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AN INDUSTRIAL PROFILE OF LATIN AMERICA AND THE CARIBBEAN

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This is a provisional document of the Pan American Center for Human Ecology and Health (ECO) of the Pan American Health Organization (PAHO) and the World Health Organization (WHO).

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PREFACE

It has often been said in recent years that health problems related to industrialization are of growing concern in Latin America and the Caribbean given the rapid growth of industry, especially the manufacture of chemicals and related products. However such statements generally have not been statistically substantiated. At the same time industrial development has not been homogenous through the Region, the industrialization process has gone much further than in others. The natural resources endowment is different in different countries. Most of the countries of the Commonwealth Caribbean gained their independence in the 1960's and 1970's.

Hence there is no publication from which a rational approach to the development of a regional environmental health strategy can be developed. Some sub-regional strategies have been adopted, most notably the CARICOM* governments adopted such a strategy based on the state of their environment.

This document has been prepared to provide a rational basis for determining regional priorities for the development of environmental health programmes related to industrial and agricultural activity in Latin America and the Caribbean.

As such it is the forerunner to follow-up studies to be carried out on a country-by-country basis linking health status with level and type of industrialization.

The document will also serve the purpose and determining to what extent chemical emergency preparedness planning is needed and for what purposes.

For reasons of consistency of data, the main sources of information were the United Nations Statistical Yearbook, as such the tables and figures are not referenced unless a different data source was used.

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*CARICOM is the Commonwealth Caribbean Common Market. The member countries are: Antigua & Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts-Nevis, St. Lucia, St. Vincent and the Grenadines and Trinidad and Tobago.

Where data are presented for the Caribbean separately from the rest of the Region, the countries included are: the CARICOM members, Suriname, Cuba, Haiti and the Dominican Republic.

The economic grouping Latin American Free Trade Association, LAFTA, was recently renamed Latin American Association of Integration, ALADI. However the acronym LAFTA has been used throughout the document.

INTRODUCTION

Industrialization, it is often said, is the engine of socioeconomic development. Following the Second World War, the countries of Latin America applied this philosophy in the 1950's in an effort to develop and broaden their economies, which up to the time were based essentially on the production and export of primary agricultural produce and metallic minerals, and the importation of finished products and consumer goods. The newly emerging independent states of the Caribbean followed suit in the 1960's and 1970's.

Initially the objective was to produce their own consumer goods often starting from imported semi-finished or finished components - the so-called "screw-driver" or assembly industries. The imported components were eventually to be produced locally thus creating a truly local manufacturing capability. To the extent that many Latin American countries now make most of the components in their consumer products the strategy was reasonably successful. In the smaller countries of the Caribbean and Central America, the lack of a sufficiently large internal market to allow for economies of scale, the policy has been somewhat less successful. However this document cannot go into that aspect of the industrialization of the Region.

As the engine gathered steam, efforts were made to link industry with the region's own natural resources, and to begin to process their raw materials and to manufacture the intermediate materials needed by industry.

Since in general, the processing of raw materials and intermediate products generate more pollutants than does the final production of goods, pollution has become increasingly problematical. As shown in this document, the 1960's and 1970's have seen a large increase in the production of basic metals, metal working and finishing, organic and inorganic chemicals, and petroleum production and processing.Almost without exception, these developments have occurred with minimal or no attention accorded the environment. Most of the industries are located in or close to large urban conurbations, on the coastlings, within the water catchment areas of major rivers, or above major underground water sources.

The interaction of the general environmental contamination and the population have led to increasingly serious environmental concerns.

The other major industry in the region, i.e. agriculture has also undergone a major transformation. Increasing

use has been made of agricultural chemicals such as fertilizers, pesticides, herbicides, fungicides, etc., which has further agravated the environmental concerns and problems. Very large numbers of workers are exposed to deadly poisons which all too often are not handled and used properly, mainly due to ignorance and lack of training.

In Section 1 of this document the external trade of the countries of the region are examined in order to determine the relative importance of the different productive sectors. The analysis demonstratesquite clearly that the major exports are from the agricultural, raw materials, fuels and chemicals sectors, while the major imports are of machinery and transport equipment, and other manufactured goods.

Section 2 looks at the internal economy in terms of the four sectors mentioned above, while section 3 examines more closely the pattern of production within those sectors.

In Section 4 the environmental health hazards and concerns, in relation to the four industrial sectors, are presented.

Finally some conclusions and recommendations for follow-up studies are given at the end of the document.

SECTION 1

LATIN AMERICAN AND CARIBBEAN EXTERNAL TRADE

1.1 Introduction

In this section the Latin American and Caribbean external trade (exports and imports) is briefly analyzed in the context of the world's trade. In particular the contribution of various economic sectors compared with the rest of the world's developing market economies is examined. Differences between Central America and the Caribbean and the members of the Latin American Free Trade Association are highlighted.

The section does not pretend to be an exhaustive and detailed economic analysis, its main purpose is to highlight the importance of certain economic sectors in relation to other lesser important ones. Those major sectors thus indentified are looked at in more detail in subsequent sections of the document.

1.2 The World Trade Structure

From Table 1 it can be seen that the developed market economies as defined by the United Nations dominate the world external trade. Prior to the rapid increase in oil prices, jointly those countries were responsible for nearly 71 percent of all imports and almost 72 percent of all exports in 1970. By 1977, mainly due to the oil price increases the corresponding figures were aproximately 67 percent and 65 percent. During the same period of time the developing market economies' share of imports increased from a little more than 18 percent to 23 percent and their exports increased from almost 18 percent to nearly 26 percent. Latin America and the Caribbean, with about 8 percent of the world's population accounted for 5.6 percent of total world exports in 1970 and 5.4 percent in 1977. Imports for the corresponding years were 5.9 percent and 6.1 percent.

TABLE 1 - WORLD TRADE IN 1970 AND 1977 BY REGION
(PERCENTAGES)

		DEVELOPED MARKET ECONOMIES	CENTRALLY PLANNED ECONOMIES	DEVELOPING MARKET ECONOMIES	LATIN AMERICA AND THE CARIBBEAN	LATIN AMERICA FREE TRADE ASSOCIATION
IMPORTS	1970	70.7	10.1	18.4	5.9	3.7
	1977	66.8	9.3	23.0	6.1	3.1
EXPORTS	1970	71.8	10.5	17.6	5.6	4.0
	1977	64.8	9.5	25.7	5.4	3.6

Since such figures say nothing of the sectorial distribution of the trade, Figures 1 and 2 are presented. These figures show a breakdown of world trade by economic region and by sector. The regions and sectors used are those defined by the United Nations in their statistical yearbooks. The pie charts demonstrate quite graphically the domination of world trade by the developed market economies in all sectors except fuels. Also clearly evident is the marked effect which the 1973/1974 OPEC oil price increases had on the sectorial distribution of world trade in dollar terms. Whereas in 1970, fuels etc. accounted for 9.3 percent of total world trade, by 1977 the proportion had risen to 19.7 percent, of which the developing countries share was 74.7 percent up from 63.4 percent in 1970. Another generally known fact which is clearly visible in figures 1 and 2 is that by and large the developing countries are suppliers of raw materials and importers of heavy machinery, transport equipment and other finished or semi-finished manufactured goods. In this respect, however, there are some important differences between Latin America (particularly the Latin American Free Trade Association (LAFTA) countries*) and the rest of the world's developing countries.

1.3 Latin America and Caribbean External Trade in the Context of Developing Countries

In order to remove the blanketing effect of the developed market economies, Figures 3 and 4 have been prepared. These are pie charts showing the sectorial breakdown of the developing countries' total world trade. These figures

* The LAFTA members are: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

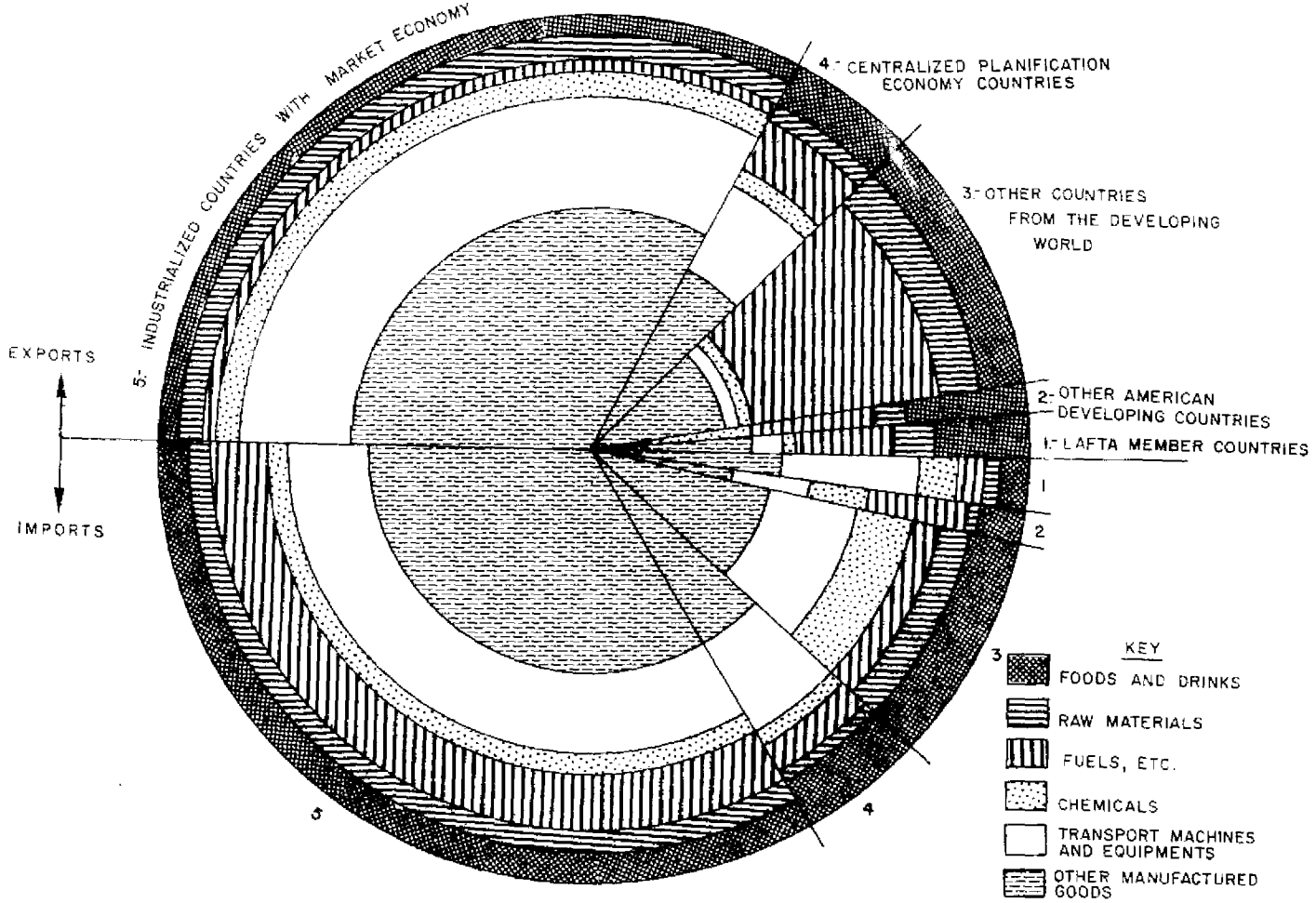
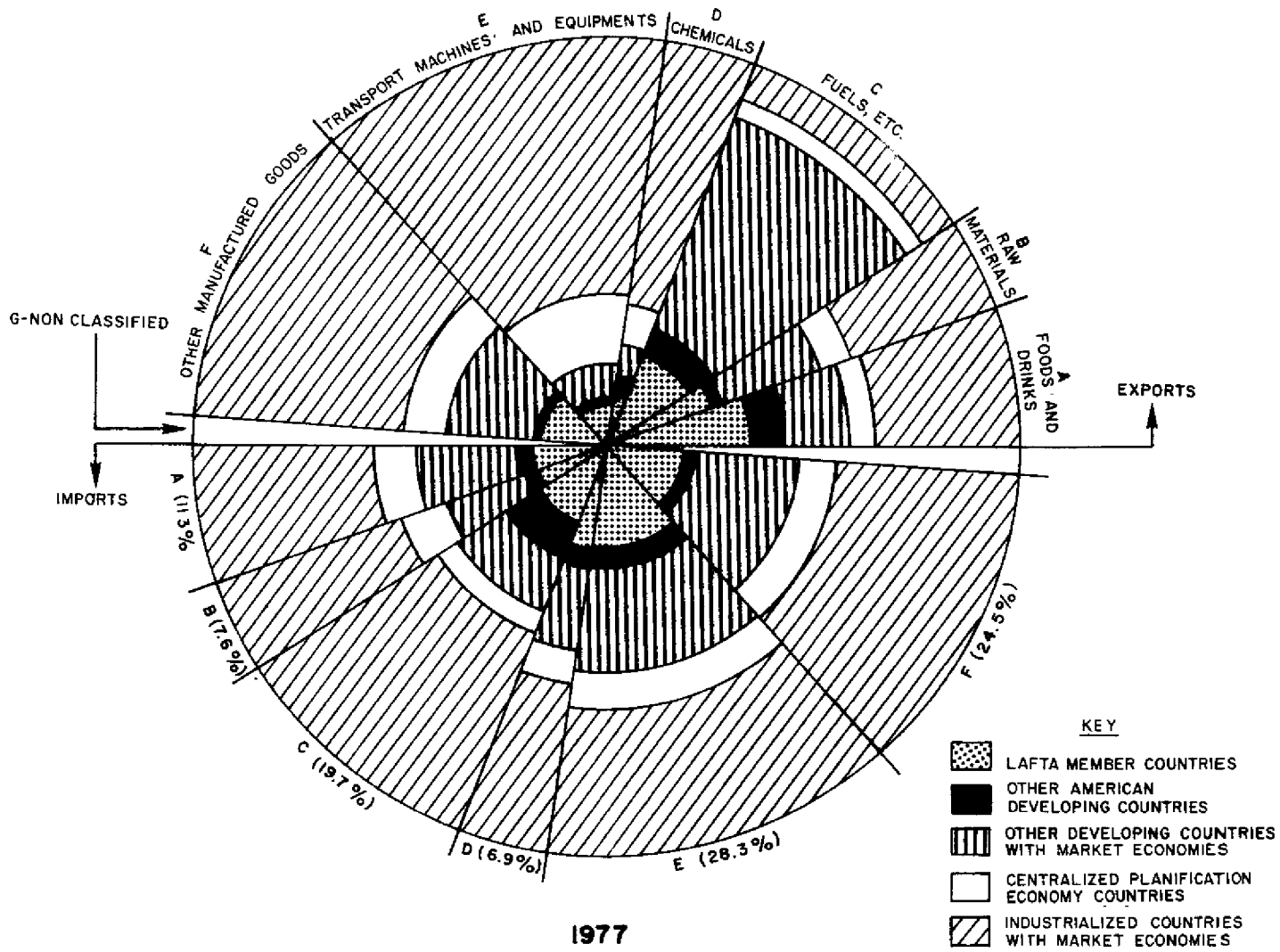


Fig. I WORLD TOTAL FOREIGN TRADE (1977)

Fig. 2 WORLD TOTAL FOREIGN TRADE (1977)



1977

demonstrate even more clearly the relative insignificance of exports of heavy machinery, transports equipment and other manufactured goods (17.6% in 1977) and their dominance in imports (58.7 percent in 1977). With respect to the sectorial shares attributable to Latin America and the Caribbean, the actual figures are presented in Table 2.

TABLE 2 - LATIN AMERICAN AND CARIBBEAN WORLD TRADE AS A PROPORTION OF TOTAL DEVELOPING COUNTRY WORLD TRADE 1977 - PERCENT.

		FOOD & DRINK	RAW MATERIALS	FUELS ETC.	CHEMICALS	MACHINERY & TRANSPORT EQUIPMENT	OTHER FABRICATED GOODS
LATIN AMERICA & CARIBBEAN	E	51.3	27.6	12.4	49.1	21.6	16.9
	I	22.3	19.2	45.2	33.2	24.8	20.8
LAFTA ONLY	E	32.8	23.1	6.9	20.0	18.9	14.8
	I	12.9	15.4	15.8	24.2	18.0	13.7
CENTRAL AMERICA & CARIBBEAN	E	18.5	4.5	5.5	29.1	2.7	2.1
	I	9.4	3.8	29.4	9.0	6.8	7.1

E= exports; I= imports

The above figures should be viewed in the context of relative populations of the regions. The population of Latin America and the Caribbean in 1977 was approximately 331 302 000 of which 86.8 percent lived in the LAFTA countries. In the same year, the total developing market economy contries had a population of about two thousand million. In other words, the population of Latin America and the Caribbean, in 1977 was about 16.5 percent of that of the developing market economy countries. Thus a more meaningful way to compare world trade is to put it on a per capita basis. Table 3 shows the proportion of world trade on a per capita basis, for Latin America and the Caribbean, relative to the rest of the developing world for 1977.

TABLE 3 - PROPORTION OF WORLD TRADE ON A PER CAPITA BASIS FOR LATIN AMERICA AND THE CARIBBEAN RELATIVE TO THE REST OF THE DEVELOPING WORLD (1977)

		FOOD & DRINK	RAW MATERIALS	FUELS ETC.	CHEMICALS	MACHINERY & TRANSPORT EQUIPMENT	OTHER FABRICATED GOODS
LATIN AMERICA & CARIBBEAN	E	5.31	1.92	0.71	5.06	1.45	1.07
	I	1.51	1.25	4.33	2.61	1.73	1.38
LAFTA ONLY	E	2.92	1.80	0.44	1.50	1.40	1.04
	I	0.89	1.09	1.12	1.91	1.32	0.95
CENTRAL AMERICA & CARIBBEAN	E	14.3	2.33	2.36	21.5	1.29	0.95
	I	4.55	1.76	20.2	5.1	3.40	

E= Exports; I= Imports

With the exception of fuels etc., it can be seen that the proportion of the world trade enjoyed by Latin America and the Caribbean, on a per capita basis, is higher than the rest of the developing world in every other sector. Table 3 shows that the former's share of exports of food and drink, raw materials, chemicals and machinery and transport equipment is significantly higher than the latter's in relation to the region's population.

This observation is indicative of a Region which economically lies somewhere between the fully developed market economy countries and the traditionally perceived developing market economy countries. That is not to say that the observation is valid for all countries of the Region; there are significant differences between the LAFTA countries and Central America and the Caribbean, and between countries within those sub-groups. Some of the poorest countries in the world are to be found in the America.

Fig. 3 DEVELOPING COUNTRIES WITH MARKET ECONOMIES
TOTAL FOREIGN TRADE (1970)

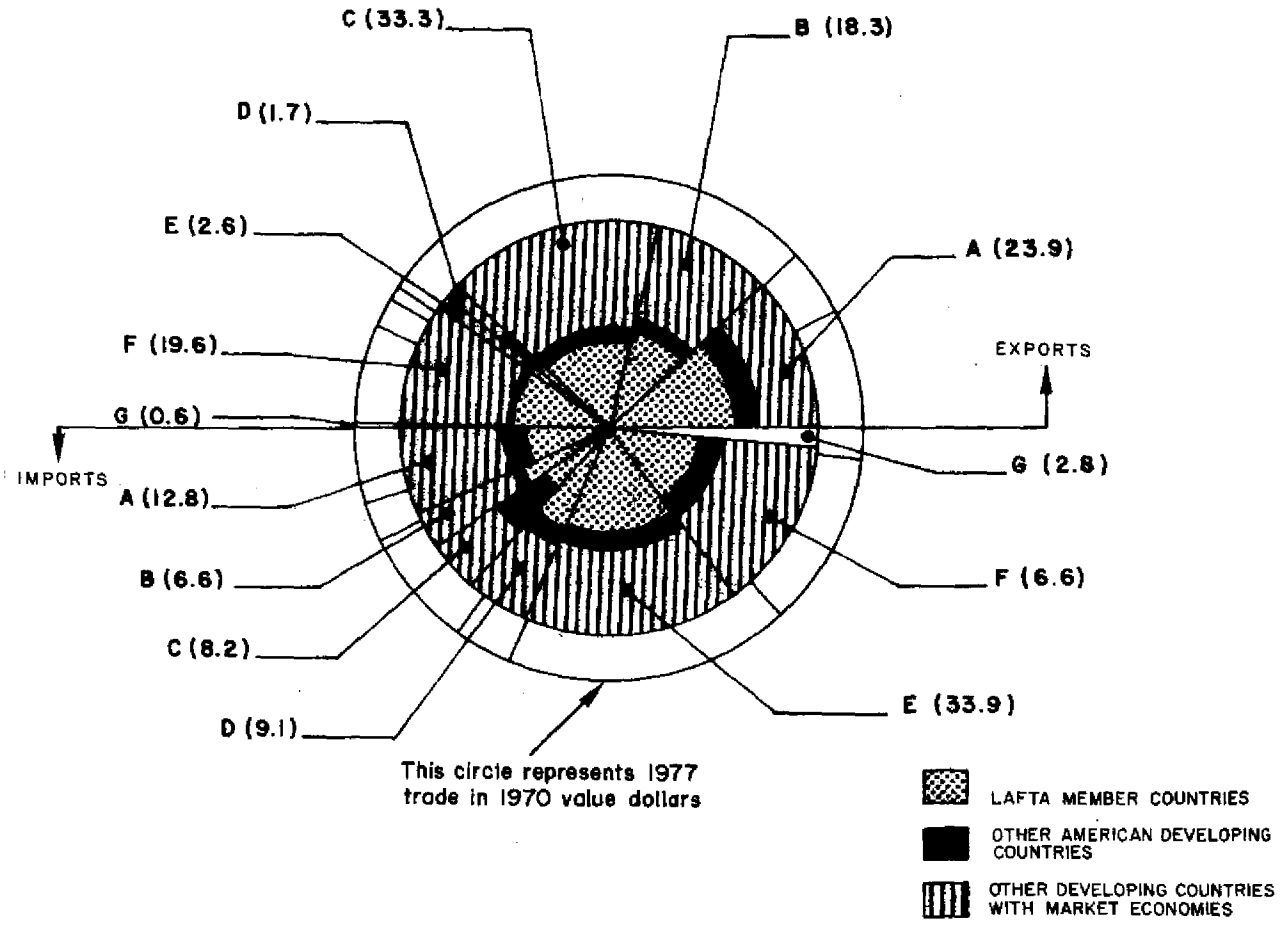
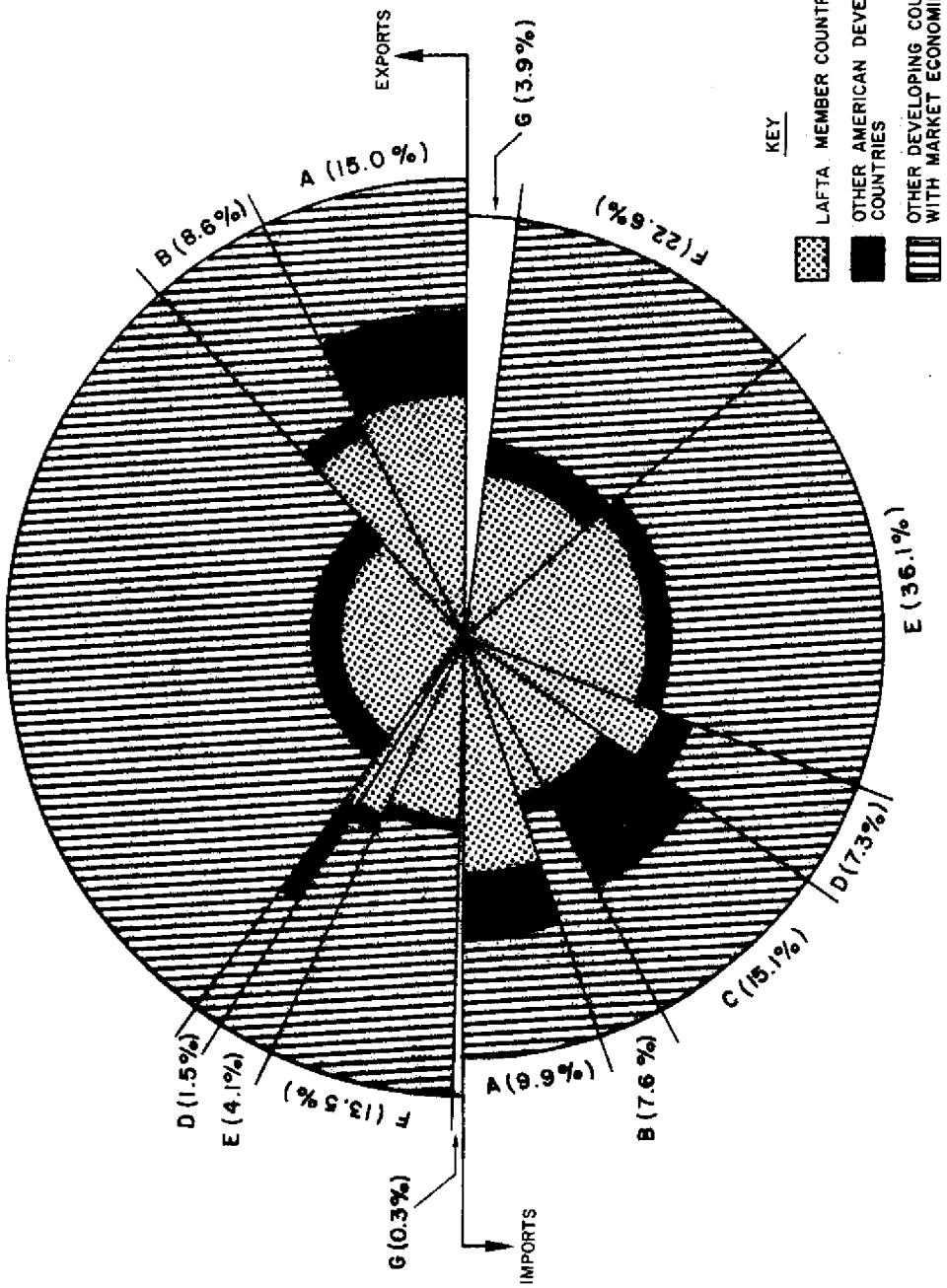


Fig. 4 DEVELOPING COUNTRIES WITH MARKET ECONOMIES
TOTAL FOREIGN TRADE (1977)



1.4 The External Trade of Latin America and the Caribbean

Turning specifically to the composition of the external trade of Latin America and the Caribbean, Figure 5 shows that in 1977, 84.9 percent of total exports were accounted for by: food and drink (36.5%); raw material (11.5%); fuels etc. (33.4%); chemicals (3.5%); whereas those four categories accounted for only 47.0 percent of total imports, broken down as follows: food and drink (8.2%); raw materials (3.7%); fuels etc. (25.9%), and chemicals (9.2%). Transport equipment and machinery on the other hand was responsible for only 3.9 percent of exports but 33.9 percent of imports. The total value of exports of food and drink, raw materials, fuels and chemicals from the Latin American and Caribbean countries in 1977 was 51 440 millions of United States dollars.

Table 3 shows that on a per capita basis, with the exception of machinery and transport equipment, and other manufactured goods, the Central American and Caribbean countries export more from the other sectors, than do the LAFTA countries. This is particularly true for food, drink and chemicals.

Figure 6 enables a visual perception of the growth in trade (exports plus imports) of the four most important sectors while Table 4 gives the per capita trade figures for the same sectors.

TABLE 4 - TOTAL LATIN AMERICAN AND CARIBBEAN EXTERNAL TRADE IN FOOD AND DRINK, RAW MATERIALS, FUELS ETC., AND - - - CHEMICALS (IN U.S. DOLLARS PER CAPITA)

		FOOD & DRINK	RAW MATERIALS	FUELS ETC.	CHEMICALS	TOTALS
LATIN AMERICA & CARIBBEAN	E	66.9	20.6	61.3	6.4	155.2
	I	17.0	7.7	53.7	19.0	97.4
LAFTA ONLY	E	49.5	19.8	39.7	3.1	112.1
	I	11.3	7.0	21.2	16.1	55.6
CENTRAL AMERICA & CARIBBEAN	E	179.3	26.4	201.4	27.7	434.8
	I	53.6	11.9	263.5	37.8	366.8

E = Exports; I = Imports

Fig. 5 TOTAL LATIN AMERICAN AND CARIBBEAN TRADE (1977)

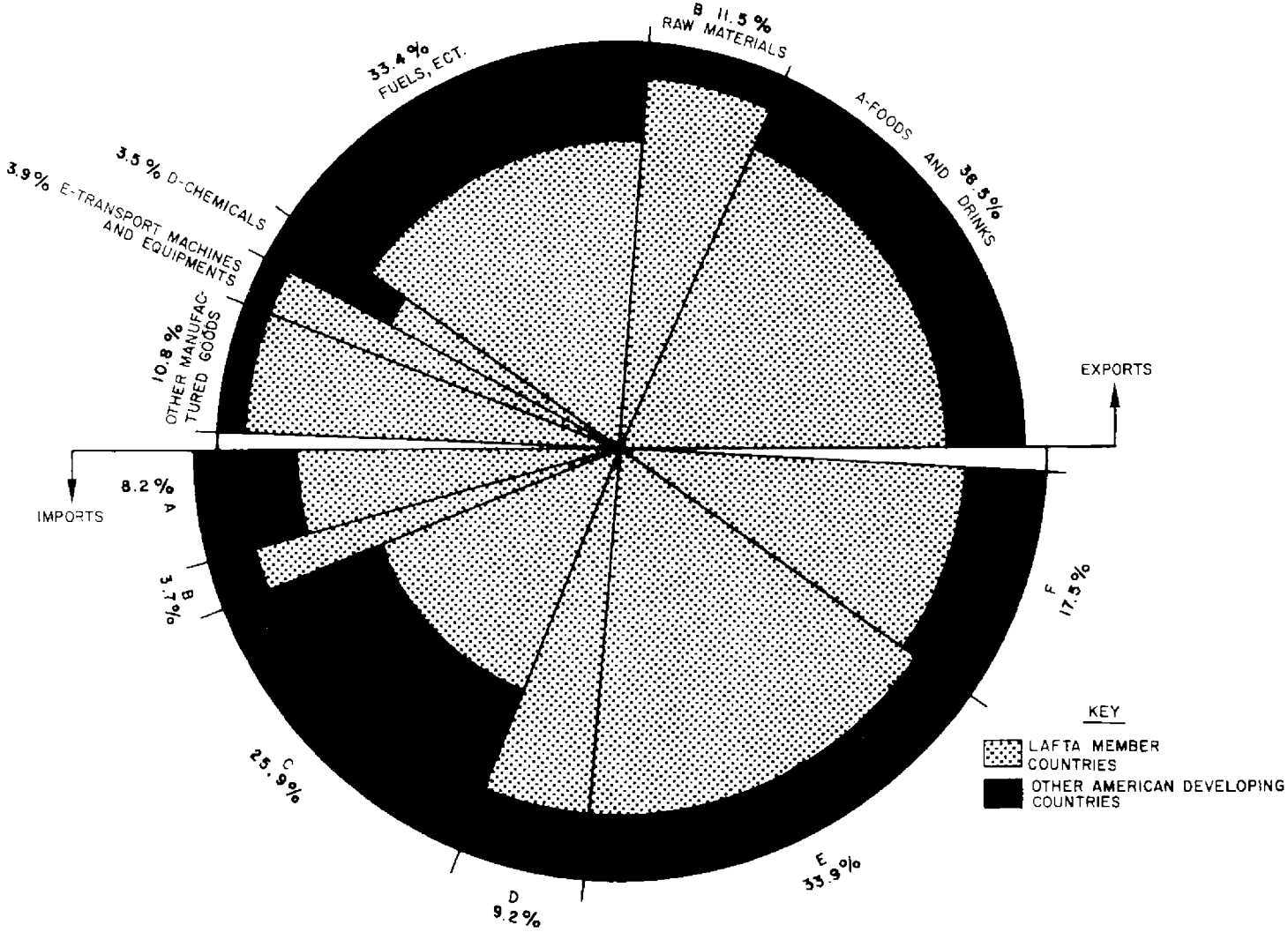
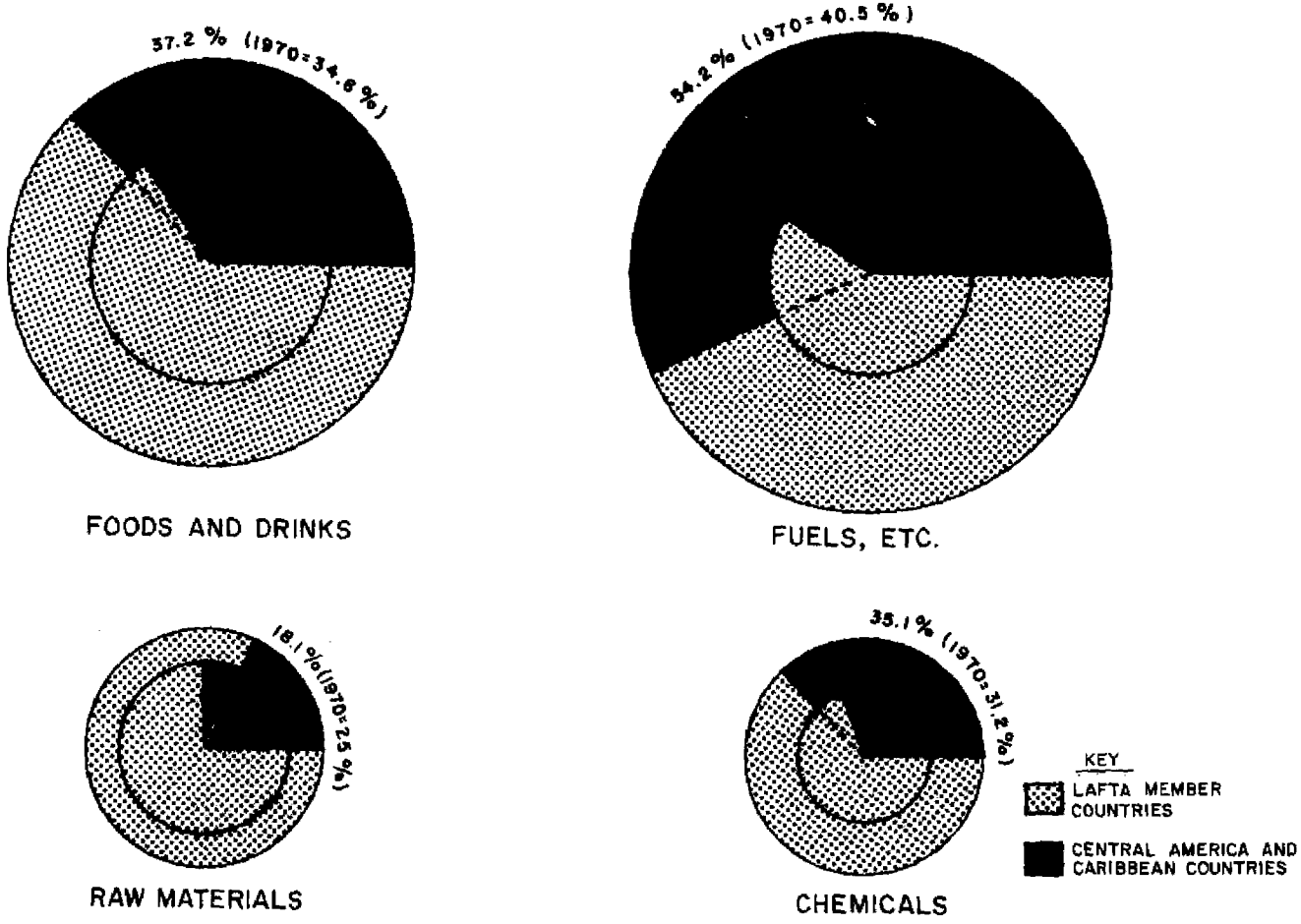


Fig. 6 FOREIGN TRADE CHOSEN FROM AMERICAN DEVELOPING COUNTRIES
1970 (INSIDE CIRCLES) AND 1977 (OUTSIDE CIRCLES)



These figures take on more significance when compared to an average per capita GDP for the entire Region, of US $1220 for 1976.

It can be observed that only in the raw materials sector did the LAFTA countries increase their share of the region's world trade. Table 5 shows the average annual growth rate over the eight-year period 1970 to 1977 for LAFTA and for Central America and the Caribbean for the same four sectors.

TABLE 5 - AVERAGE ANNUAL GROWTH RATE OF EXPORTS AND IMPORTS FROM 1970 TO 1977 FOR ECONOMIC SECTORS SHOWN, FOR LAFTA AND CENTRAL AMERICA AND THE CARIBBEAN (PERCENTAGES)

		FOOD & DRINK	RAW MATERIALS	FUELS ETC.	CHEMICALS
CENTRAL AMERICA & CARIBBEAN	E	17.8	5.5	28.0	30.1
	I	13.7	13.0	32.3	13.5
LAFTA	E	14.8	13.0	17.8	15.8
	I	15.7	13.4	33.9	16.1

E= Exports; I= Imports

SECTION 2

ECONOMIC STRUCTURE OF THE LATIN AMERICAN AND CARIBBEAN COUNTRIES

2.1 Introduction

This section is concerned not so much with a detailed micro-economic analysis of the Latin American and Caribbean countries, but rather aims to provide the reader with a picture of the relative importance of agriculture and industry in the economies of the countries. Industry encompasses the production and processing of non-agricultural raw materials, the production and processing of fuels and related products, the manufacture of chemicals, the processing of agricultural products (but not the growing of them) and the manufacture of all classes of goods. Specifically excluded are the construction and services industries.

2.2 Indicators and Economic Structure

The indicators of economic activity or structure normally used are figures related to the Gross National Product (GNP) or Gross Domestic Product (GDP).

Table 6 shows the percentage contribution to the GNP of the Manufacturing, Industrial and Agricultural Sectors for the countries of the Americas. The countries have been classified in descending order according to the contribution of the manufacturing sector. The difference between the figure for total industry and manufacturing yields the contribution to the GNP of raw materials and fuels production. Three groupings of countries have been identified, viz: those for which the manufacturing sectors contribution was 20 percent or more in 1977; those for which that sectors contribution was between 16 and 19 percent inclusive; and those with a value of 15 percent or lower.

TABLE 6 - MANUFACTURING, TOTAL INDUSTRIAL AND AGRICULTURAL CONTRIBUTION (percentage) TO GROSS NATIONAL PRODUCT, RANKED ACCORDING THE SHARE HELD BY MANUFACTURING 1977 / 1960 given in ( ) /.

	MANUFACTURING (1)	TOTAL INDUSTRY (2)	AGRICULTURE (3)	TOTAL (2)+(3)
Argentina	33[a] (28)[c]	36[a] (31)[c]	12[a] (15)[c]	48[a] (46)[c]
Peru	28[b] (23)[c]	36[b] (33)[c]	13[b] (17)[c]	49[b] (50)[c]
Uruguay	25[b] (19)	27[b] (21)	10[b] (18)	37[b] (39)
Mexico	24[b] (19)	30[b] (25)	9[b] (16)	39[b] (41)
U.S.A.	24 (29)	29 (34)	3 (4)	32 (38)
Brazil	23 (18)	26 (19)	10 (18)	36 (37)
Colombia	22[a] (18)	24[a] (23)	27[a] (32)	51[a] (55)
Chile	20 (23)	27 (34)	10 (11)	37 (45)

Cont. Table - 6

	MANUFACTURING (1)		TOTAL INDUSTRY (2)		AGRICULTURE (3)		TOTAL (2)+(3)	
Costa Rica	19	(14)	22	(15)	22	(26)	44	(41)
Dominican Rep.	19	(17)	23	(20)	21	(27)	44	(47)
Jamaica	19[b]	(12)	30[b]	(22)	8[b]	(11)	38[b]	(33)
Nicaragua	19	(16)	21	(19)	23	(24)	44	(43)
Canada	18	(23)	25	(29)	4	(6)	29	(35)
Ecuador	17	(14)	29	(17)	20	(33)	49	(50)
Paraguay	17	(16)	19	(17)	34	(37)	53	(54)
Honduras	16	(11)	19	(13)	29	(31)	48	(44)
Venezuela	16	(..)	39	(27)	6	(6)	45	(33)
El Salvador	15	(15)	16	(16)	30	(32)	46	(48)
Trinidad-Tobago	15[a]	(12)	54[a]	(44)	3[a]	(11)	57[a]	(55)
Panama	14[b]	(13)	17[b]	(15)	17[b]	(23)	34[b]	(38)
Bolivia	13[b]	(14)	25[b]	(25)	18[b]	(29)	43[b]	(54)
Guatemala	13[d]	(13)	14[d]	(14)	28[d]	(28)	42[d]	(42)
Guyana	12[b]	(9)	25[b]	(19)	21[b]	(24)	46[b]	(43)
Haiti	11[b]	(10)	15[b]	(12)	41[b]	(49)	56[b]	(51)
Barbados	10[b]	(..)	13[b]	(12)	11[b]	(25)	24[b]	(37)
Belize	10[b]	(..)	11[b]	(34)	21[b]	(30)	32[b]	(64)
Suriname	5[a]	(..)	27[a]	(33)	9[b]	(13)	36[b]	(46)
Grenada	4[a]	(4)[e]	6[a]	(6)[e]	29[a]	(20)[e]	35[a]	(26)[e]
Dominica	2[f]	(..)[g]	3[f]	(7)[g]	40[f]	(35)[g]	43[f]	(42)[g]

NOTE: No data were available for the following countries: Antigua & Barbuda, Bahamas, Cuba, St. Lucia and St. Vicent & the Grenadines.

a - 1975; b - 1976; c - 1968; d - 1963; e - 1970; f - 1973; g - 1971.

It should be noted that, with a few exceptions, as the contribution of the manufacturing sector decreases, that of the agricultural sector increases. Thus in the first group the contribution of agriculture is generally less than 15 percent; in the second group it is generally between 20 and 25 percent; in the third group there are figures as high as 40 percent.

Table 6 and Table 7 which shows the 1977 per capita GNP of the countries of the Americas, confirm the observation made in the previous section regarding the level of development of the LAFTA countries. All of the countries in the first group are LAFTA members, and only one LAFTA member, Bolivia, is in the third group. Table 7 shows that many of the LAFTA countries have per capita GNPs higher than the average for all middle income countries.

Virtually without exception it should be noted that over the time period considered the contribution of the manufacturing sector to the GNP has increased while that of the agricultural sector has decreased. The two notable exceptions are the developed market economy countries, Canada and the USA. The latter is discussed further, below.

As mentioned earlier there are some apparent anomalies in the ranking of certain countries. These exceptions require a brief explanation in order to interpret the date correctly. These are dealt with below on a country by country basis.

TABLE 7 - GNP PER CAPITA IN US DOLLARS (1977)

	US$/CAPITA	COMMENT
U.S.A.	8 520	
CANADA	8 460	
BAHAMAS	3 520	Tourism economy
VENEZUELA	2 660	Oil economy
TRINIDAD - TOBAGO	2 380	Oil economy
BARBADOS	1 770	Tourism economy
ARGENTINA	1 730	
SURINAME	1 470	Bauxite economy
URUGUAY	1 430	
BRAZIL	1 360	
COSTA RICA	1 240	
PANAMA	1 220	
CHILE	1 160	
JAMAICA	1 150	Tourism & bauxite economy
MIDDLE INCOME COUNTRIES AVERAGE	1 140	
MEXICO	1 120	
CUBA	910	
DOMINICAN REPUBLIC	840	
PERU	840	
NICARAGUA	830	
ECUADOR	790	
GUATEMALA	790	
PARAGUAY	730	
COLOMBIA	720	
BOLIVIA	630	
GUYANA	560	
GRENADA	520	
HONDURAS	410	
HAITI	230	
LOW INCOME COUNTRIES AVERAGE	170	

NOTE: Data were unavailable for: Antigua & Barbuda, Belize, Dominica, St. Lucia and St. Vincent. This information was taken from "World Development Report, 1979" WORLD BANK, Washington,D.C. August 1979.

COLOMBIA

This is the only country with a high contribution from both the manufacturing and agricultural sectors. The very large export-oriented coffee and cotton growing industries are mainly responsible for the agricultural sector's contribution.

JAMAICA

Although in the middle range for contribution of the manufacturing sector, agriculture contributes only eight percent to the GDP. Still basically an undeveloped economy, the explanation lies in the fact that the twin lynch-pins of the economy are bauxite mining and tourism. The former is reflected in the 30 percent figure for total industrial contribution (c.f. 29 percent and 25 percent for the U.S.A. and Canada respectively). At the same time, the country, following the Puerto Rican development model, has a comparatively large assembly and "finishing touch" manufacturing sector based on imported raw and semi-processed materials.

CANADA

The thirteenth position occupied by Canada, may at first sigh appear to be anomalous, as indeed may be the fourth position occupied by the U.S.A.. However, a declining contribution of manufacturing to the GDP is common to most industrialised market economy countries. The decline is generally matched by an increasing contribution from the service sectors. Thus in Canada, while the contribution of manufacturing declined from 23 percent to 18 percent, services increased from 28 percent to 37 percent from 1960 to 1977. For the U.S.A. the decline in manufacturing was from 29 percent to 24 percent, while the increase in services was from 33 percent to 37 percent. Similar changes which have taken place in the economic structure of other industrialised countries are:

	MANUFACTURING % OF GDP		SERVICES % OF GDP	
	1960	1977	1960	1977
FRANCE	37	27	24	31
W. GERMANY	40	38	19	32
JAPAN	33	30 (1976)	19	30(1976)
UNITED KINGDOM	32	25 (1976)	25	33(1976)

TRINIDAD AND TOBAGO

Although in the lowest section with respect to contribution of the manufacturing sector, this country has the lowest (3 percent) contribution from the agricultural sector. However at 54 percent, total industrial contribution is by far the highest in the Americas. These figures reflect the dominance of a single industry, petroleum, in the country.

SURINAME

The economy of this country is also dominated by a single industry: bauxite, alumina and aluminium production; leaving the agricultural sectors contribution a long way behind at nine percent.

2.3 Indices of Industrial Production

In Table 8 the indices of industrial production for the years 1960 and 1977 are tabulated for a few economic groupings of the world. For the same groupings and years the indices for industrial employment are presented in Table 9. The indices have been subdivided for basic metals production and for the production of chemicals, petroleum, coal and rubber products.

Using 1970 as the base year (i.e. index=100) it will be noted that in 1960, Latin America and the Caribbean had a lower production index in each category, compared to the other groups, but by 1977 the region had the highest indices. The growth in industrial production over the eighteen year period compared with the developed market economies is better illustrated in figures 7 and 8.

For basic metals, there was a steady acceleration from 1960 to about 1968 followed by a uniform high growth rate for the remainder of the period; for the developed market economies the same pattern was followed from 1960 to 1968 (although the acceleration was smaller). However from 1968 to 1974 there was a decceleration followed by a drop in production from 1974 to 1977.

In the case of chemicals, petroleum, coal and rubber products, a similar pattern is observed, although Latin America and the Caribbean has shown some decceleration in production since 1974 and the index for the developed market economies has not decreased.

TABLE 8 - INDICES OF INDUSTRIAL PRODUCTION (1979 = 100)

		1960	1977	% increase 1960 - 1977
LATIN AMERICA &	A	42	160	281.0
CARIBBEAN	B	46	162	252.2
DEVELOPING	A	46	158	243.5
MARKET ECON.	B	45	160	255.6
DEVELOPED	A	42	143	240.5
MARKET ECON.	B	60	107	78.3
NORTH AMERICA	A	47	150	219.1
	B	71	103	45.1

A= Chemicals, petroleum, coal and rubber products
B= Basic metals

TABLE 9 - INDICES OF INDUSTRIAL EMPLOYMENT (1970 = 100)

		1960	1977	% increase 1960 - 1977
LATIN AMERICA &	A	76	143(76)	88.2
CARIBBEAN	B	67	148(76)	120.9
DEVELOPING	A	64	150	134.4
MARKET ECON.	B	57	184	222.8
DEVELOPED	A	79	101	27.8
MARKET ECON.	B	92	92	0.0
NORTH AMERICA	A	78	103	32.1
	B	93	92	-1.1

A= Chemicals, petroleum, coal and rubber products
B= Basic metals

These figures show the very large growth that has taken place during the decades of the 1960's and 1970's in the industrial sector of the Latin American and Caribbean countries leading to their economic importance as highlighted in the previous section.

The indices of industrial employment will be discussed in Section 2.5.

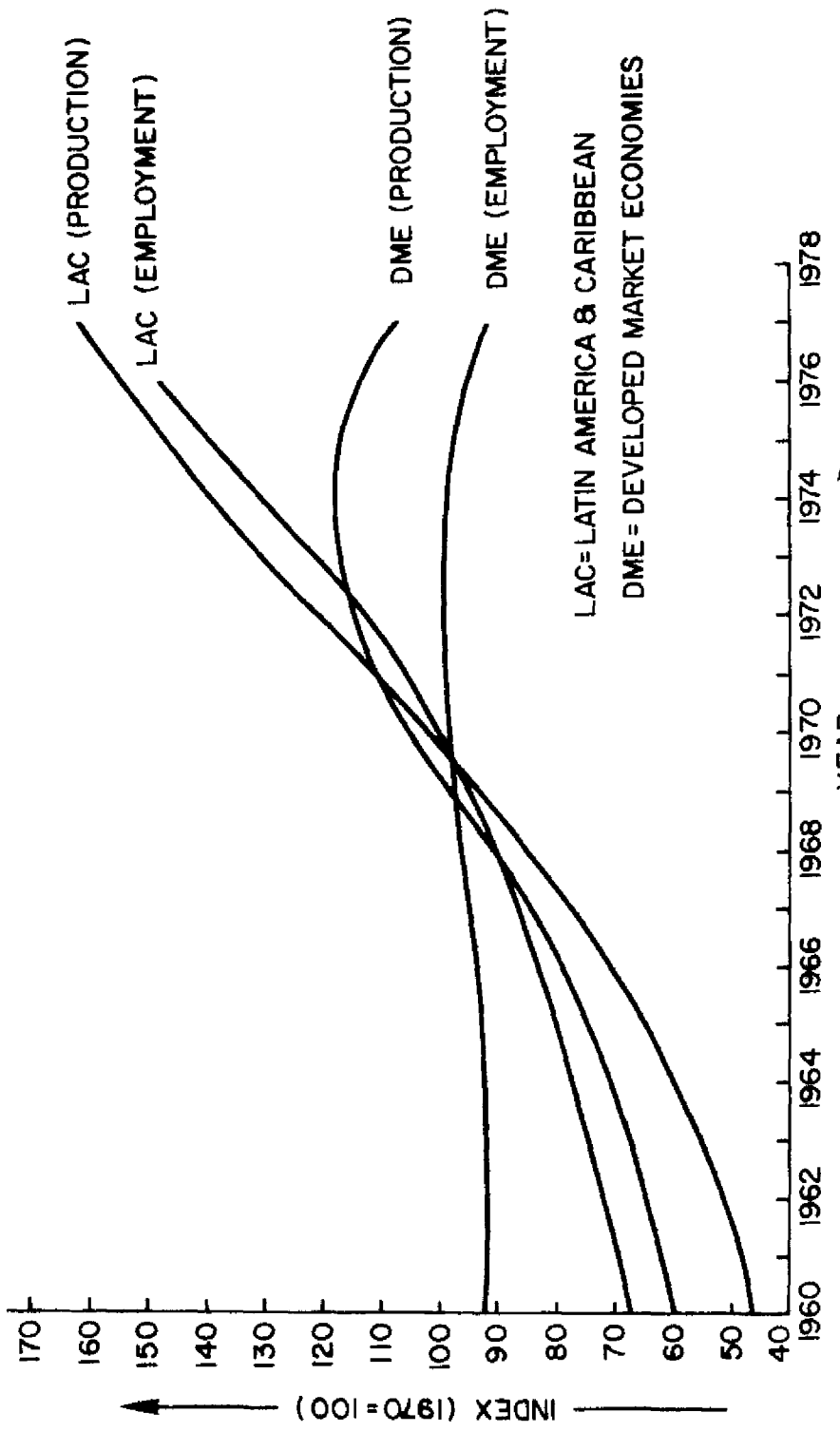


Fig. 7 INDICES OF INDUSTRIAL PRODUCTION AND EMPLOYMENT FOR BASIC METALS

Further evidence of this changing economic structure is presented in the following section.

2.4 Value Added in the Manufacturing Sector

Since the manufacturing sector can be divided into various sub-sectors based on the material processed and the end product, such textiles and clothing, machinery and transport equipment, chemicals, food and agriculture and others, it is interesting to look at the relative contributions of the chemicals and food and agriculture sub-sectors.

Table 10 shows the percentage distribution of the value added in those two sub-sectors of the manufacturing sector. The table clearly shows those countries which have fairly large and/or well developed chemicals industries, those whose industries are based on agriculture. In some countries both the chemicals industry and food and agriculture processing are important. In this latter group is to be found Argentina, Colombia and Mexico. Heavy dependence on agricultural products is to be found in Jamaica. Ecuador, Dominican Republic, Panama and Paraguay.

TABLE 10 - DISTRIBUTION (percentage) OF VALUE ADDED IN MANUFACTURING FOR FOOD & AGRICULTURE AND CHEMICALS (1979) RANKED ACCORDING TO THE SHARE OF THE CHEMICALS INDUSTRY.

	CHEMICALS	FOOD & AGRIC.	TOTAL
ARGENTINA	13	20	33
COLOMBIA	12	30	42
MEXICO	12	20	32
BRAZIL	11	14	25
U.S.A.	11	11	22
CHILE	10	15	25
URUGUAY	9	26	35
JAMAICA	8	50	58
CANADA	7	13	20
ECUADOR	7	30	37
TRINIDAD-TOBAGO	7	13	20
VENEZUELA	7	18	25
DOMINICAN REP.	5	72	77
PANAMA	5	52	57
PARAGUAY	5	33	38

SOURCE: "World Development Report, 1982" World Bank, Washington D.C.

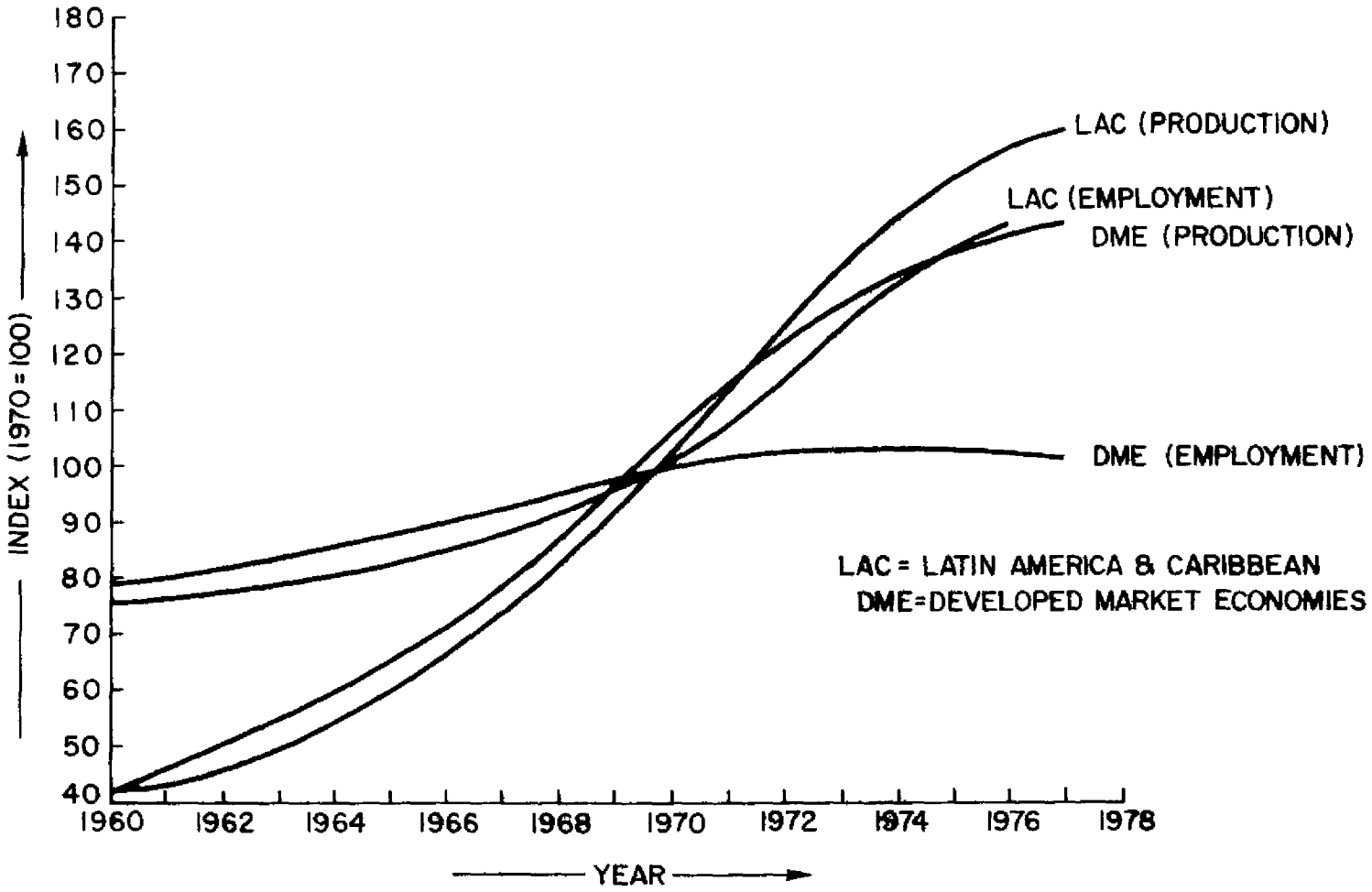


Fig. 8. INDICES OF INDUSTRIAL PRODUCTION AND EMPLOYMENT FOR CHEMICALS, PETROLEUM, COAL AND RUBBER PRODUCTS

TABLE 11 - EMPLOYMENT IN MANUFACTURING, INDUSTRY AND AGRICULTURE

	MANUFACTURING		INDUSTRY		AGRICULTURE	
	Thousands (Year)	% of economically active population	% of labour force		% of labour force	
			1980	(1960)*	1980	(1960)*
ANTIGUA & BARBUDA	--	--	-	-	-	-
ARGENTINA	--	--	28	(36)	13	(20)
BAHAMAS	--	--	--	-	-	-
BARBADOS	9.4(77)	6.2	--	-	-	-
BELIZE	--	--	--	-	-	-
BOLIVIA	31.3(75)	1.2	24	(18)	50	(61)
BRAZIL	3 538.0(74)	5.7	24	(15)	30	(52)
CANADA	1 748.0(76)	11.5	29	(35)	5	(13)
CHILE	236.4(75)	3.5	19	(20)	19	(30)
COLOMBIA	456.6(75)	3.1	21	(19)	26	(51)
COSTA RICA	55.6(75)	5.0	23	(19)	29	(51)
CUBA	--	--	31	(22)	23	(39)
DOMINICA	--	--	--	--	-	-
DOMINICAN REP	109.5 (76)	4.4	18	(12)	49	(67)
ECUADOR	74.9 (75)	2.1	17	(19)	52	(58)
EL SALVADOR	51.2 (75)	2.5	22	(17)	50	(62)
GRENADA	--	--	--	-	-	-
GUATEMALA	68.7 (75)	2.2	21	(14)	55	(67)
GUYANA	29.5 (77)	6.6	--	--	-	-
HAITI	19.8 (77)	0.7	7	(6)	74	(80)
HONDURAS	36.8 (75)	2.5	15	(11)	70	(63)
JAMAICA	49.0 (72)	4.9	25	(25)	21	(39)
MEXICO	1 708.0 (75)	5.3	26	(20)	36	(55)
NICARAGUA	--	--	14	(16)	39	(62)
PANAMA	27.1 (76)	2.5	18	(14)	27	(51)
PARAGUAY	--	--	19	(19)	49	(56)
PERU	250.1 (73)	2.9	19	(20)	40	(52)
ST. LUCIA	--	--	--	-	-	-
ST. VINCENT	-	--	--	-	-	-
SURINAME	7.3 (75)	3.1	--	-	-	-
TRINIDAD-TO-BAGO	47.1 (75)	8.1	36	(34)	16	(22)
U.S.A.	17 613.0 (76)	12.3	32	(36)	2	(7)
URUGUAY	238.7 (75)	12.6	32	(29)	11	(21)
VENEZUELA	323.7 (75)	4.4	27	(22)	18	(35)

* These figures were taken from "World Development Report, 1982" World Bank, Washington, D.C.

A large and growing chemicals industry implies an increasing number of persons being exposed to the associated health risks. This will be taken up in section 4.

2.5 Employment in Manufacturing, Industry and Agriculture

Detailed employment statistics were not readily available for the preparation of this document. However a sufficient amount of data were found to enable general comments to be made and to draw a few preliminary conclusions.

Mining for example, as will be seen in Section 3, constitutes a significant economic and environmental activity in the region. Although employment statistics were generally not available, based on those obtained it may be assumed that the labour force is considerable. In 1974 Brazil reported 65 000 workers in the sector; Mexico reported 47 900 in 1975; the numbers for Canada and the USA were 117 000 (1976) and 474 000 (1972) respectively.

Table 11 shows employment in the manufacturing, industrial and agricultural sectors for most of the countries of the region. From this table the shifting of the labour force from agriculture to industry over the previous two decades is clearly observable. However the proportion of the labour force still in agriculture is very high in many countries. With the ever increasing use of pesticides in agriculture this represents a serious health hazard to a very large number of people. Table 12 lists those countries with more than one fifth of their labour force in industry and those with more than one quarter in agriculture.

The indices of industrial employment given in Table 9 and shown graphically in Figs. 7 and 8 also show a steady and fairly rapid increase in the number of workers employed in the basic metals, chemicals, petroleum, coal and rubber products industries. Certainly the rate of growth far exceeds that of the developed market economy countries in which there has either been a decline or at least stagnation.

TABLE 12 - COUNTRIES OF LATIN AMERICA AND THE CARIBBEAN WITH THE STATED PROPORTION OF THEIR LABOUR FORCE IN INDUSTRY AND AGRICULTURE IN 1980.

20% or more of labour force in industry	Argentina, Bolivia, Brazil, Canada Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Jamaica, Mexico - Trinidad & Tobago, USA, Uruguay, -- Venezuela.

Cont. Table - 12

25% to 34% of labour force in agriculture	Brazil, Colombia, Costa Rica,Panama
35% to 49% of labour force in agriculture	Dominican Republic, Mexico,Nicaragua Paraguay, Peru
50% or more of labour force in agriculture	Bolivia, Ecuador, El Salvador, Guatemala, Haiti, Honduras.