturers Association;
(b) the Georgetown Chamber of Commerce;
(c) the Consultantive Association of Guyanese Industry, Ltd. (CAGI).

The above are self-explanatory and all relate to the private sector. A main interest is in training. The Guyana Co-operative Agricultural and Industrial Development Banking (GAIBANK), was created in 1973, is wholly owned by the Government. 60% of loans disbursed in 1985 were in the agricultural sector, 40% in industry. Up to the end of 1985, GAIBANK disbursed G$ 235 million. GAIBANK also channels foreign loans and lines of credit. Rates are 12% for agriculture, 14% for industrial projects. Staff are now 280 and there are 20 regional offices. Fund sources include: CDB, IDA, EEC, CIDA, IDB, OPEC, EIB.

7. Industrial estates

The IDB, EIB and CIDA provide assistance to GAIBANK in agro-industry both public and private, to develop industrial estates and associated infrastructure. Assistance to plan and finance estates is vital to provide facilities to encourage new industrial entrepreneurs. GUYMIDA has a vital interest in this field of promoting new small-scale industry. No industrial estates exist as such.

A Free Zone proposal has been made to Treasury by consultants. This basically needs legislation to encourage more joint ventures, enabling GUYMIDA to promote industrial investment including foreign partners. (Already the garment industry exports under 807 to its foreign partners, Guyana Liquor Corporation and the rice industry have European partners, and GUYBULK is a 50/50 Guyana-Norway shipping venture). "Free Zones" in this context means allowing what CARICOM defines as "Enclave Industries".

4. Export promotion

The Guyana Export Promotion Council provides four types of services: market information (desk research only); training for exporters in documentation, etc., market identification; promotion through trade missions. Products covered are: fresh fruits and vegetables, hides and skins, garments and wooden furniture.

The Council, started in 1983, aims mainly at developing non-traditional export items, such as furniture, pre-fabricated houses, processed fruits, vegetables, juices, drinks, handicrafts, liquors, etc. NOTE: Export earnings for bauxite and sugar declined from US$ 309 million 1980 (80% of total merchandise exports), to US$ 151 million in 1983 (73% of total merchandise exports). This accounts largely for the present shortage of foreign exchange and the lack of spare parts and other (imported) inputs, causing lack of growth in other sectors.

The Council is autonomous, drawing its membership from both the public and private sector, although it is funded entirely by the Government. In the past it has received assistance from the CARICOM Secretariat, the Caribbean Development Bank, ITC/UNDP and CFTC. Currently there is a regional export promotion project, which is financed by a line of credit to CARICOM and partly executed by the Irish Export Board.

It seems that a clear policy for a long-term export programme is required to co-ordinate efforts in the field, since at present there are potential export products being researched independently by the IAST, the Guyana Liquor Corporation and the private sector. The Bureau of Standards should also be involved, and it is recommended that regular meetings of an export co-ordination committee be considered, in order to have a combined and concentrated export campaign. As over 90% of all official exports are marketed through state controlled organizations, there is a case for encouraging more private sector exports.

Considering the various sectors, the position is:

a. Forestry Products: Exports are largely either logs or "baulks" of roughly cut hardwoods. Obviously adding value by producing timber engineered pre-fabricated housing units, furniture and handicraft items is desirable. There is also a market for exotic hardwoods for veneers, etc., but at present it is not easy for dealers to obtain prices from Guyana.

The Forestry Commission's Marketing Unit should be strengthened and be a member of the Export Co-ordination Committee.

b. Garments: Local production has declined considerably since 1977, despite the local production of cotton by Sanata Textiles. There are plans to produce a cotton/polyester mix cloth, but assistance to producers in equipment and design is also needed.

Some production for export under 807 U.S. Tariff to the U.S.A. already exists, and as it brings in foreign currency and is labour intensive, it should be encouraged.

c. Agro-Industry: Apart from sugar, rum, molasses, there are openings for exports to North America and Europe of winter vegetables and tropical fruits. (This is documented by the CARICOM study done by Booz, Allen, Hamilton, Inc.). Also tropical fruit juices and pulps could be exported in bulk, providing the quality met with international standards. Product development is needed for other food products, such as jams, jellies, etc. The ITC should be approached to assist in this field, as Caribbean studies are being done.

Much development work is required in the field of leather to produce items, mainly for the domestic market.

d. Incentives: There must be reasonable incentives if manufacturers are to be persuaded to go in for the complex processes of producing for export. In the private sector a "Champion Exporter" award has been instituted for the largest net foreign exchange earner each year. Sanata Textiles already has a 50 - 60% "Retention Factor", which is needed to finance the import of raw materials. Retention of a percentage of foreign currency earned must be extended to the private sector, to enable them to re-equip and import essential items.

An investment code is being devised by GUYMIDA.

e. Technical Assistance: Technical assistance is needed to strengthen the mechanisms for promoting exports, whether manufactured or semi-processed goods, and to assist in the formulation of plans, policies and strategies for encouraging and supporting the further development of exports.

The diversification of the industrial sector and the promotion of export manufacturing, especially in those sectors affording possible backward and forward linkages, should be a very high priority.

5. Statistics and data management

The National Data Management Authority, established in 1983 under the State Planning Secretariat provides two types of services:

(a) Systems engineering and computer services, basically main frame machine time (IBM 370-115/2).

(b) Application engineering, systems analysis, programming.

They collate, but do not collect statistics, earning fees, which will eventually make them self-financing. Most work is done for the Statistical Bureau at the Ministry of Planning and Development, which is not computerized. They do not do Central Bank on Customs statistics or data entry functions.

6. Employment statistics

Population estimates are based on a 1970 Population Census, since by May 1985 the results of the 1980 Census had not been published. The population at the beginning of 1985 is estimated at 788,092, with a rate of natural increase of 2.2%. Apparently net emigration is about 10,000 per year.

Employment in the public sector in 1984 was:

a. Total employment: 73,259

b. Central Government: 28,686 = 39.2% of total employment

c. Rest of the public sector: ,572

The rest of the public sector (c) includes GUYSTAC Group, Guyana Rice Board, Guyana National Engineering Corporation (GNEC), Guyana Stores Ltd. (GSL), Guyana Electricity Corporation (GEC), Guyana Pharmaceutical Corporation (GPC), Guyana Transport Corporation (GTC), Guyana Sugar Corporation (GUYSUCO), Guyana Mining Enterprises Ltd. (GUYMINE).

Of public sector employers, the main ones are:

		As percentage of total employment
GUYSUCO:	26.700	36%
GUYSTAC Group	13,000	18%
GUYMINE	4,700	6%

One problem has been that of strikes, especially in the sugar industry, which in 1984 involved 58,779 workers, and a loss of 152,000 man days. Man days lost in 1984 in the rest of the public sector were 144,157.

There is little available information on matters of labour training or unemployment. It is known that the efficient use of labour resources could be improved by re-assessing the role of different Ministries in deploying labour more effectively. In theory, more labour is needed in the regions, but in the manufacturing sector its has been found that labour is not willing to "pioneer" except for the mining of gold and diamonds. Motivation is needed in the public sector to stimulate higher productivity.

Progress has been made in this field by introduction of "performance contracts" in the GUYSTAC Group, to increase efficiency in the four groups: utilities, agriculture based and commercial companies I and II. Similarly the Rice Board has been restructured (with IDB aid) into three groups: Guyana Rice Milling and Marketing Authority; Guyana Rice Export Board and the National Paddy and Rice Grading Center.

7. Industrial manpower development

The lack of technical and managerial personnel is a constraint to the expansion of industrial activities in the country. It is caused on the one hand by the orientation of the education system towards education in the arts rather than on technical and scientific education as in agronomy, science, engineering and accounting, etc., and on the other by an exodus from the country of those who have developed these skills. It has been estimated that as many as 5,000 skilled, semi-skilled and professionals may be leaving the country annually, representing 10% of the professional, technical and managerial and technically trained categories.

UNDP has a project to obtain the services of national consultants (Guyanese living abroad) for short-term assignments in Guyana. This is known as "TOKTEN". Its applicability to Guyana is limited because living conditions currently are such that few expatriate Guyanese are prepared to return.

Formal education in Guyana begins with kindergarten between ages 3 - 5 years and primary beginning at six years for an obligatory six years of schooling. At the secondary level, most schools are geared to academic education although some Community High Schools have programmes for pre-vocational instruction. Technical and vocational training is carried out by the Guyana Industrial Training Centre, the Government Training Institute and the New Amsterdam Technical Institute. These institutes aim at training persons over 15 years in specific technical careers with a view to preparing and maintaining skilled labour force.

Guyana Industrial Training Center (GITC) was established with the assistance of USAID in 1968. It aims at training semi-skilled workers. Its programmes last one year and it has an enrollment of 200 students.

The Government Technical Institute (GTI) was founded in 1951 and it has a two-year technical studies programme for 2,000 students.

The New Amsterdam Technical Institute was constructed with assistance from the Canadian Government and aims at providing technical training on a regional level. It has an enrollment of about 450 students.

The University of Guyana was established in 1963 but concentrated primarily on humanities and the social sciences (political science, economics and philosophy). The School of Technology and School of Agriculture were established in 1969. Up to that point technical education had to be undertaken abroad, however, in the 1970s the deteriorating economic situation made it difficult for persons to go abroad for training, therefore making it necessary to train engineers and accountants in Guyana.

The Inter-American Development Bank is implementing a $14.6 million programme of loans and grant technical assistance to the above mentioned institutions to strengthen the capability to carry out technical and vocational training. The assistance includes training abroad, equipment and operational support. It is giving priority to agriculture, technology and management.

Other assistance is being given as follows:

Sector/Project	Source	Estimated Cost (million US$)	Nature of assistance
Education loan	IDB	0.50	Manpower development through training of individuals in particular skill areas
Rural Marketing Centre	IDB	0.12	Training of managers of marketing centres
Strengthening of Educational Centre	UNESCO	0.30	Development of Centre through provision of equipment and training of educational personnel
	ILO	0.80	Assistance to Guyana Management Institute - 2 years

The large enterprises such as GUYSUCO and GUYMINE and GUYSTAC have their own specialized training programmes. The mission had the opportunity to visit the GUYSUCO Training Center near New Amsterdam and were well impressed by the facilities and programme for mechanics and electrical workers. Training is given for two years and after finishing the course, the students are placed in jobs with one of the public enterprises.

For managers, the recently established Management Development Institute is beginning a programme of training for managers. The president of Guyana Management Association indicated an interest in a programme of training for manufacturers, which would begin with a needs analysis of the industry. The key sectors are garments, wood products and furniture, food, engineering and chemicals. There would be an immediate need for training in production management, marketing, product design, finishing and quality control.

A joint programme with Chambers of Industry and the Management Development Institute could be established which, in the first phase, would be directed at strengthening the training capacity of the Institute.

Technical assistance projects in support of the IAST, GUYSTAC, GUYMIDA, GUYSUCO and the Forestry Commission should all include an element of training.

VII. TECHNICAL ASSISTANCE PRIORITY NEEDS

Guyana's technical assistance requirements arise out of the prevailing economic difficulties encountered and the potentials of growth and development in the short and long run. The Government's policy objectives are to rehabilitate industries which have run into a state of disrepair and thus raise their efficiency and productivity; to develop a viable export sector through the development of small- and medium-scale industries with an enhanced participation of the private sector; to promote effective transfer and development of industrial technology particularly oriented to resource-based industries; and to diversify energy resources. The mission held in-depth discussions on technical assistance needs with GUYMIDA, GUYSTAC, IAST, GUNEC, GUYSUCO as well as with representatives of the private sector. Detailed project concepts were, as a result, agreed upon and subsequently discussed with DIEC and the Resident Representative at a concluding session organized for the purpose. In this section, the outcome of these discussions are briefly indicated and represent the priority areas of technical assistance to be addressed by UNDP/UNIDO during the 4th Cycle.

1. DP/GUY/86/001 Industrial Sector Survey

Policy analysis and programming of the industrial sector is hampered by the absence of a central nucleus for industry embracing the public and private sectors and by the lack of up-to-date consolidated data. The last Guyanese industrial census was undertaken in 1970. However, the results were never published. Therein arises the need for an industrial survey. The reorientation of policies towards exports of manufacturers and the private sector calls for a better understanding of the characteristics of existing industry and its rehabilitation and revitalization requirements. The aim of this project is to strengthen the data base for policy analysis and strategy formulation for integrated industrial development. The fielding of two experts for three months each under an enlargement of the project DP/GUY/86/001 was proposed and endorsed by the Resident Representative.

Counterpart agency will be GUYMIDA in co-operation with SPS, Central Statistical Bureau and relevant public corporations and Government departments.

Estimated UNDP inputs = US$ 64,000

2. Resource Based Small and Medium Industry Development

A project concept was developed in a series of meetings the mission had held with GUYMIDA. The project aims at strengthening the capacity of GUYMIDA to render assistance to small and medium enterprises in such specialized areas as market research, project analysis and appraisal, market research, data management systems and business development. The project would focus on:

- Resources analysis and project identification for domestic and export markets based on local raw materials including efficient utilization of agro-waste as raw material inputs;

- Preparation of project profiles, market studies and preinvestment studies

- Assistance to rural and small-scale enterprises in greater utilization of installed capacity and technology transfer

- Investment promotion and provision of information and documentation for the guidance of potential investors.

- Provision of on-the-job training as well as the organization of training programmes aimed at developing the capabilities of small-scale entrepreneurs.

As a result of the project, the following units of GUYMIDA would be strengthened:

- Office of the Executive Director: Macro-economic and sector analysis.

- Pre-investment Project Studies and Technology Transfer Department.

- Projects and Information Department.

- Investment Promotion and Co-ordination Department.

- Human Resources Development and Documentation Center.

Estimated UNDP inputs: US$ 1,546,000

Duration: 4 years.

3. Research and Development Support for the Institute of Applied Science and Technology

The Institute of Applied Science and Technology (IAST) has, since its establishment in 1980, achieved significant results and developed capabilities for research and technological development. The Institute was supported by UNDP/UNIDO through two successive projects, namely DP/GUY/79/002 and DP/GUY/81/003. The demand for its services from industry has been growing significantly thus changing its initial role of a purely academic institute into an operational agency for engineering design, implementation and industrial extension services. The aim of the present project is to introduce and develop management accounting systems, industrial engineering capabilities, technological information data bank and career development of its research staff through training abroad. Research and development programmes will be intensified with a particular focus on natural products, ceramics, mineral technology, energy and food.

Estimated UNDP inputs: US$ 800,000

4. Transfer of Technology Arrangements for Small-Scale Industry in Guyana Based on Indian Plant and Equipment

The project will focus on facilitating transfer of technology developed by India to Guyana through TCDC arrangements. A study tour of Indian officials to Guyana will review the proposed projects for technology transfer and officials from Guyana will go to India to see first hand the technology and equipment available. The project encompasses training for Guyanese technicians in India and Indian consultancy during the implementation phase. The counterpart agency is GUYMIDA and the project document is being finalized on the basis of the concepts and approaches agreed upon during the mission.

UNIDF (Special Purpose Contribution) $ 153,000.

5. GUYSTAC Management Consultancy

This project is aimed at strengthening the operational and technical capacity of the GUYSTAC Secretariat to monitor the programme of the Public Sector enterprises through a management information system covering both financial and operational information. In addition, the project will further develop the GUYSTAC capability to provide consultancy type assistance to corporations and to carry out diagnostic reports on individual companies. A full-fledged project document has been elaborated based on the recommendations of an evaluation mission fielded in 1985. The project document has reached the approval stage.

Estimated UNDP inputs: US$ 1,036,040

6. Development of Secondary Wood Processing Industries

In recent years Guyana has utilized certain lines of credit it had received to rehabilitate and expand its logging and sawmilling operations. It can be assumed that once these are completed, the regular supply of sawn-wood will be assured both on the local and export markets. The furniture and joinery industry would thus be assured of its major raw material requirements. It would not, however, be in a position to export because it lacks certain infrastructural facilities and skills. (It must be realized that production of furniture and joinery, unlike sawmilling, is a labour intensive operation, and that the development of of an export oriented furniture industry would create a considerable number of jobs with relatively low investments).

The fields in which it is proposed to provide assistance are: modern, serial furniture production technology; creation of a specialized documentation centre; creation of common service facilities for tool maintenance; study of preservation requirements of the lesser known species that could be used for joinery production; study of the suitability of lesser known species for use in furniture; promoting the use of timber in construction; improving the product development capability of the furniture industry; training of Guyanese technicians in the above and related fields, and the provision of industrial engineering capabilities.

Estimated UNDP inputs: US$ 400,000

7. Diversification of the Sugar and Sugar By-products Industries

The sugar and sugar-based industries are the country's second largest export earner, after bauxite production. The fluctuation in the price of sugar, and the quotas set by various countries and groups of countries have, however, made it a less attractive product than in the past. The various Government corporations processing sugar cane and its by-products have embarked on diversification programmes, and have requested the following assistance to finalized them:

A techno-economic feasibility study - including pilot plant work - is to be undertaken to produce animal feed from cane, hydrolized bagasse and molasses. (The feed is to be used to help develop the country's dairy industry). A similar study - again with test at pilot plant level - will be carried out on the fermentation of molasses to produce feed yeast.

The introduction of soya-bean utilization on marginally productive land on certain sugar estates has to be preceded by an in-depth study to determine the most profitable products to be obtained (under Guyana's conditions) and the most appropriate methods of producing them.

The Guyana Liquor Corporation is carrying out R & D work in various fields. Assistance will be given to it in helping solve specific problems such as gasification of residues, production of anhydrous alcohol, and production of high-grade starch from cassava, eventually for export as a replacement for corn starch. This will also involve the supply of some pilot plant equipment or the carrying out of these operations in a pilot plant abroad.

Estimated UNDP inputs: US$ 500,000

8. Strengthening of Training Facilities for Manufacturing Industries in Production Management and Marketing

There is an absence of information on the skills requirements of Guyana manufacturers. The first task therefore is to make an analysis of needs for the specific skills required for the garments, wood products and furniture, food and engineering industries in the area of production management and marketing. The project would work with the Guyana Manufacturers Association, the Georgetown Chamber of Commerce and Industry and GUYMIDA. After the undertaking of a needs analysis, a training consultant would come to Guyana to design the programme, develop training materials, and carry out at least two training courses in production and marketing management.

UNIDO (XP) inputs: US$ 70,000

9. Assistance to SANTANA Textile Mills

Technical assistance packages were recommended in 1981 and 1982 by visiting UNIDO experts Curran and Haworth. The absence of positive action in both instances has led to the initiation of a consultancy contract between Santana Textiles and Engineering and Consulting of West Germany for a period of 14 months beginning March 1985. UNIDO recommendations referred to above, specified a minimum technical assistance period of three (3) years. After nine months of operation the major constraints identified and existing are:

(a) The low technical base of the limited managerial and supervisory cadres of the Company.
(b) The need to recruit and train managerial resource while still maintaining a multi-shift operational level developed within the consultancy programme.

A project proposal would include provision of a team of specialists to manage the Santana Textiles Mill and provide training for a period of two years in production, spinning and weaving.

Duration:	2 years
Estimated UNDP inputs:	US$700,000

10. Development of Mini-Hydropower Generation Plant

Energy diversification is a priority area for Guyana to relieve the heavy burden imposed on the economy by imported fossil fuels. Guyana is endowed with abundant water resources with hydropower potential. These resources are on the two main rivers - the Essequibo and the Mazaruni and their tributaries. A major hydroelectric project on the upper Mazaruni River that was to form the basis for a large industrial complex in the mineral rich Essequibo region has been postponed due to difficulties in raising the external credit finance needed for the project. However, there is a great potential for development of small industries along or near the rivers if electricity supply could be assured. Examples of these industries are stone quarries, saw mills, gold mines, etc.

This project aims at promoting rural industrialization through construction of a demonstration mini-hydropower plant at a selected site. Guyanese personnel shall be trained in the design of MHP including civil works aspects. Assistance shall be given also to facilitate local production of the selected turbine, among other suitable MHP components, and actual construction and testing of the plant.

Estimated UNDP inputs US$ 126,000

11. Development of Electrical Power Generation Using Wood Wastes/Rice Husks

Like the MHP project, this project aims at energy diversification as well through use of alternative sources of energy. Wood wastes and rice husks may be used as partial substitutes for diesel in electricity generation.

The project is a potential TCDC where Guyana may co-operate with Indonesia who have developed and applied the needed technology. The aim of this project is to facilitate this technology transfer. The project shall be implemented in two phases: an exploratory mission by one expert to determine technical parameters and study tour by Guyanese counterpart to Indonesia followed by construction phase of the demonstration plant at a selected site.

Estimated UNDP inputs: US$ 57,000

12. Establishment of a Spare Parts Inventory and Production Centre

The lack of spare parts is a critical constraint of the continued operation of many industries, such as the sugar industry, rice milling, bauxite and other manufacturing industries. Guyana already has engineering capabilities to produce spare parts locally thus reducing the need to import and thereby saving in foreign exchange. The project proposes to assess this capability and based on the assessment to come up with a comprehensive plan for the production of spare parts in the country.

Estimated UNIDO inputs: US$ 120,000

13. Assistance to GNEC

To streamline the operations of GNEC, assistance is required in:

(i) Establisment of a quality control laboratory for the foundry;
(ii) training of tool and die makers;
(iii) training of pattern makers for the foundry;
(iv) technology transfer in fibre-glass boat construction technology.

Estimated UNDP inputs: US$ 106,000

15. Technology for Energy Conservation in Aluminium Production

In Guyana, over 40% of imported fossil fuels is used by the bauxite industry alone. Guyana also has a metallurgical grade alumina plant with a 300,000-tonnes per annum capacity that has been closed for technical and economic reasons. The alumina industry is energy-intensive and thus efficient energy utilization is crucial for international competitiveness.

This project aims at transferring technology for energy conservation in the production of metallurgical grade alumina. A demonstration of the sedimentation and dehydrating technology by Hungarian experts shall be carried out upon reactivation of the alumina plant.

Estimated UNIDF inputs: US$ 40,000

ANNEX I

LIST OF MACHINERY WHICH CAN BE MANUFACTURED IN THE COUNTRY FOR SMALL-SCALE INDUSTRIES BY LOCAL FABRICATORS PREFERABLY BASED ON IMPORTED WORKING DRAWINGS AND DESIGNS

(subject to availability of raw materials and critical components)

A. Agriculture

1. Briquetting fuel plant
2. Fruit juice and beverage equipment
3. Mobile charcoal kiln
4. Plant for flattening rice cereal
5. Rice processing machinery
6. Small poultry feed plants

B. Chemical

1. Activated carbon manufacturing plant
2. Cassava glue manufacturing plant
3. Cassava starch making plant
4. Desiccated coconut making plant
5. Distillation plants
6. Hand chalk moulding machine (cap. 500 pcs./charge of 15 mins.)
7. Paper re-cycling plant
8. Sodium Silicate Plant

C. General

1. Coconut husk defibering plant
2. Bottle cleaning and toilet brush making plant
3. Hand candle making machine
4. Rubberised moulded parts manufacturing equipment
5. Sewing thread reel and ball winding plant
6. Twine/rope manufacturing machine
7. Diesel oil engines (5 - 10 H.P.)

D. Machine tools and tooling

1. Bakelite moulding dies for electrical accesories
2. Bicycle hand guard rolling machine
3. Hacksaw machine (motorized)
4. Injection moulding tools for electrical accessories
5. Metal spinning lathe
6. Pedestal double end grinder
7. Press tool dies for metal forming
8. Set of press tools for butt hinges
9. Wood working lathe
10. Wood sander