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REPUBLIC OF TRINIDAD AND TOBAGO

NATIONAL PROFILE

CHEMICAL SAFETY MANAGEMENT IN TRINIDAD AND TOBAGO 2001

PAN AMERICAN HEALTH ORGANIZATION/
WORLD HEALTH ORGANIZATION

JUNE, 2001

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INTRODUCTION

BACKGROUND

At the 1992 Rio Earth Summit sponsored by the United Nations Conference on Environment and Development (UNCED), an action plan (Agenda 21) was formulated. It requested inter alia that the ILO and a number of its members countries make a direct contribution in its implementation via the Interdepartmental Project on Environment and the World of Work (INTERDEP/ENV).

A programme of the three-part INTERDEP/ENV Project relates to support for the ratification and implementation of specific ILO Occupational Safety and Health Conventions. Activities within this programme contribute to the empowerment of employers' and workers' organizations, relevant government ministries and non-governmental organization in some countries to formulate and execute policies based on principles enshrined in the ILO Standards on the Working Environment.

In pursuance of this objective, a National Tripartite Workshop was held in Trinidad and Tobago, July 25-27, 1995, for the purpose of charting a course and setting priorities in respect of ratification and implementation of the relevant ILO Conventions and Observance of Recommendations. These include the Chemical Convention, 1990 (No. 170), Chemicals Recommendation, 1990 (No. 177) and the Prevention of Major Industrial Accidents Convention, 1993 (No. 174).

At the workshop, the outline of a national profile on chemical safety management was presented by the then Ministry of Labour and Co-operatives. The legislative infrastructure was given in respect of pesticides, toxic chemicals and environmental protection against contamination. Components of the institutional existing framework were discussed; they included both state bodies and Non-Governmental Organizations (NGOs). The types of inspection and monitoring services available were made known and the range of risk factors at high density industrial centres formed a basis for discussion. Another aspect considered was the proper disposal of hazardous materials as an important facet of chemical safety management.

The outcome of the workshop was a Country Policy Framework Paper on Chemical Safety and the Prevention of Major Industrial Accidents in Trinidad and Tobago. The paper formed the basis of a national profile of chemical safety management in Trinidad and Tobago.

All the stake-holders in chemical safety management in Trinidad and Tobago participated and were consulted in the formulation of the original Country Paper. There were employer/employee organizations, government agencies, non-governmental organizations an the private sector. This document entitled, “National Profile – Chemical Safety Management in Trinidad and Tobago 2001,” represents an update of the original prepared in June 1995.

PROFILE OBJECTIVES

1. To identify the range of risk factors associated with the handling, use and disposal of dangerous chemicals both in the industrial setting and at domestic premises.

2. To assign duties and responsibilities to government agencies in respect of rules and regulations designed to control dangerous chemicals and to minimize harmful effects to man, animal and the environment.

3. To devise safe systems of work in the use, handling and storage of toxic chemicals in Trinidad and Tobago to ensure safe industrialization and sustainable development and growth.

4. To devise delivery systems for the dissemination of useful information to enable persons to protect themselves against harmful effects of hazardous chemicals.

5. To encourage non-governmental organizations to join in the campaign for the safe storage, handling, use, transportation and disposal of chemicals.

6. To ensure that children are protected from death or illness arising from hazardous chemicals.

7. To allow for the rough estimation of hazards that may arise from proposed installations susceptible to gaseous emissions.

SCOPE

The profile provides minimum standards set by the local regulatory agencies and it directs workers and consumers to places and persons for the purpose of getting helpful information on chemical safety management.

There are also the foreign and international agencies from which assistance can be obtained in cases where new chemicals might be unfamiliar to local entities. Included in this grouping are the ILO, WHO, PAHO and the Office of Environmental and Scientific Affairs of the World Bank. The latter publishes a Manual of Industrial Hazard Assessment Techniques. The World Bank and the International Finance Corporation during appraisals for industrial development are required to evaluate measures to control major industrial accidents.

Among the variety of hazardous substances included in the profile are the chlorinated hydrocarbons, the organo-phosphates, the carbamates, pyrethroids, quinones, nitrobenzenes, derivatives of mercury, copper, the triazines, bipyridyl compounds and phenyl-ureas.

In the preparation of the profile, guidelines were used as given by UNITAR (United Nations Institute for Training and Research) in the document entitled, “Preparing a National Profile to Assess the National Infrastructure for Management of Chemicals.” It was prepared under the umbrella of the Inter-Organization Programme for the Sound

Management of Chemicals (IOMC), a cooperative agreement of FAO, ILO, OECD, UNEP, UNIDO and WHO and in close cooperation with the secretariat of the Intergovernmental Forum on Chemical Safety (IFCS).

As a priority for action beyond 2000 as stipulated in the IFCS third session – Forum III Final Report – Programme Area E: Strengthening of national capabilities and capacities for management of chemicals, countries should inter alia regularly update national profiles. It is against this background that the profile for Trinidad and Tobago has been reviewed. The 1995 National Profile entitled, "Country Paper on Chemical Safety and the Prevention of Major Industrial Accidents in Trinidad and Tobago," was used as the bench mark. The decision to update was taken on the basis of recommendations emanating from "FORUM III" meeting held in Bahia, Brazil, October 15-20, 2000. The exercise was conducted under the auspices of the local office of PAHO/WHO.

CHAPTER ONE

NATIONAL BACKGROUND INFORMATION

1.1 PHYSICAL AND DEMOGRAPHIC CONTEXT

A. Size of the Country (area in km^2) : 4828 (Trinidad); 302 (Tobago)

B. Form of Government: Parliamentary Democracy

C. Official Language: English

D. Local Languages: Hindi, Patois (French)

E. Total Population: 1.214 million (1990 Census)

F. Urban Population: 10.5% (urban high population density and non-agricultural)

G. Rural Population: 89.5% (rural ~ low population density and agricultural)

H. Average Age of Population: 34 years

I. Population of Working Age: 558,700 (1998)

J. Birth Rate: 13.9 (1998)

K. Life Expectancy: 70.66

L. Literacy Rate: 78% (functional)

M. Average Education Level of Population: Secondary Education

N. Unemployment Rate: 12.5%

O. Number of Women Employed Outside the Home: 214,100

1.2 POLITICAL/GEOGRAPHIC STRUCTURE OF THE COUNTRY

There are eight counties, namely St. George, St. David, St. Andrew, Caroni, Nariva, Victoria, Mayaro and St. Patrick. In the area of health and environmental control, the counties are served by Regional Health Authorities (RHA).

Regional Health Authorities are responsible for hospitals continuing care facilities, community health services and public health programmes. They deliver services in the region and work with local communities to provide health care to residents of the catchment area.

Each RHA is required to:

1. Promote and protect the health of the population within the region and work to prevent disease and injury.
2. Assess continually the health needs of the region.
3. Determine priorities in providing health services in the region and allocate resources accordingly.
4. Ensure that reasonable access to quality health services is provided in and throughout the region.
5. Promote health services in a way that responds to the needs of individuals and the requirements of services and facilities.

The administrative divisions for the delivery of health services are as follows:

1. The North-West Regional Health Authority
    - Diego Martin; San Juan/Laventille; City of Port of Spain

2. The Central Regional Health Authority
    - Tunapuna/Piarco; Couva/Tabaquite/Talparo; Borough of Arima; Borough of Chaguanas

3. The South-West Regional Health Authority
    - Princess Town; Penal/Debe; Siparia; City of San Fernando; Borough of Point Fortin

4. The Eastern Regional Health Authority
    - Sangre Grande; Mayaro/Rio Claro

5. The Tobago Regional Health Authority
    - The Island of Tobago

The role of the Central Government is to formulate broad policy directions in respect of health and environmental control while that of the local government body is to implement plans and evaluate the results where deviations and variances are observed. It is the duty of the local body to effect corrective action and to make adjustments as required.

Since December 1995, 60,000 new jobs have been created in Trinidad and Tobago; during the first half of the fiscal year, October 1999 to September 2000, about 11,000 additional jobs were created. The unemployment rate was reduced from 16% in December 1995 to the present 12.5%.

TABLE 1A

INDUSTRIAL EMPLOYMENT BY MAJOR ECONOMIC SECTORS

		1	2	3
ISIC	Description	No. of Facilities	No. with Emp. Figure	No. of Persons Employed as Per Column (2)
31	Food Industry	445	212	9661
32	Textile/clothing and leather goods	190	109	2457
33	Wood and wood products	350	230	1844
34	Paper and paper products	257	151	3527
35	Chemical/petro/plastics	208	115	3779
36	Non-metallic	110	64	2578
37	Basic Metals Industry	21	16	1511
38	Fabrication of machinery and equipment	309	205	3999
39	Other manufacturing industries	60	31	442
	Mining and Extraction (Oil/natural gas/minerals/metals)	217	122	8467

FIGURE 1A - PERSONS EMPLOYED BY INDUSTRY

TOTAL USED 38,265

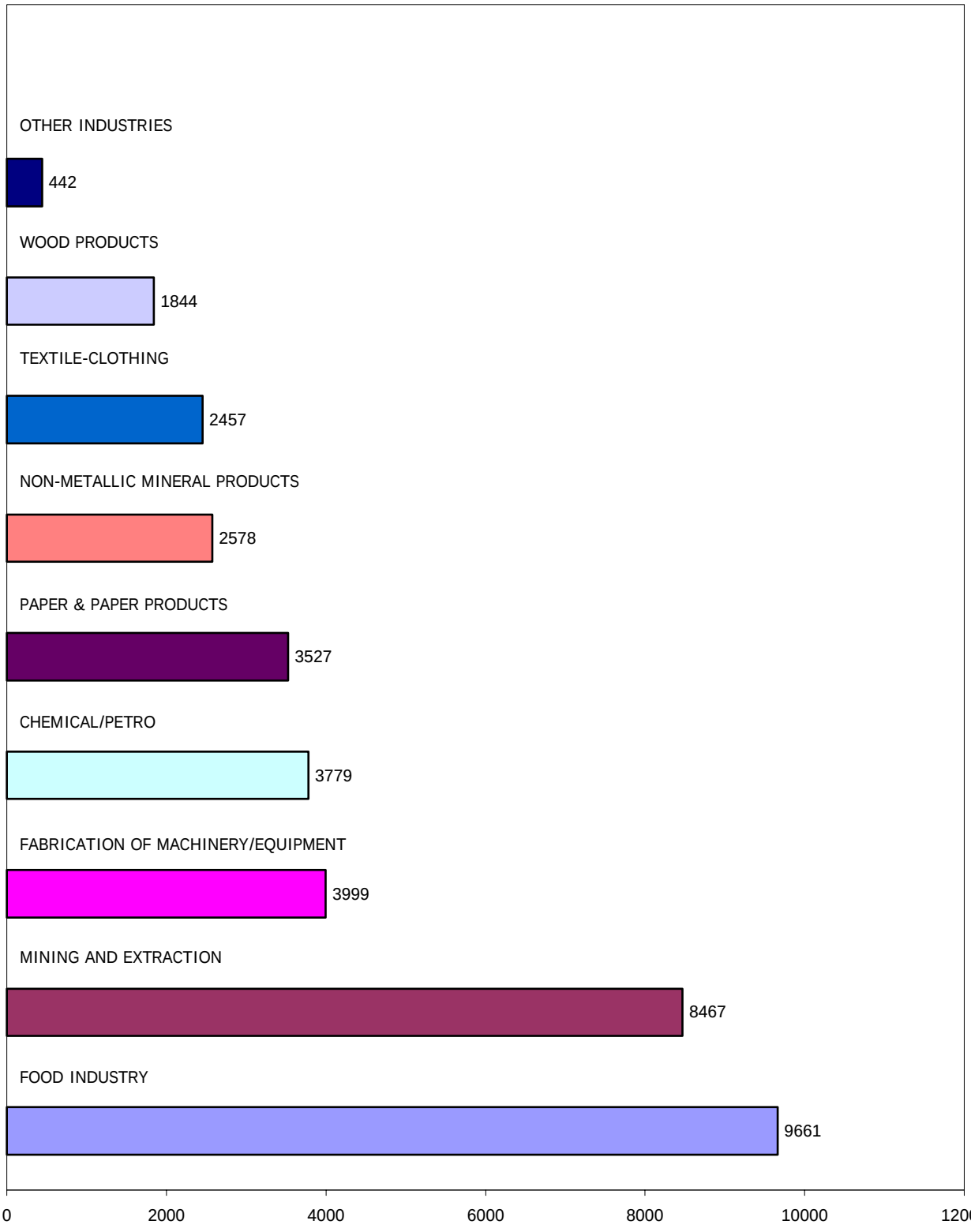
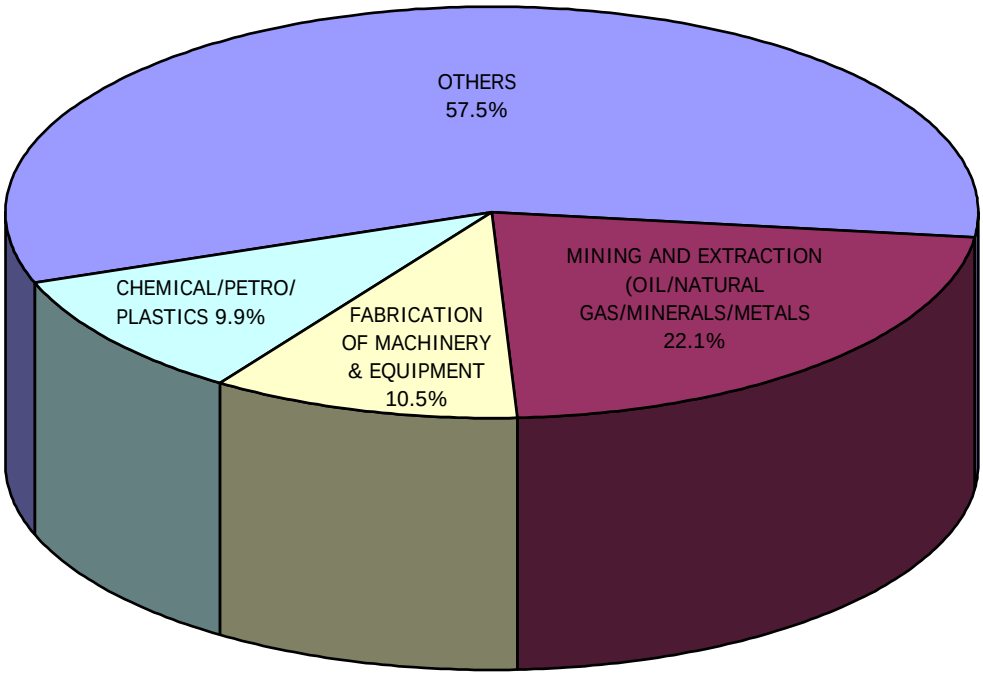


FIGURE 1B - % PERSONS EMPLOYED BY INDUSTRY

TOTAL USED: 38,265



SOURCE: CENTRAL STATISTICAL OFFICE

FIGURE 1D - AGRICULTURE AS SHARE (%) OF GDP

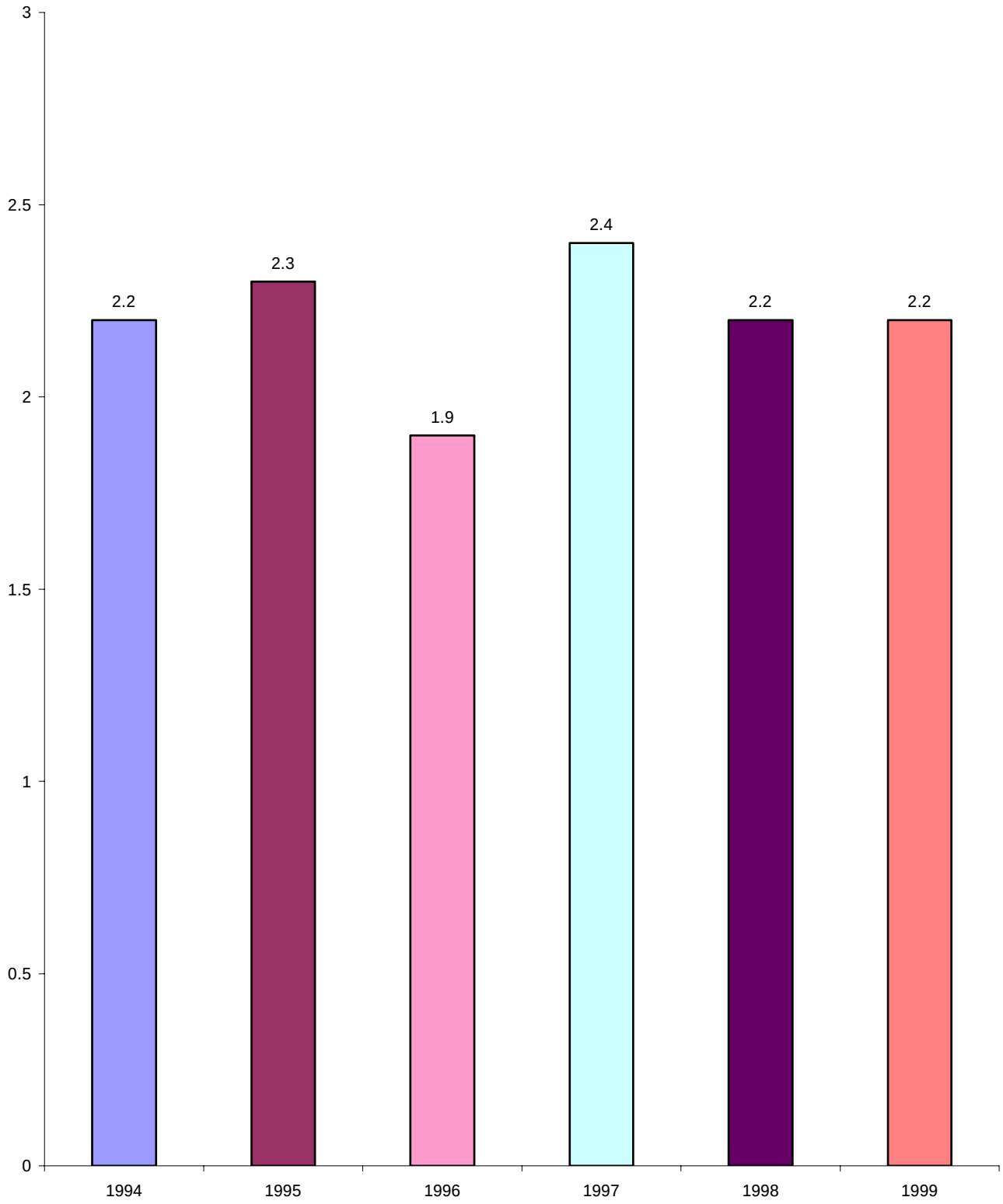


TABLE 1B

PRODUCTION OF SELECTED AGRICULTURAL COMMODITIES

	Oranges 000 kg	Grapefruit 000 kg	Cocoa Beans 000 kg	Coffee Beans 000 kg	Sugar Tonne	Broiler 000 kg	Fresh Milk 000 lit	Table Eggs 000 dox
1969	8110	13190	3464	3791	241026	13200	**	**
1970	10639	18219	6213	2302	219512	15450	7264	**
1971	6664	13180	3767	3894	216575	14750	8359	**
1972	9796	18193	7542	3300	231968	14400	10303	**
1973	556	3268	3162	2716	186677	14540	7235	5621
1974	10120	16980	4161	1940	186289	15620	7297	6753
1975	2684	6265	5240	4024	162580	21700	7741	8598
1976	6236	8780	3249	2671	203637	19500	6319	3901
1977	743	2671	3345	2918	175975	23800	5868	4997
1978	2213	5602	3398	2500	144734	24400	5927	5866
1979	2999	3939	2628	2497	140437	19300	6253	4751
1980	2616	4049	2380	2239	142690	18800	5681	3487
1981	1792	2945	3145	2433	92557	20500	5841	3357
1982	661	1175	2246	1794	79878	30000	7848	2326
1983	623	2316	1732	1388	78070	27400	9017	3142
1984	1267	1997	1560	852	64775	27100	10065	2292
1985	2450	3629	1307	2142	81293	33384	10557	2958
1986	1581	2740	1426	1334	92314	29654	11325	3077
1987	1674	1195	1501	1842	83256	29483	9892	3018
1988	2327	2427	1796	581	89014	26372	9664	3198
1989	2374	1742	1492	1206	97034	28457	10420	4242
1990	1015	1799	2110	1944	118163	30887	10071	3682
1991	2215	1244	1511	914	100351	26460	11391	3861
1992	1220	992	1114	707	110388	24602	10538	4118
1993	5949	2668	1983	874	104796	29872	9163	4486
1994	6385	4033	1444	1015	123385	26463	9069	4315
1995	5963	4292	1762	830	113569	30051	8928	4445
1996	7154	4644	2292	352	115610	29452	9623	4328
1997	6797	3646	1740	1102	119981	26591	9838	4771
1998	4202	3524	1270	367	101000	26180	9976	4586
1999	6181	4496	1159	344	112000	**	10242	4757

Source: Quarterly Agricultural Reports, Central Statistical Office

** Data unavailable at this time

TABLE 1C

GDP, AGRICULTURAL GDP AND PERCENTAGE CHANGES AT FACTOR COST (CURRENT PRICES)

Year	Gross Domestic Product (GDP) TT$m	Agricultural GDP (TT$m)	Annual Change of Agric. GDP %	Agric as Share of GDP (%)	Agric Labour Force	Agric Share of Labour (%)
1985	18157.2	911.2	0.6	5.0	44900	10.8
1986	17478.3	631.0	-30.8	3.6	45500	11.1
1987	17271.9	613.1	-2.8	3.5	47700	11.7
1988	17284.7	613.4	0.0	3.5	51800	13.0
1989	18372.9	591.9	-3.5	3.2	55600	13.8
1990	21539.3	737.1	24.5	3.4	50590	12.4
1991	22558.6	762.2	3.4	3.4	51100	11.7
1992	23117.6	801.6	5.2	3.5	49100	10.8
1993	24490.5	815.6	1.7	3.3	45675	10.8
1994	29311.7	651.4	-20.1	2.2	52590	11.7
1995	31697.0	733.1	12.5	2.3	47800	10.1
1996	34448.1	668.7	-8.8	1.9	42275	9
1997	36552.4	864.7	29.3	2.4	46900	9.3
1998	38197.1	828.3	-4.2	2.2	41200	8.1
1999	41044.9	891.3	7.6	2.2	46800	9.1

Sources: CSO Annual Statistical Digests – Various Years; Review of the Economy 1999

TABLE 1D
NATIONAL AND AGRICULTURAL SUB-SECTORAL EMPLOYMENT NUMBERS AND UNEMPLOYMENT RATES

	EMPLOYMENT (Numbers)				
Year	National	Total Agric	Domestic Agric	Export Agric	Sugar Industry
1986	390500	46800	33700	3400	9700
1987	372300	43600	30400	3200	10000
1988	371600	48400	32900	2200	13300
1989	366600	51000	35700	2100	13200
1990	367800	46400	33500	2200	10700
1991	401000	47100	31900	3500	11700
1992	405900	47400	30400	3100	13900
1993	404500	46100	30700	2800	12600
1994	415600	51800	35600	3300	12900
1995	431500	46200	30400	3100	12700
1996	444200	42800	28300	3100	11400
1997	459800	44000	28800	1400	13800
1998	479300	39300	27200	1700	10400
Growth Rate 1995-1997	2.7%	0.2%	-4.0%	2.0%	-2.7%

Source: Nagy 2000. “Trinidad and Tobago Agricultural Sector Performance Evaluation (1985-1999)” Texas A&M

TABLE 1E

TOTAL IMPORTS AND FOOD IMPORTS AND EXPORTS (CURRENT PRICES)

Year	Total Imports TT$m	Food Imports TT$m	Food as a Share of Total Imports %	Total Exports TT$m	Food Exports TT$m	Food as a Share of Total Exports %	Food Imports as a Share of Food Exports %
1966	778.6	89.7	11.52	717.2	54.9	7.65	163.39
1967	725.3	87.0	12.00	752.7	57.0	7.57	152.63
1968	856.5	87.6	10.23	923.9	75.3	8.15	116.33
1969	968.5	106.2	10.97	935.8	77.2	8.25	137.56
1970	1087.2	103.4	9.51	963.3	81.5	8.46	126.87
1971	1329.2	114.5	8.61	1041.5	80.1	7.69	142.95
1972	1471.1	132.9	9.03	1071.5	92.3	8.61	143.99
1973	1564.0	161.0	10.29	1374.9	87.8	6.39	183.37
1974	3777.8	250.3	6.63	4166.3	158.8	3.81	157.62
1975	3243.7	284.9	8.78	3878.5	232.1	5.98	122.75
1976	4908.8	321.3	6.55	5394.9	190.2	3.53	168.93
1977	4371.7	366.6	8.39	5241.9	163.6	3.12	224.08
1978	4721.0	438.2	9.28	4895.1	138.0	2.82	317.54
1979	5067.1	536.0	10.58	6264.7	171.1	2.73	313.45
1980	7626.4	707.8	9.28	9784.8	176.9	1.81	400.11
1981	7498.9	834.7	11.13	9025.9	159.7	1.77	522.67
1982	8873.1	904.7	10.20	7372.4	125.5	1.70	720.88
1983	6196.7	929.8	15.00	5646.3	107.6	1.91	864.13
1984	4605.9	894.1	19.41	5216.2	100.7	1.93	887.88
1985	3739.0	764.1	20.44	5247.1	88.4	1.68	864.37
1986	4939.9	786.7	15.93	4988.6	160.6	3.22	489.85
1987	4387.5	833.4	18.99	5264.6	190.4	3.62	437.71
1988	4291.5	720.2	16.78	5423.5	241.7	4.46	297.97
1989	5195.4	863.8	16.63	6706.9	331.6	4.94	260.49
1990	5361.8	859.9	16.04	8842.0	363.5	4.11	236.56
1991	7084.8	895.1	12.63	8436.4	383.2	4.54	233.59
1992	6096.5	896.7	14.71	7898.0	373.9	4.73	239.82
1993	7495.3	938.9	12.53	8800.9	498.5	5.66	188.35
1994	6867.2	1017.8	14.82	11607.2	669.3	5.77	152.07
1995	11363.3	1345.9	11.84	14512.1	882.8	6.08	152.07
1996	12989.1	1422.9	10.95	15028.9	823.7	5.48	172.74
1997	18934.4	1560.8	8.24	15902.9	979.6	6.16	159.33
1998	18966.8	1699.6	8.96	14220.5	959.0	6.74	177.23
1999	18965.6	1700.8	8.97	17661.2	938.3	5.31	181.26

Source: Central Statistical Office Overseas Trade Report – Various Years

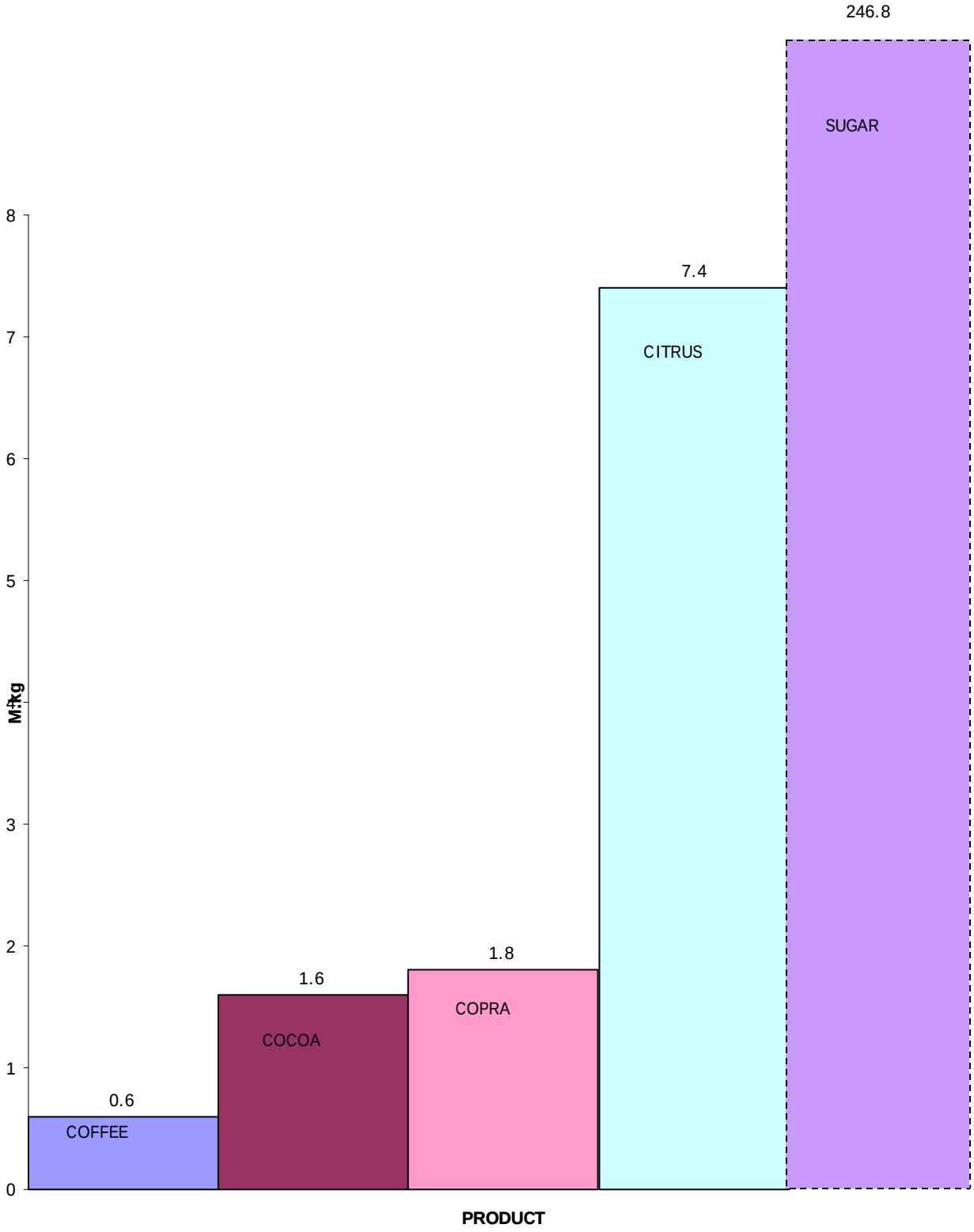
TABLE 1F

BREAKDOWN OF AGRICULTURAL PRODUCTION – 2000

Crops	Production	Total Value of Crop (TT$)	Size of Production Area (Hectares)
Sugar	246760 tonnes	41,949,200	
Cocoa	1,592,843 kg	22,299,802	10000
Coffee	552,824 kg	6,633,888	600
Copra	1,829,077 kg	4,444,657	
Citrus	7,420,432 kg	NA	
Rice	4809 kg	9137.10	2383.4

Source: Central Statistical Office

FIGURE 1C - AGRICULTURAL PRODUCTION 2000 EXCLUSIVE OF VEGETABLES (MEGA kg)



CHAPTER TWO

CHEMICAL PRODUCTION, IMPORT, EXPORT

TABLE 2A

CHEMICAL PRODUCTION AND TRADE

Chemical Type	Production	Importation/Value	Exportation/Value
Pesticides (agricultural, public health and consumer)		2,706,399 kg $71,157,478	1,078,545 kg $16,419,740
Fertilisers	3,946,700 tonnes (3,950 M.kg)	5,601,395 kg $17,721,147	599,691,895 kg $302,930,843
Petroleum Products	53,334,259 bbl (6,716 M.kg)	3,103,610 bbl (390.6 M.kg)	49,848,799 bbl (6,274.8 M.kg)
Chemicals	53,280 bbl (6.2 M.kg)	128,521,850 kg $133,137,330	4,808,300,000 kg $2,765,000,000
Total	10,672.7 million kg	527.4 million kg	11,683.9 million kg

In Trinidad and Tobago, dependence on synthetic and naturally derived pesticides has increased tremendously over the years. In respect of the registered pesticides, 57.2 percent are used in agriculture and 22.8 percent are used for domestic purposes. figure 2B(4) shows the local usage of registered pesticides.

Generally, the imports of pesticides consisted mainly of weedicides (63%), insecticides (24%) and others (13%). Nonetheless, there has been some integrated pest management – this involves chemical and biological control using predators and cultural practices such as use of pest resistant varieties. In the case of the mealy bug outbreak, predators were used.

TABLE 2B

REGISTERED PESTICIDES – 549 AS OF 200-04-30

No. of	1996	1997	1998	1999	2000
Applications	40	42	45	88	127
Withdrawals	0	0	01	13	10
Referrals (Inadequate)	02	01	07	27	26
Approvals	05	16	54	70	117

TABLE 2B(1)

CLASS OF REGISTERED PESTICIDES

Class	Number	%
1A	13	2.4
1B	20	3.6
II	100	18.2
III	64	11.7
IV	352	64.1
Total	**549**	**100.0**

TABLE 2B(2)

Class	Number	%
Insecticides	289	52.6
Weedicides	109	19.9
Fungicides	73	13.3
Others	78	14.2
Total	**549**	**100.0**

TABLE 2B(3)

CHEMICAL TYPES

	Number	%
Organophosphates	42	14.5
Chlorinated HC	0	0
Carbamates	43	14.9
Others	204	70.6
Total	289	100.0

TABLE 2B(4)

USAGE OF PESTICIDES

Use (Year 2000)	Number	%
Agriculture	314	57.2
Pest Control	40	7.3
Industry	54	9.8
Public Health	16	2.9
Domestic	125	22.8
Total	549	100.0

CLASS DESCRIPTION:

IA - Extremely Hazardous

IB - Highly Hazardous

II - Moderately Hazardous

III - Slightly Hazardous

IV - Unlikely to present acute hazard

2.3 CHEMICAL WASTE

In Trinidad and Tobago, the chemical waste generated by industry, agriculture and households include the following:

(1) Waste acids/alkalis;

(2) Heavy metal sludges;

(3) Heavy metal slags;

(4) Paint sludges;

(5) Oil waters, sludges, waste lube oils;

(6) Spent filter media;

(7) Spent catalysts;

(8) Waste solvents;

(9) Waste pesticides;

(10) Waste chemical/pesticide containers;

(11) Asbestos;

(12) PCBs (Polychlorinated biphenyl) and

(13) Lead recycling wastes

Quantities of these wastes have not generally been recorded. In the event of an accidental discharge of oil or land or in coastal areas, a National Oil Spill Contingency Plan (NOSCP) can be activated to address the problem. The Plan seeks to minimise the damage to the environment by producing a timely and effective response capability to an oil spill emergency.

In the Plan, three (3) responsibility levels are defined. They are:

Level 1: Port and Area Plan for less than 5,000 bbl spilled

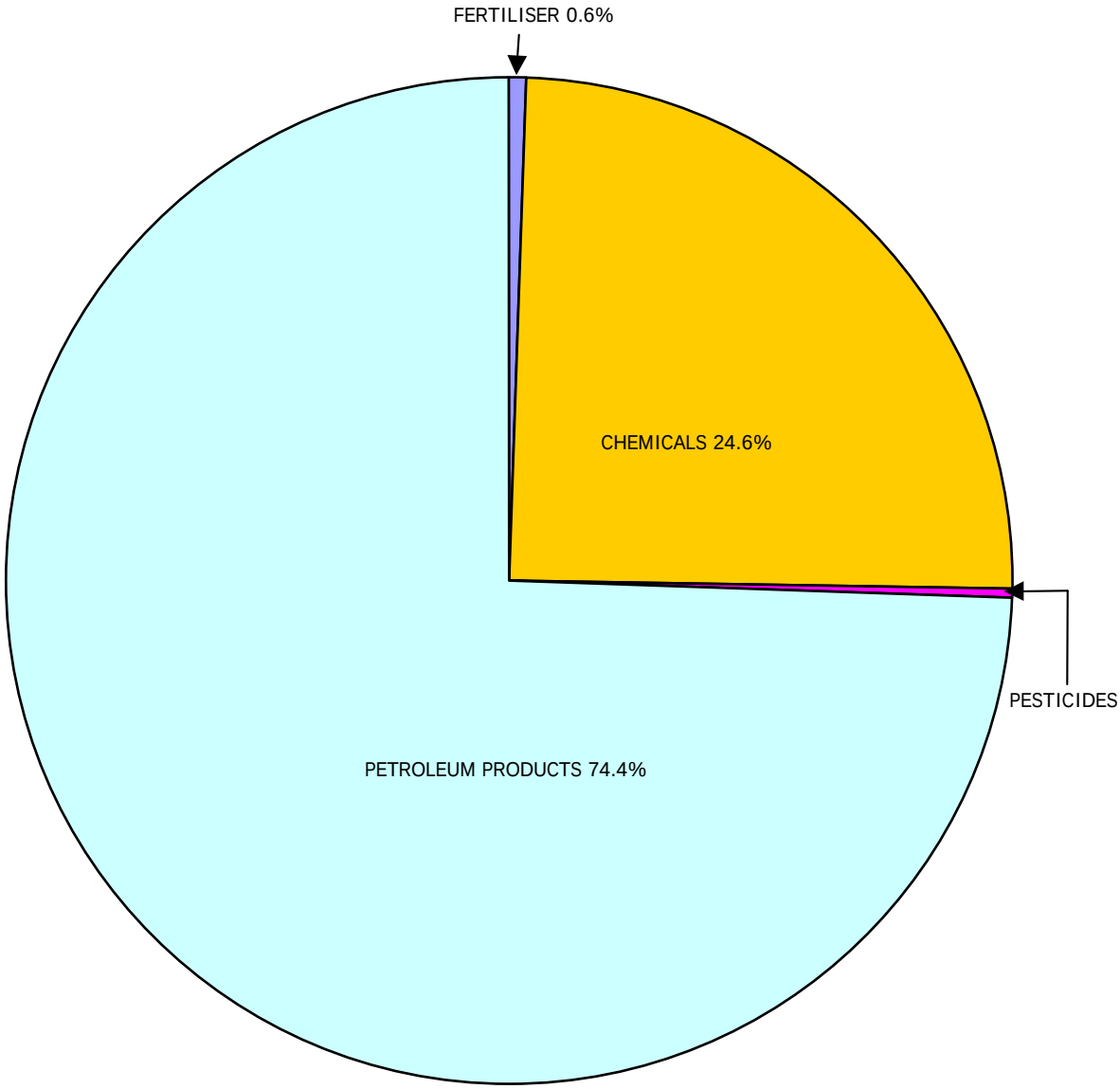
Level 2: Natural Plan for 5,000 to 30,000 bbl

Level 3: International Plan for over 30,000 bbl

Assuming an industry average of 20% waste index, the amount of waste generated from the imported quality of chemical will be 105.48 million kg per year.

A serious problem exists where chemicals have been obsolete or have degraded to the extent of being useless. There is no standardised or approved method for the disposal of these substances – the Forrest Park Landfill has not been designated a toxic waste disposal facility. At one time, deteriorated explosives were dumped at sea; this is contrary to the London Convention on Dumping, 1975.

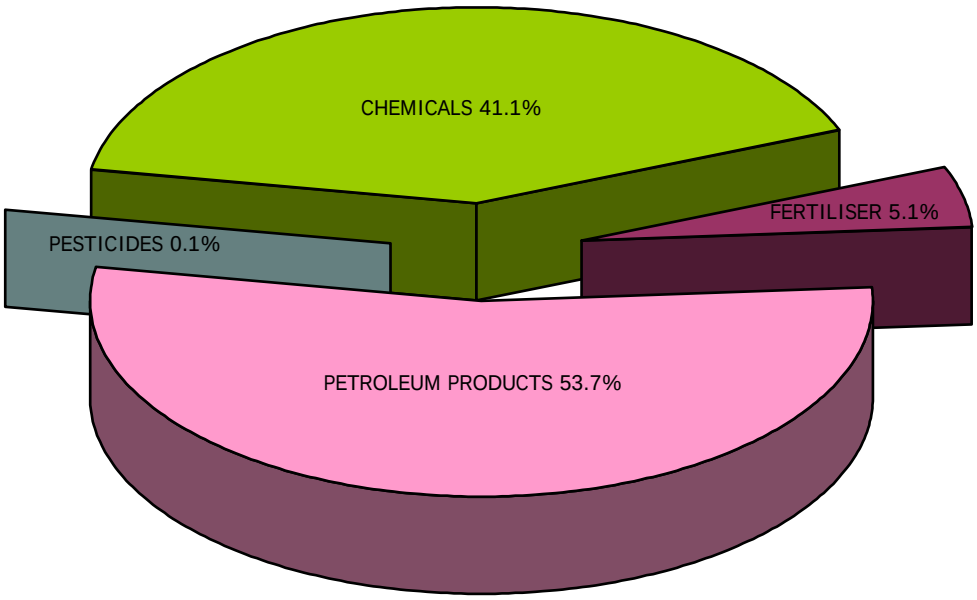
FIGURE 2A - IMPORTS BY PRODUCT 1999
TOTAL = 527,400,000 KG



SOURCE: CENTRAL STATISTICAL OFFICE

FIGURE 2B - EXPORTS BY PRODUCT 1999

TOTAL = 11,683,908,000 KG



SOURCE: CENTRAL STATISTICAL OFFICE

FIGURE 2C - IMPORTS EXCLUDING PETROLEUM PRODUCTS
TOTAL 137.05 MILLION KG

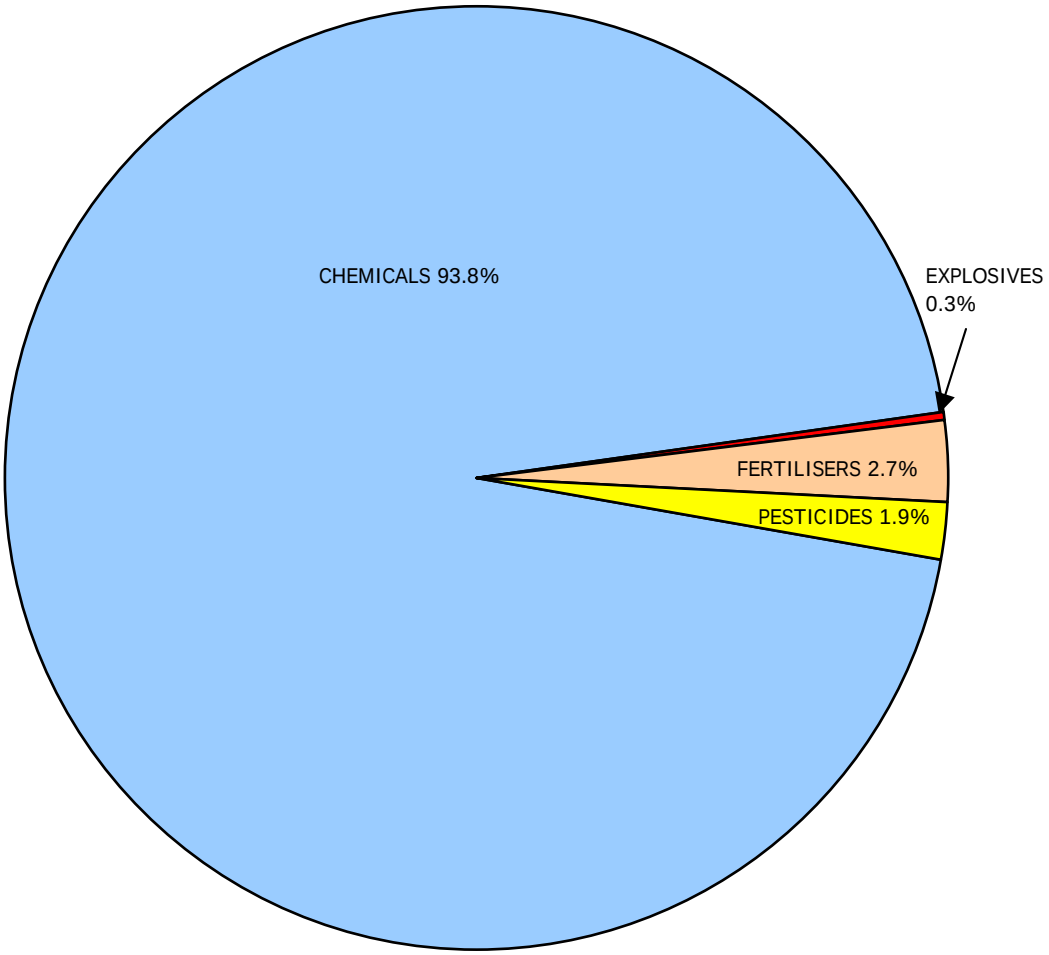


FIGURE 2D - REGISTERED PESTICIDES BY USE
TOTAL = 549

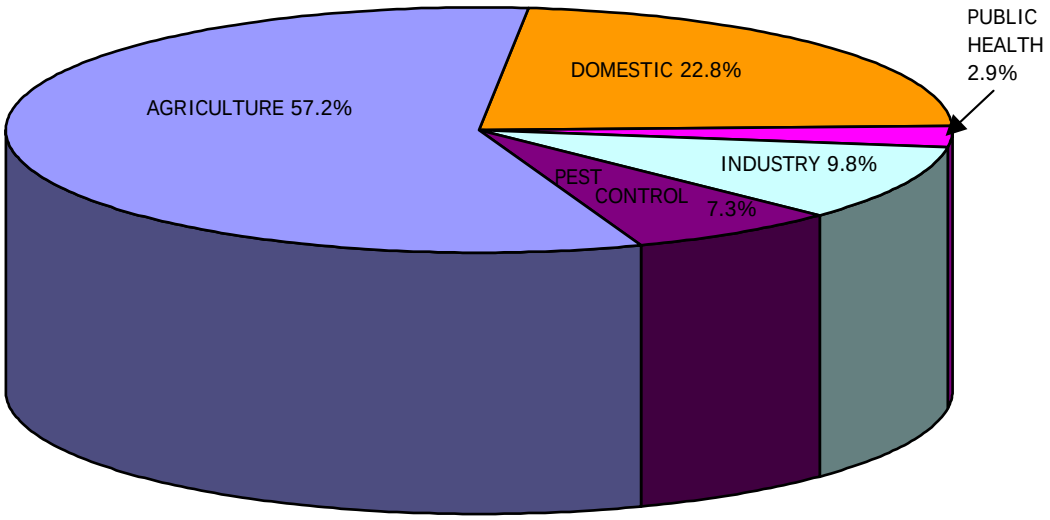


FIGURE 2E - REGISTERED PESTICIDES BY TYPE
TOTAL = 549

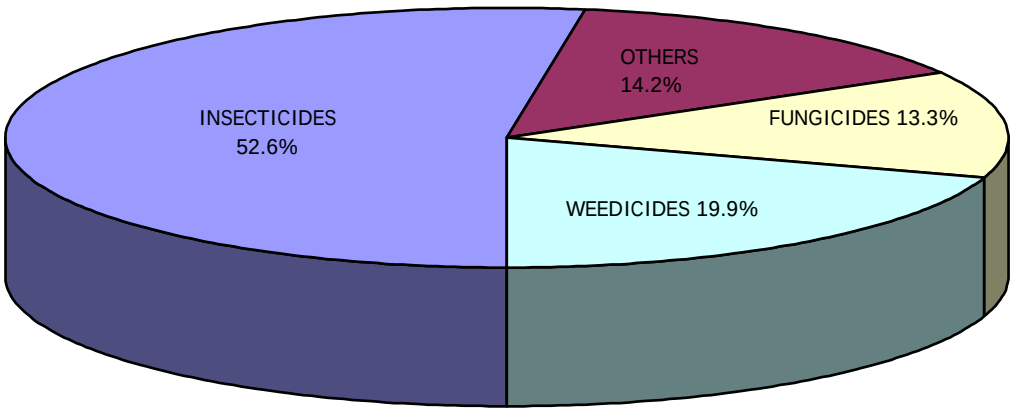


FIGURE 2F - APPROVALS OF PESTICIDES
TOTAL AS OF 2001-04-30 = 549

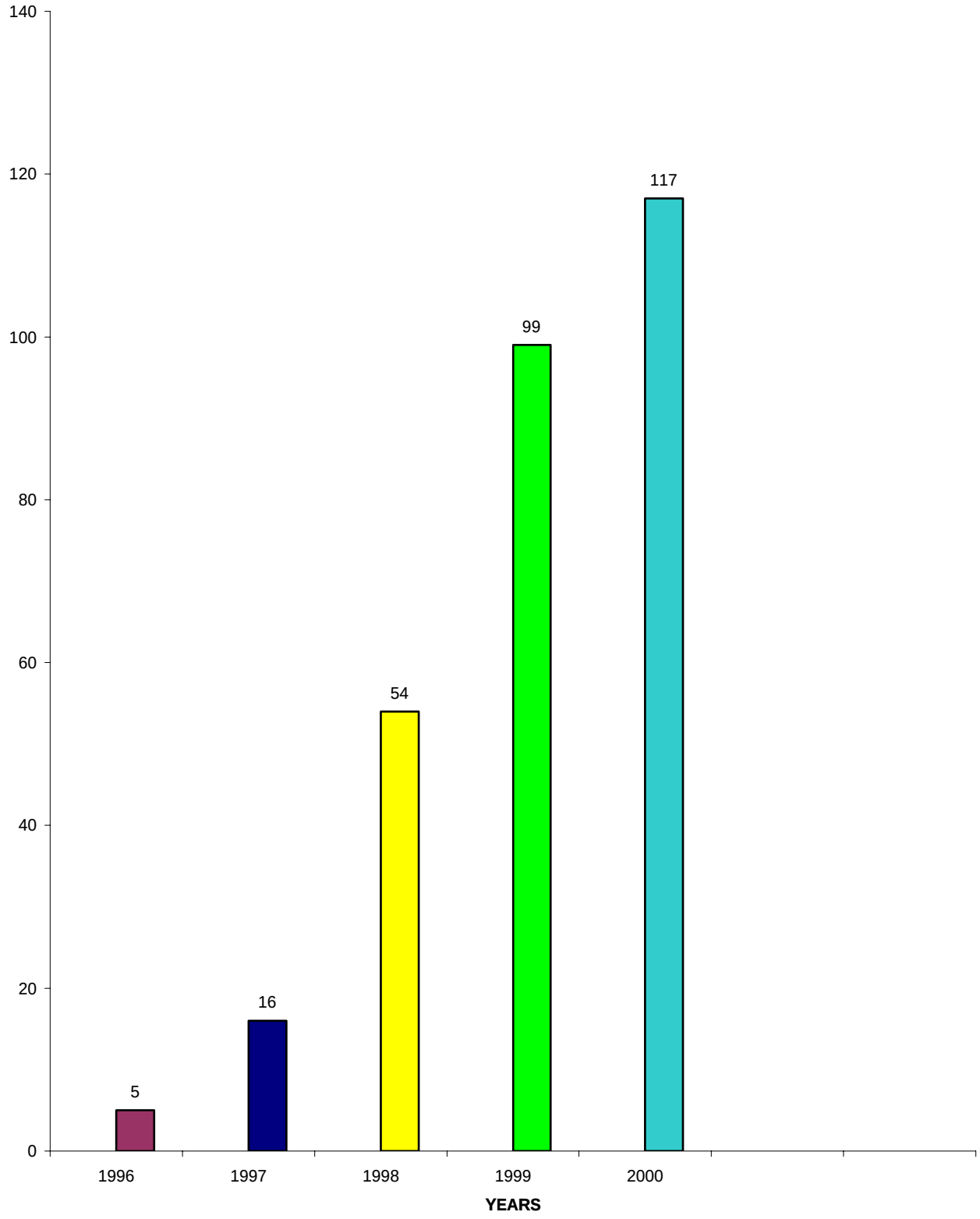


FIGURE 2G - APPROVALS/APPLICATIONS FOR REGISTRATION OF PESTICIDES

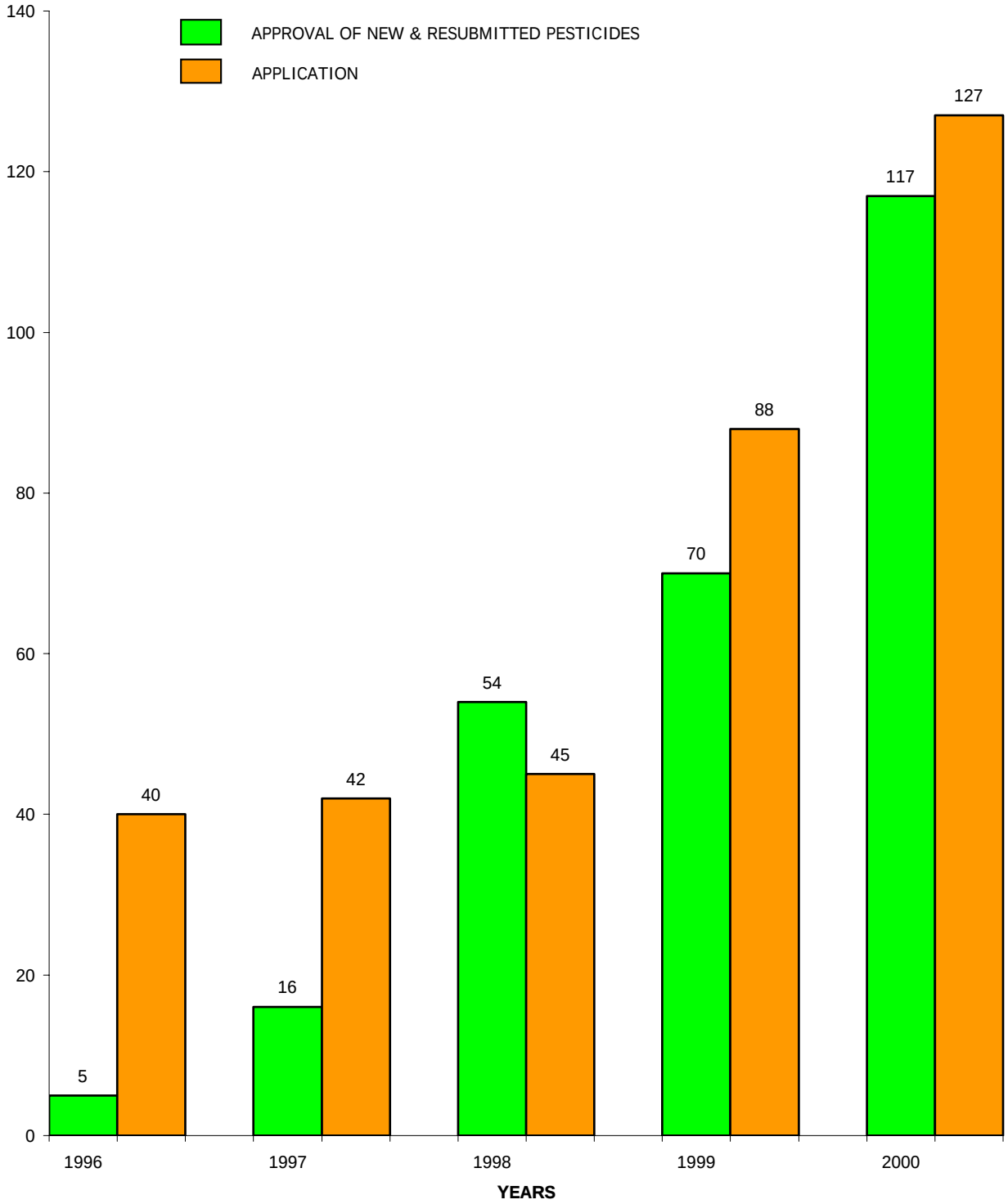
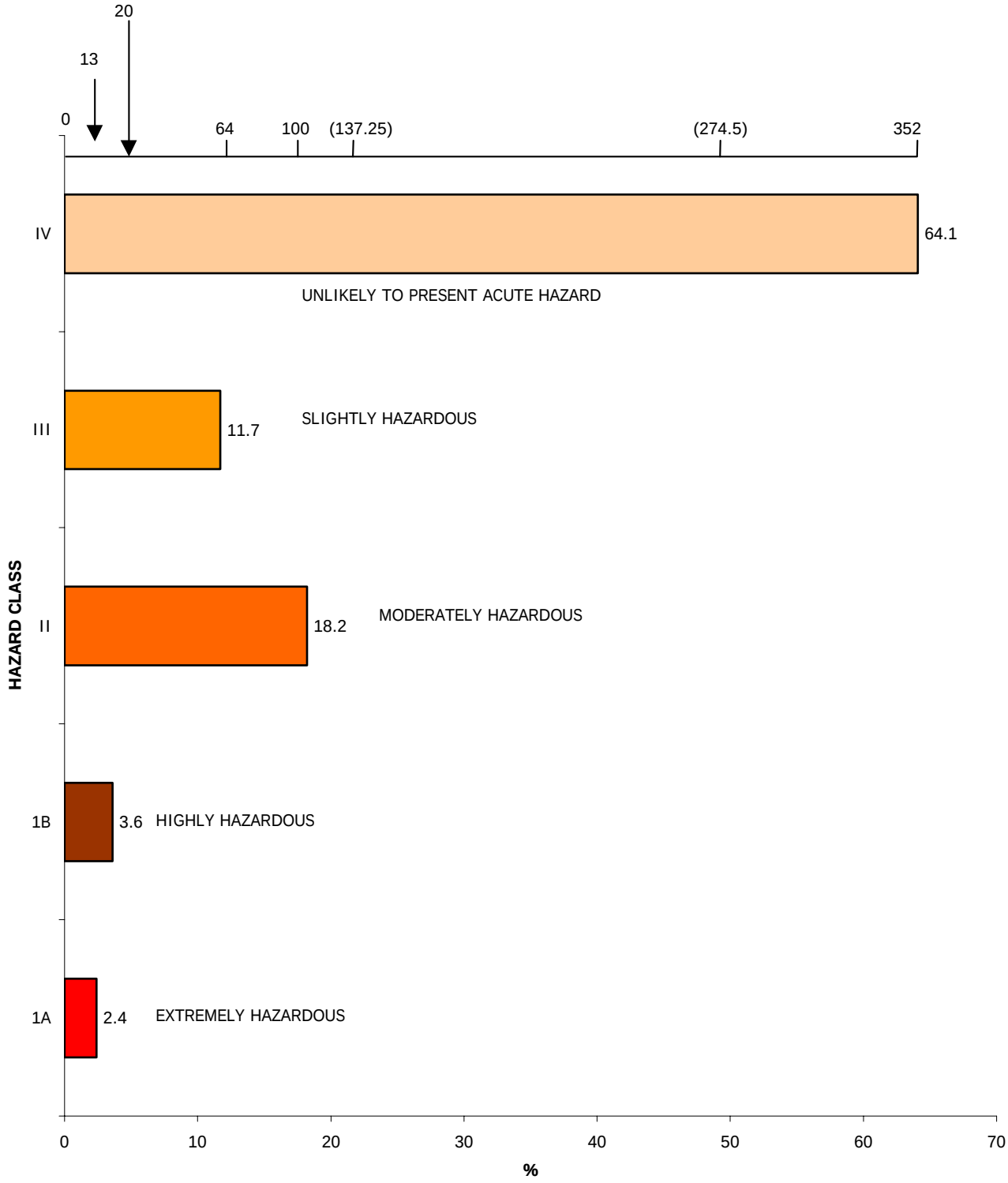


FIGURE 2H - REGISTERED PESTICIDES BY CLASS
TOTAL = 549



CHAPTER THREE

PRIORITY CONCERNS RELATED TO CHEMICALS

3.1 Priority Concerns in respect of the production, import, export and use of chemicals are shown below.

TABLE 3A

PRIORITY CONCERNS RELATED TO CHEMICALS

Potential Problems	Level of Concern	Ability to Control Problem	Availability of Data	Specific Chemicals/ Metals	Priority Ranking
Air Pollution	High	Medium		TEL	High
Poll. of Inland Waterway	Medium	High	WASA	Silicates	High
Marine Pollution	Medium	Low	IMA	Zn, Pb, Cu, Hg, Cd	Medium
Groundwater Poll.	Low	High		Leachate	Low
Soil Pollution	High	High	Min. Health	Pb	High
Pesticide Residues	High	Medium	Min. Health	Org/P; CHC	High
D/Water Contamination	High	High	WASA	Alkyl B/ Sulphonate	High
Haz. Waste T/Disposal			SWMCOL		
OH: Agriculture					
OH: Industrial	High		NIB; FI	Asbestos	
Public Health	High		Min. Health	Pesticides	High
Chem. Accidents: Ind.	High		FI	H_2S; HC	High
Chem. Accidents: Transp					
Contr. Chem. Imports	Medium	Medium	PTCCB		
Ecosystems					
Storage/Disposal of Obsolete Chem.	Medium		SWMCOL		

3.2 DIAGNOSIS

There are several sources of information that are useful in the management of chemicals. However, gaps exist in terms of adequacy of data that can inform strategies in the planning process.

Specific frequency rates could be used to determine the magnitude of certain untoward events; the collection of data relating to man-days lost as a result of chemical accidents could be used to determine severity rates of accidents involving the use and handling of hazardous chemicals.

Chemical disasters represent large economic losses. These include medical costs, wage losses, insurance costs, administrative costs, property damage, time lost by employees not directly involved in the accident and sometimes fire loss or damage. The cost data relevant to these aspects are not now available.

In the case of a gaseous chemical release, there is no standard method for conducting a consequence analysis in respect of say, a Gaussian plume. There are a number of dispersion models such as the ISCST and the AFTOX, which give toxic or flammable impacts of chemical accidents.

A Chemical Hazard Information Program (CHIP) is required. In a CHIP, scientific and technical expertise is applied to the work environment problems being experienced by

both business and labour. Active prevention of injury and illness is promoted through information and education.

A gap in the information matrix relates to the quantity of chemical wastes. Attention is paid to inputs to the process and the efficiency of transformation to product but records on wastes are sparse.

Part of the private sector is not in full agreement with the proposal of Government to introduce a “Green Fund” for the preservation of the environment. The levy on business amounts to 0.1 percent of gross sales.

The arguments are as follows. Many companies already incur large expenditures to effect pollution prevention at source. Such companies will therefore become burdened by having to pay both the “Green Fund” and having to fund their pollution prevention equipment, systems and facilities. This can result in reductions in pollution preventative investments thereby being counter-productive to good environmental stewardship. Any levy can be inflationary since it can result in higher prices to the consumers and any additional tax is never a positive influencing factor in an investor’s decision on where to locate a project.

The private sector recommended that this levy be reduced to 0.05 percent and that a major portion of the fund be used for much needed environmental infrastructure projects such as hazardous waste disposal and upgrade of the nation’s sewage system.

3.3 PRIORITY FOR ACTION

Pollutant Release and Transfer Registers (PRTRs) are recognised in Chapter 19 of Agenda 21 as an important tool to raise public awareness about potential chemical risks and as an effective environmental management tool to stimulate chemical risk reduction.

Common characteristics of many PRTR programmes include: a listing of pollutants, reporting of releases and transfers i.e. to air, water or land, reporting by source and reporting annually.

It is suggested herein that Trinidad and Tobago should establish a PRTR/emission inventory after initiating a design process involving affected and interested parties and taking into consideration national circumstances and needs.

CHAPTER FOUR

LEGAL INSTRUMENTS AND NON-REGULATORY MECHANISMS

4.1 NATIONAL LEGAL INSTRUMENTS

The Pesticides and Toxic Chemicals Act, 1979 seeks to regulate the importation, storage, manufacture, sale, use and transportation of pesticides and toxic chemicals and to provide for the establishment of the Pesticides and Toxic Chemicals Control Board and for matters incidental thereto.

The functions of the Board are to:

(1) Advise the Minister on matters relevant to the making of regulations under the Act.

(2) Advise on and monitor the implementation of the regulations and

(3) Furnish returns as the Minister may require from time to time.

Regulations can be made in respect of the following matters inter alia:

1. Prohibiting the manufacture, importation, sale, advertisement and use of any class of pesticide or toxic chemical.

2. Controlling the use of pesticides in agriculture generally or in particular crops or pests, for toxic chemicals in agriculture, the arts, commerce, industry, for domestic or other purposes.
3. Prescribing the procedure for granting licences to function pest control operators.
4. Controlling the use of pesticides on produce during storage or transportation.
5. Protecting workers against risk of poisoning by pesticides or toxic chemicals during usage, storage or manufacture of these substances and
6. Disposing of packaging material and unwanted stocks of these hazardous substances.

The Factories Ordinance Ch. 30 No. 2 is to provide for the promotion of the health, safety and welfare of persons employed in factories.

A requirement under this Ordinance is the giving of written notice of suspected cases of poisoning by lead, phosphorous, arsenic, mercury, benzene or aniline.

There is the Electric Accumulator (Manufacture and Repair) Order 1974 made under section 34 of the Factories Ordinance. Precautions have to be taken in respect of a lead process or the manipulation of raw oxide of lead so as to avoid health risks to persons employed in the establishment. There are stipulations in respect of ventilation and washing facilities.

Under proposed occupational safety and health regulations, where toxic substances or materials are manufactured, used or handled in an industrial establishment, no person is to be exposed to inhalation, ingestion, skin absorption of or skin contact with such substances or materials at concentrations above those approved by the American Conference of Governmental Hygienists (USA).

The Environmental Management Act No. 3 of 2000. It pertains to the directing and administering of matters affecting the quality of all land, area beneath the land surface, atmosphere, climate, surface water, groundwater, sea, marine and coastal areas, seabed, wetlands and natural resources within the jurisdiction of Trinidad and Tobago.

The Environmental Management Authority has to submit to the Minister in charge, a programme to define wastes which should be deemed “hazardous wastes”, to establish requirements for the handling and disposal of these wastes and to establish standards and design criteria for handling and disposal facilities and to establish licensing requirements in respect of hazardous wastes.

Under the Act, a hazardous substance is one which, by reasons of its chemical or physical properties and based on technical, scientific and medical evidence is determined to cause harm to human health or the environment, through handling or from a release.

The Public Health Ordinance Ch. 12 No. 4 at section70(1) prohibits inter alia:

(a) Any accumulation or deposit of any material wherever situated, which is a nuisance or is injurious to health and

(b) Any school, workroom, shop, office, factory, warehouse or other place of business from being not so ventilated as to render harmless, as far as practicable, all gases, vapours dust or other impurities generated in the course of the work, that are a nuisance or injurious to health.

The Explosives Act Ch. 16:02 relates to gunpowder and other explosive substances. The Minister may by order, prohibit absolutely, or subject to conditions or restrictions, the manufacture, keeping, importation, conveyance and sale or any of them of any explosive which is of so dangerous a character that it is expedient for the public safety to make an order.

Regulations may be made in respect of conditions under which explosives are stored and the disposal of deteriorated explosives.

Under the Quarry Regulations of the Mines, Borings and Quarry Act Ch. 61:01, no explosive and no fuse or detonator is to be stored otherwise than in a magazine constructed and situated in accordance with the requirements and subject to the approval of the Senior Inspector of Factories.

Explosives, fuses and detonators required for blasting must be conveyed from the magazine to the quarry at the time required and must be kept until used in secure cases or

canisters so made and closed as to prevent any escape of the explosives and any danger from sparks. Detonators are to be kept in separate and secure boxes.

TABLE 4A

REFERENCES TO EXISTING LEGAL INSTRUMENTS

Legal Instrument	Responsible Ministries	Chemical Use Categories	Objectives of Legislation	Relevant Articles	Resources Allocated
Pesticides and Toxic Chemicals Act No. 42/1979	Health; Agriculture; Labour	Chlorinated HC; Organophosphates, carbonates, etc.	To control use of chemicals; ensure health and safety	Establishment of PTCC Board; designation of inspectors, etc.	Budget under allocation for Min. of Health
Public Health Ord. Ch. 12 No. 4	Health	Chlorinated HC; Organophosphates, carbonates, etc.	To protect health of public	Prohibition of accumulation of hazardous materials	Budget under Local Health Authority
Factories Ord. Ch. 30, NO. 2 & Protective Measures Order, 1977	Labour	Chlorinated HC; Organophosphates, carbonates, etc.	To protect health of workers	Duty of employer to protect health of worker	Budget of Ministry of Labour/SS
Environmental Mgt. Act No. 3/2000	Min. of the Environment	Chlorinated HC; Organophosphates, carbonates, etc.	To provide for the mgt. of environment	S.59 – Mgt. of hazardous substances	Budget of Min. of the Environment
Petroleum Act Ch. 61:02	Energy & EI	Hydrocarbons	Exploration/ development of production	Oil tank regulations	Min. of Energy/EI
Explosive Act Ch. 16:02	Min. of National Security	Sensitisers/oxiders; ANFO (nitrous glycerine)	To control importation, storage, use of explosives	S.35 importation/ storage licence	
Shipping Act No. 24/1987	Ministry of National Transportation	Dangerous cargo e.g. toxic chemicals	To ensure safety of life at sea; registration of ships	S.390 – re: Dangerous Goods	Budget of Min. of National Transportation

The Factories (Protective Measures) Order, 1977 addresses the matter of blasting and use of explosives. At paragraph 32, it is stated that empty boxes and packing material made of paper and fibre which previously contained explosives are not to be used again for any purpose but are to be destroyed by burning at a place designated by the Chief Factory Inspector. At paragraph 33, it is further stated that explosives, blasting agents or blasting supplies which are damaged or which have deteriorated are not to be used.

Dangerous Goods are considered at part XIV of the Shipping Act No. 24 of 1987. Section 309(1) states: "The Minister may by regulations establish which goods, articles or materials to be carried in a ship are dangerous goods in accordance with the International Convention for the Safety of Life at Sea, 1974 relating to the carriage of dangerous goods and to amendments thereto or replacements thereof or with any other Convention which may be accepted by Trinidad and Tobago, and such regulations shall have regard to the International Maritime Dangerous Goods (IMDG) Code of the International Maritime Organization.

4.2 LEGAL INSTRUMENTS

Chemicals Covered	Legislation
Agricultural Pesticides Industrial Pesticides Consumer Pesticides	Pesticides and Toxic Chemicals Act 42 1979 and Regulations made thereunder
Organic Toxic Chemicals	Explosives Act Ch. 16:02
Inorganic Toxic Chemicals	Factories Ordinance Ch. 30 No. 2; Public Health Act Ch. 12: No. 4
Hydrocarbons	Petroleum Act Ch. 61:02

4.3 LEGISLATION BY USE CATEGORY

TABLE 4

LEGAL INSTRUMENTS

TABLE 4B

OVERVIEW OF LEGAL INSTRUMENTS TO MANAGE CHEMICALS

Class of Chemical	Importation	Production	Storage	Transport	Distribution	Use/Handling	Disposal
Pesticides	X	X	X	X		X	X
Fertilisers							
Industrial	X	X	X	X		X	X
Petroleum Products			X		X		
Consumer Chemicals	X						
Explosives	X	X	X	X		X	

4.4 NON-REGULATORY MECHANISMS

A “Green Fund” is to be established to provide resources for communities and NGOs throughout the country to carry out their own environmental projects. In addition, corporate citizens will continue the work they have started in protecting the environment, that is the fauna and flora, from degradation by physical and/or chemical agents.

Another mechanism has taken the form of a National Oil Spill Contingency Plan in which a number of agencies have voluntarily decided to assist each other.

4.5 ANALYSIS AND COMMENTS

A few gaps exist in the current legislation but measures are being taken to bridge them. Regulations on toxic chemicals have been prepared and are being finalised; there was need for inclusion of some items alluded to in the Chemical Warfare Convention 1993. Draft regulations for the disposal of hazardous wastes incorporate tenets enshrined in the Basel Convention (1989). There are technical guidelines for the environmentally sound management of waste under the Basel Convention. These guidelines include those for hazardous waste from the production and use of organic solvents, for waste oils from petroleum origins and for wastes comprising or containing polychlorinated biophenyls, polychloroterphenyls and polybromobiphenyls.

At present there are no rules governing the operations of persons as they perform pest eradication in the field. Pest Control Operator Regulations are needed to ensure sound practices during pest exterminators. The law can be divided into three specialised areas viz. Household pest control, wood-destroying organisms control and fumigation.

The operator should qualify for a licence based on training experience and/or examinations. An individual wishing to perform pest extermination for hire or on property other than his or that of his employer must be holder of a licence. All employees of licensed operators, who perform pest control would have to be registered.

Within the legal framework, there is need for a Pesticide Residue Committee to ensure that produce does not reach the consumer with high concentrations of pesticide residue.

If the pre-harvest interval is too short, there is the probability that applied pesticide may not have degraded sufficiently, resulting in harmful effects to the consumer. This Committee can emanate from that which is drafting standards for maximum residue limits in foods.

At the Point Lisas Industrial Estate, the Responsible Care Mechanism has been introduced. It is a modified version of that created by the Canadian Chemical Producers' Association. It is aimed at addressing public concerns about the manufacture, use and disposal of chemicals. It represents a commitment by the chemical industry to improve continually aspects of health, safety and environmental performance and to communicate openly about its activities and achievements.

This voluntary and rigorous programme of collective action by member companies include the following:

(1) Adherence to the principles and objectives of Responsible Care.

(2) Safety, health and environmental performance, measured by a consistent set of indicators.

(3) Systems for mutual aid and sharing best practice throughout.

(4) Channels of communication to the public.

(5) Responsible Care Management System Guidance and a mandatory self-assessment process.

Included in this mechanism is a Hazardous Waste Management Policy to ensure the protection of people and the environment throughout the entire chemical and chemical product life cycle.

There is a void in the legislative framework in terms of prevention of major industrial accidents. The corresponding ILO Code No. 174 underscores the need for taking appropriate measures to prevent major accidents and to minimise the risks and the effects of major industrial accidents. The Convention also seeks to limit the consequences in an accident in which hazardous substances are involved.

A course of action open to the Government is the introduction of a legal instrument to prevent major industrial accidents under the umbrella of the drafted Occupational Safety and Health Bill. The appropriate measures to be adopted may take the form of an order under the substantive statute. Guidelines in this area can be obtained from the CIMAH (Control of Industrial Major Accident Hazards) Regulations 1984, administered by the Health and Safety Executive, UK and made under the Health and Safety at Work Act.

Another model available is the Process Safety Management of Highly Hazardous Chemicals Standard, 29 CFR 1910.119. This is intended to prevent or minimise the consequences of a catastrophic release of toxic, reactive, flammable or explosive highly hazardous chemicals from a process. It specifies that process hazard analyses must be conducted for each process, it requires a pre-startup safety review to ensure adequate

safety, operating, maintenance and emergency procedures are in place and that work permits are issued when and where they are required.

CHAPTER FIVE

RELEVANT AGENCIES INVOLVED

TABLE 5A

RESPONSIBILITIES OF AGENCIES

Ministry/ Agency	Importation	Production	Storage	Transport	Distribution	Use/ Handling	Disposal
Environment			X				X
Health	X					X	
Agriculture	X					X	X
Labour			X			X	X
Trade/ Industry	X	X			X		
Finance	X	X					
National Security	X			X	X	X	X
Legal Affairs							
Customs & Excise	X	X					
Foreign Affairs	X				X		

5.1 DESCRIPTION OF MINISTRIES

The Ministry of Environment consists of those agencies which ensure that economic growth proceeds in an environmentally sound manner, with emphasis on conservation of the natural resources of Trinidad and Tobago. Waste disposal is one of its concerns so that agencies such as the Solid Waste Management Co. Ltd. falls within its purview. There are a number of disposal sites including one at Forrest Park designed for hazardous wastes. The Environmental Management Agency is a key organisation within this Ministry; it is staffed by professionals in the field of environmental law, analytical chemistry and environmental science.

Within the Ministry of Health is the Occupational Health Unit headed by a Specialist Medical Officer and an Occupational Hygienist. The Chemistry/Food and Drugs Division is a large unit from which the Registrar of Pesticides and Toxic Chemicals is drawn. The Chief Medical Officer and the Chief Chemist and Director of Food and Drugs are members of the PTCC Board.

The Ministry of Agriculture incorporates inter alia the Fisheries Division, Forestry, Food Production and Apiaries Unit. The disposal of toxic chemicals at sea impacts on fish stock both pelagic and demersal. Large volumes of pesticides are used in food production and fertilisers are necessary for economic production.

In the Ministry of labour and Manpower Development is the Factory Inspectorate. This unit administers the Factories Ordinance Ch. 30 No. 2 which promotes the health, safety and welfare of persons employed in factories. There are reportable industrial diseases arising from poisoning by lead, phosphorous, arsenic, mercury, benzene and aniline. There are regulations under the proposed Occupational Safety and Health legislation relating to maximum permissible exposure limits of contaminants. Where toxic substances are manufactured, used or handled in an industrial establishment, no person is to be exposed to inhalation, ingestion, skin absorption or contact with such substances at concentrations above those approved by the American Conference of Governmental Industrial Hygienists. Officers at the Factory Inspectorate are university graduates in science and engineering.

The Ministry of Trade and Industry deals with importation of pesticides and toxic chemicals and the export of fertilisers et al from Trinidad and Tobago (urea and ammonia) and methanol.

The Finance Ministry monitors revenue derived from the export of chemicals produced – these include petroleum products. Components include Customs and Excise and Inland Revenue Department.

National Security Ministry includes the Police Service and the Fire Service. A licence to import explosives is granted by the Minister and permission to use explosives is granted by the Commissioner of Police. Fires of all kinds including those in which oxidisers are involved, are fought by the Fire Services and advice on the storage of flammable material is given by their Prevention Unit.

The Ministry of Foreign Affairs is the conduit for interaction between local agencies and such external organisations as the ILO, PAHO and FAO. The ILO is concerned with workers' health and safety in the use, handling and disposal of hazardous chemicals, PAHO focuses on public health generally and FAO on the use of agricultural chemicals for economic growth and sustainable development of countries.

NEMA (National Emergency Management Agency) has the duties and responsibilities of planning, directing and co-ordinating activities aimed at the mitigation of effects arising

from disasters and large scale emergencies including those associated with chemical hazards.

Its objectives include the rescue of persons, the treatment of victims of an emergency, safeguarding others, arranging for escape or evacuation where necessary, the containment of the incident with minimum damage and the decontamination procedures where required. Communication channels are established and maintained throughout an emergency to ensure efficient deployment of personnel and effective use of resources available.

The agencies involved in the emergency plans of NEMA include the Fire Services, Police Service, Defence Force, Regional Health Authorities, Ministry of Works, REACT for radio communication and TTEMAS.

5.2 NON-GOVERNMENTAL ORGANISATIONS

A non-governmental organisation involved in chemical safety management is TTEMAS (Trinidad and Tobago Emergency Mutual Aid Scheme).

The organisation's vision is to provide regional leadership in industrial preparedness and emergency response. Its mission is to provide an effective mutual aid system in the event of critical incidents and to influence the national community to adopt policies, practices and procedures for the elimination, containment and mitigation of technological disasters. The Responsible Care Approach has been adopted in which there is commitment to

safety and environmental sustainability and environmental and safety management has been merged into all business processes.

Emergency simulations conducted by TTEMAS include a release of ammonia, an aircraft crash at a chemical plant, offshore earthquake with natural gas line rupture, a chlorine release, a methanol release with fire and explosion and a release of butane from a tank.

PLIPDECO (Point Lisas Industrial Port Development Corporation) has an important role in chemical safety management. It manages an industrial estate where there are 8 ammonia plants, 1 urea plant, 5 methanol plants, 2 iron and steel plants and 1 urea-formaldehyde plant.

In respect of occupational safety and health the Employers' Consultative Association (ECA) is a major stakeholder. It is the umbrella organisation for the Chamber of Commerce, the Trinidad and Tobago Manufacturers Association (TTMA) and others.

The activities of the ECA relative to the occupational safety and health include:

(i) Creation of awareness of OSH among its 86 members.

(ii) Management training: an average of four programmes annually and

(iii) Representation on committees on OSH, on the National Emergency Management Agency (NEMA) and on the Pesticides and Toxic Chemicals Control Board.

The ECA, the labour movement and the government discuss matters of occupational safety and health and seek to promote awareness generally. At the enterprise level, small and medium-sized enterprises (SMEs) establish OSH committees having employer and worker representation on a voluntary basis.

Joint Health and Safety Committees (JHSC) exist at some of the better organised industrial establishments in Trinidad and Tobago. They consist of representatives of management and workers and should be chaired by a person with authority to take important decisions.

An important attention area of any JHSC is the matter of sound management of chemicals and the prevention of industrial disasters. JHSCs consider the systems of work generally, and that relating to the handling, use, transport and disposal of chemicals with special reference to proper personal protective clothing and equipment.

The National Safety Council of Trinidad and Tobago attempts to educate and influence workers and employers to adopt safety, health and environmental policies, practices and procedures that prevent and mitigate human suffering and economic losses arising from preventable causes.

The Council, a non-government organisation cannot regulate but influences public opinion, attitudes and behaviour in matters of safety and the working environment.

5.3 ANALYSIS AND COMMENTS

(a) The Occupational Safety and Health Division is part of the Ministry of Labour and Social Development. In operational terms, this Division has the responsibility for promoting and monitoring the safety of persons employed in factories. The Occupational health Unit is part of the Ministry of Health, its responsibility relates more directly on the harmful effects of chemicals on workers. There is some overlap of attention areas here.

(b) In situations where dangerous chemicals are used in petroleum operations e.g. glutaraldehyde, acrolein in water-flooding (secondary oil recovery), the Ministry of Energy and Energy Based Industries will be directly concerned. Greater liaison is required with the Ministry of Health (PTCCB) in terms of biocides used in petroleum production.

(c) In general, there is adequate cooperation between the government agencies. Investigation teams comprise personnel from various ministries where the severity and magnitude of an untoward event warrants the establishment of such a team.

(d) A non-government organisation such as TTEMAS has played an important role in heightening awareness and sensitivity of the corporate community in a number of areas including preparedness for chemical fires. The emergency simulations are vital aspects of preparedness.

(e) There is greater scope for the operation of the National Safety Council of Trinidad and Tobago. Its membership ought to be enhanced and its programmes of information dissemination should be stepped up in content and receivership.

The Council should intensify its efforts in bringing together safety and health professionals representing industry and labour to join with government, associations and public-interest representatives to form national coalitions on key safety, health and environmental issues; it is feasible for the National Safety Council to convert its information base into activity such as training and consulting services.

CHAPTER SIX

INTER-AGENCY COMMISSIONS AND CO-ORDINATING MECHANISMS

TABLE 6A

OVERVIEW OF INTER-AGENCY COMMISSIONS

Name of Mechanism	Responsibilities	Secretariat	Members	Legislative Mandate	Information Provided
Interagency Body	To advise Minister, re: Regulations; implement regulations	Registrar of PTC	Chief Medical Officer; Chief Chemist/DFD, CTO, Agriculture et al	Pesticides and Toxic Chemicals Act, No. 42 of 1979	Policy issues; public health matters
Ad hoc Bi-lateral Group	Cooperation on specific matter; biological monitoring		Min. Health & Factory Inspectorate (PI)		Concerns of worker health e.g. exposure to chemicals
Ad hoc Bi-lateral Group	Investigation and chemical monitoring		Chem/F&D and FI		Gas release situation at factories
Ad hoc Bi-lateral Group	Sampling and testing		UWI and Min. Health		Environmental contamination of lead in soil
Ad hoc Bi-lateral Group	Sampling and testing		CARIRI and Min. Health		Air contamination – asbestos in schools
Ad hoc Bi-lateral Group		Min. Trade, Industry and C/Affairs	Bureau of Standards and Min. Trade, Industry and C/Affairs	Standards Act No. 18 of 1997	Compulsory std e.g. household chemical such as bleach

6.2 INTER-AGENCY AND CO-ORDINATING MECHANISMS

An inter-agency body in the form of the Pesticide and Toxic Chemicals Board is configured as follows:

(1) The Chief Medical Officer.

(2) The Chief Technical Officer, Ministry of Agriculture.

(3) The Chief Chemist and Director of Food and Drugs.

(4) The Director of the Bureau of Standards.

(5) The Industrial Inspection Supervisor.

(6) Not more than four other persons whom the Minister may from time to time appoint as members, of whom

  (i) One shall be a representative of an organisation of workers.

  (ii) One shall be a representative of an organisation of employers.

  (iii) One shall be a person with specialised knowledge of occupational medicine or industrial hygiene and

  (iv) One shall be a person with special knowledge of a branch of agriculture involving the use or effects of pesticides.

The Chief Medical Officer and the Chief Technical Officer are to be Chairman and Deputy Chairman respectively, Secretary to the board is the Registrar whose functions include keeping and maintaining a Register of Licences, a Register of Pesticides and a Register of Toxic Chemicals.

Bi-lateral grouping occurs on a reactive basis. As problems arise where persons are exposed to specific risks from inhalation, ingestion or absorption of chemicals, collaboration takes place. Ad hoc groups are formed to address the threat; agencies which have the required technical infrastructure such as laboratories and the expertise to

interpret results cooperate to solve the problem at hand. The combinations vary in terms of government/government or non-government/government; in the case of Cariri co-operation takes place along commercial lines.

6.3 INPUT FROM NON-GOVERNMENTAL BODIES

Requirements for labelling of retail packages of pesticides were formulated as a compulsory standard by a Sectional Committee of the Trinidad and Tobago Bureau of Standards. It included representatives of the University of the West Indies, of private consultancies, of the Agricultural Society of Trinidad and Tobago, of the Chamber of Industry and Commerce and of the Trinidad Manufacturers' Association.

On the Specifications Committee on pesticides, the Caribbean Agricultural Research and Development Institute was represented. The mechanism for obtaining input involves broad-based participation, consultation and consensus.

Membership of the Pesticides and Toxic Chemicals Board includes a representative of an organisation of workers such as a union and a representative of an organisation of employers – the ECA (Employers Consultative Association) is that organisation.

6.4 ANALYSIS AND COMMENTS

The mechanisms for obtaining input and for co-ordination have been working satisfactorily. They have achieved their objectives regarding the management of chemicals and the preservation of the environment. All the agencies have been very co-

operative in providing information and in sending representatives when required for discussions.

The Ministry of Energy and Energy-based Industries can perhaps be more widely consulted on matters relating to the catalysts, biocides, the drilling mud additives and chemical cutters used in refining and production of petroleum.

Aspects of chemical management covered to date include the registration of pesticide, the licensing of premises, the labelling of retail packages of pesticides, regulations for the control of toxic chemicals and the disposal of containers of pesticides.

Information is shared across the various agencies on request. However, a more efficient mechanism will be via an extranet which is a private specially designated website. It will allow non-governmental bodies to access information using their own user names and passwords. The extranet will provide “customer self-service” in acquiring data on pesticides and toxic chemicals.

CHAPTER SEVEN

DATA ACCESS AND USE

7.1 AVAILABILITY OF DATA

TABLE 7A

QUALITY AND QUANTITY OF AVAILABLE INFORMATION

Data Needed for	Pesticides	Industrial Chemicals	Consumer Chemicals	Chemical Wastes
Priority Setting				
Testing – local conditions	Good	Fair	Fair	Fair
Risk Assessment	Good	Fair	Fair	
Classification/Labelling	Good	Good	Good	Fair
Registration	Good			N/A
Licensing	Good			N/A
Permitting	Good			N/A
Risk Reduction	Fair	Fair	Fair	
Accident Preparedness/ Response	Fair	Fair	Fair	
Poisoning Control	Fair	Fair	Fair	Poor
Emissions Inventories		Fair		Poor
Inspections/Audits	Good	Good	Good	
Information to Workers	Fair	Fair	Fair	Fair
Information to Employers	Good	Good	Good	

7.2 LOCATION OF NATIONAL DATA

TABLE 7B

LOCATION OF NATIONAL DATA

Type of Data	Location	Data Source	Who Has Access	How to Gain Access	Format of Data
Production Statistics	Central Stat. Office	Industry	Public	Request	By chemical
Import Statistics	Central Stat. Office	Customs	Public	Request	By chemical
Chemical Use Statistics	Scattered	Industry	Min. Trade/Ind.	Request	By chemical
Ind. Accident Reports	Factory Insp.	Occupiers	Courts	Request	Data/Findings
Transport Accident Reports	Min. Agriculture				
Occ. Health Data (Agricultural)	Min. Agriculture				
Occ. Health Data (Industrial)	Min. Health	Industry	Health Workers	Request	Reports
Poisoning Starts	Min. Health				
Poll. Release & Transfer Register					
Haz. Waste Data	Solid Waste Act	Industry			
Register of Pesticides	Chemistry/ F&D				
Register of Tox. Chem.	Chemistry/ F&D				
Inventory of Existing Chemicals					
Register of Imports	Customs	Importers	CSO	Request	
Register of Producers	N/A				

7.3 COLLECTION AND DISSEMINATION OF DATA

The Registrar of Pesticides and Toxic Chemicals is required to keep and maintain the appropriate Registers for licences, for pesticides and for toxic chemicals. He enters in these registers such information as prescribed by regulations.

Inspectors receive from the Registrar, the type of information that is necessary for carrying out their duties which include examinations, inspections, investigations and inquiries pertinent to the Pesticides and Toxic Chemicals Act.

In the application of registration of a pesticide the following information has to be furnished:

(1) Identity of the substance, including common name of the active ingredient, its chemical name, IUPAC nomenclature, ISO nomenclature, empirical formula and structural formula.

(2) Patents covering the active ingredient or the production process thereof, name and address of country of origin of the active ingredient, chemical composition and quantitative composition of each active ingredient, nature of solvents, dispensing agents, emulsified, additives et al, registration in any other country.

(3) Application method in the field, dosage recommended for each application method, miscibility of the product with other pesticides, compatibility with other pesticides, efficacy of the product, laboratory and field tests conducted and results, the phytotoxicity of the product.

(4) Proposal for labelling and directions for use, proposal for packaging including net contents and overall capacity of the package.

(5) Method of destruction and neutralisation, recommended procedure for dealing with spillages on land or in water, decontamination and dispersal, disposal of waste and of excess prepared for use.

(6) Safety advice in respect of handling, storage and transportation, any disaster or emergency preparedness plan for chemical accidents.

(7) Physical, chemical and technical properties of the product e.g. flammability, explosivity, oxidising nature, CFC content, acidity/ alkalinity, density, suspension or emulsification properties, corrosive properties, fat solubility, surface tension melting point, boiling point, vapour pressure, hydrolysis stability.

(8) The method used to detect and determine the active ingredients in the product e.g. CIPAC, AOAC, ISO or others, the spectra data and chromasomes provided such as UV, FTIR, NMR, Mass Spectroscopy and Chromatography.

(9) Acute and toxicity, acute dermal toxicity, acute inhalation toxicity, chronic toxicity, carcinogenic effect, mutagenic effect, teratogenic effect, neuro-toxicity, toxicity of metabolities, sensitisation, ecotoxicological data, accumulation in soil adsorption to soil particles, toxicity to soil organisms, leaching, biotic degradation, toxicity to wild fauna, birds/honey, beneficial insects, human toxicity and antidotes/first-aid phytotoxicity.

(10) Residue data such as maximum residue limits, metabolism in plants, methods of detecting residues in food, water, soil, air, wildlife, wood, textiles or treated materials.

7.4 ANALYSIS AND COMMENTS

Act No. 26 of 1999 is a legal instrument aimed at giving members of the public, a general right of access to official documents of public authorities.

It seeks to make available to the public information about the operations of public authorities and to create a general right of access to information in documentary form that is in the possession of public authority. There are exceptions such as information deemed to be confidential business information which the authority possesses.

A statement of possession of certain documents are to be published by a public authority. Included in this category of documents is an environmental impact statement prepared within the public authority. By extension, if a pesticide impact assessment was done, the possession of such a document may have to be publicly stated.

There are voids in the information base for national chemicals management. In the area of chemical wastes produced, the quantities of solid, liquid or gaseous wastes are not required to be provided by law. As a result, the records of these are very often not available, even if inputs and output are known in a transformation process, the waste components are not carefully monitored.

The MEDLINE Database can be accessed at the Medical Library, Port of Spain General Hospital. The problem associated with access to databases via the Internet, is that the information given at a particular site tends to be introductory and not very many details are found on a specific chemical.

CHAPTER EIGHT

TECHNICAL INFRASTRUCTURE

8.1 OVERVIEW OF LABORATORY INFRASTRUCTURE

TABLE 8A

OVERVIEW OF LABORATORY INFRASTRUCTURE

Name/Description of Laboratory	Location	Equipment/Analytical Capabilities Available	Accreditation	Cert. GLP	Purpose
1. Environmental/ Toxicology Laboratory	Chemistry/ F&D Division, 115 Frederick St., POS	Atomic Absorption Spectrometer – elemental analysis (Pye/Unicam); High Pressure Liquid chromatograph (Hewlett Packard); Two gas chromatographs – detectors: ECD and FPD; Mass Spetrophotomer (Hewlett Packard); Two UV/Visible Spectrophotomers; pH meter (Fisher); Flame Photometer (Corning)	No	Pesticide Training Manual; AOAC	Compliance of pesticide formulations and residue analysis
2. Cariri Chemical Laboraotry	St. Augustine Campus, UWI	Atomic Absorption Sepctrophotometer et al Gas chromatograph with flame ionisation detector; high pressure liquid chromatograph	Yes	ASTM USEPA protocols	Waste water testing Analysis of organics
3. Forensic Science Centre Laboratory (FSC)	Barbados Road, Federation Park	Toxicology Lab: HPLCX2 (Perkin-Elmer) & (Hewlett-Packard); UV-visible spectrophotomer; GC-MS; gas chromatograph with autosampler		AOAC protocols	Court Matters

FSC-Instrumentation Room/Chemistry Lab	Barbados Road, Federation Park	Gas chromatograph with automatic gas control (Hewlett-Packard); Hydrogh generator; N_2/air generator; Head Space Analyser; GC/MS; 3 other GC's; Fourier Transform IR spectrophometer (FTIR); Atomic Absorption Spectraphotometer with ICP			Analysis of drugs, of poisons, determination of cause of death
4. Institute of Marine Affairs	Hilltop Lane, Chaguaramas	Gas chromatograph – Mass spectrometer High pressure liquid chromatograph; Atomic absorption spectrometer; Dionex Ion Chromatograph; UV-VIS Spectrophotometer (Two) – one Unicam/one Perkin Elmer		ASTM; 10C; USEPA protocols	Research and consultancy purposes: analysis of sediments; toxicological analysis; oil finger printing
5. T&T Bureau of Standards	Lot 2, Century Drive, Trincity	UV-Visible Spectrophotometer; Atomic Absorption Spetrometer; Bomb Calorimeter	UKAS	ASTM AALA	Determination of trace metal (feeds); calibration
6. Agricultural Research Station	Centeno	Flame Photometer; Atomic Absorption Spectrometer; Gas Chromatograph; pH meter; Electrical Conductivity Meter	No	AOAC	Plant material testing; soils testing, water analysis, seed testing

There are other laboratories such as those of the Departments of Chemistry and of Agriculture at UWI where similar type items of equipment are used in teaching and research.

8.2 COMPUTER CAPABILITIES

Most agencies have access to computer systems such as the Central Statistical Office, the Chemistry/Food and Drugs Division, the Ministry of Agriculture and the Ministry of Agriculture and the Ministry of Agriculture. Generally, there are stand-alone computers, not linked in a LAN such as an intranet – there is no file server that acts as a node to manage a set of disks. The computer has email and internet facilities.

The Institute of Marine Affairs is in possession of 65 computers with peripherals. They are linked in an Intranet that allows exchange of information on such matters as trace metals in marine sediments, petroleum hydrocarbons, ammonia, nitrite and nitrate in coastal areas, polycyclic aromatic hydrocarbons, total organic carbon and findings on the various projects of the Institute.

The network comprises the MicoVax II minicomputer as file server and IBM and/or IBM-PC compatible terminals situated at various locations within the premises. There is also the SCIENCE net electronic mail facility to keep researchers informed of activities in their fields of interest and to enable easy access to information housed at marine science libraries worldwide.

The Customs and Excise Division uses ASYCUDA (Automated System for Customs Data). It is a computerised customs management system that covers most foreign trade; it handles manifests, customs declarations, accounting procedures, transit and suspense procedures. It generates trade data that is useful for statistical economic analysis.

Software used was developed by UNCTAD and operates on micro in a client server environment under UNIX and DOS and RDBMS (Relational Database Management System). It can be configured to suit national characteristics and legislation, and provides EDI (Electronic Data Interchange between traders and Customs).

8.3 ANALYSIS AND COMMENTS

Laboratories involved in the management of chemicals are reasonably well equipped to conduct analytical work. They are headed by persons trained in the fields of chemistry, toxicology, chemical metrology, agronomy and environmental sciences.

What is needed is intensification in such areas as pesticide residue determination and the creation of a real time system of data transfer to farmers in order to prevent dangerously short pre-harvest periods. In such cases, residues are likely to be at concentrations much higher than the pesticide tolerance levels.

The technical infrastructure is not as integrated as it can be; there are gaps in the liaison between the pesticide and toxic chemicals inspectors and officers in the Ministry of Energy and Energy Industries, involved in approval of biocide importation for the petroleum industry. Further, information exchange between the Inspectors and Agricultural Extension Officers can be made to take place on a timely basis for effectively advising farmers.

Information support services for the technical staff have not been fully developed. The Chemical Information Centre is a key resource for persons wishing to access data on pesticides and toxic chemicals; this facility ought to be developed by a Systems Analyst with the advice of technocrats in the disciplines of chemistry, toxicology, occupational hygiene etc.

Training at various levels is essential. Seminars and lectures for staff as well as for farmers in the field should take place at one level of the instructional framework.

CHAPTER NINE

INTERNATIONAL LINKAGES

9.1 INVOLVEMENT WITH INTERANTIONAL ORGANISATIONS

TABLE 9A

MEMBERSHIP INTERNATIONAL ORGANIZATIONS

International Organizations	National Focal Point	Other Agencies Involved
UNEP	Min. of Health (IRPTC Program)	Min. of Agriculture
IPES		
WHO	Min. of Health	
FAO		
UNIDO		
ILO	Min. of Labour	Min. of Health
World Bank	Min. of Finance	Min. of Planning/ Dev't.
OECD		

TABLE 9B

PARTICIPATION IN INTERNATIONAL AGENCIES

International Agencies	Primary Responsible Agencies
1. Agenda 21 – Commission for Sustainable Development	Ministry of Planning and Development
2. UNEP London Guidelines	Maritime Services Division
3. FAO Code of Conduct	
4. Montreal Protocol	Environmental Management Authority
5. ILO Convention 170	Ministry of Labour and Social Development
6. UN Recommendation for T of DG	Maritime Services Division
7. Basel Convention	Pesticide and Toxic Chemicals Inspectorate
8. London Convention	Maritime Services Division
9. GATT/WHO	Ministry of Industry and Trade
10. Chemical Weapons Convention	Ministry of Health

9.2 ANALYSIS AND COMMENTS

Trinidad and Tobago is a member of the United Nations and of several of its specialised agencies such as the ILO, UNEP, FAO and APELL. Collaboration with the WHO has been positive in promoting several occupational safety and health initiatives.

International cooperation with the ILO in the field of occupational safety and health in the Caribbean region has continued since the start of the 1980s. The follow up to the 1995 Workshop should contribute to implementation of the provisions of the ILO Chemicals Convention, 1990 (No. 170) and to eventual ratification thereof. The Tripartite Consultation on Labour Standards Convention 144 has been ratified.

NEMA (National Emergency Management Agency) has encouraged industries to become involved in APELL and has circulated the Procedure for Hazard Identification and Evaluation in a Local Community. NEMA is the agency of government with responsibility for taking action to reduce the impact of disasters and emergencies on the population and economy of Trinidad and Tobago. It is responsible for co-ordinating emergency response and relief operations in major events.

In 1985, a three-week course on chemical safety was conducted with participants from the Ministry of Labour and Cooperatives and the Ministry of Health. Partners of America and the UNEP/APELL facilitated in terms of support for attendance of some participants.

Trinidad and Tobago has ratified the following Conventions/Agreements:

(1) Vienna Convention (1985) on substances that deplete the ozone layer.

(2) Montreal Protocol (1987).

(3) Basel Convention (1989) on the transboundary movement of hazardous waste.

(4) Prior Informed Consent (PIC).

The country also participates in the IFCS (Inter-governmental Forum on Chemical Safety) and is a member of the Standing Committee of that organisation. Six activities have been identified – Trinidad and Tobago has already started activities in respect of the establishment of Poison Control Centres, Persistent Organic Pollutants and Prior Informed Consent (PIC).

Some industries in the country have adopted internally accepted standards such as those of OSHA and NIOSH of the USA and of the HSE of the United Kingdom. Regulations on pesticides are based on the FAO International Code of Conduct on the distribution and use of pesticides. These have been adopted as well as the UNEP London Guidelines for exchange of information on Chemicals in international trade.

CHAPTER TEN

RESOURCES AVAILABLE IN GOVERNMENT

TABLE 10A

RESOURCES AVAILABLE IN GOVERNMENT MINISTRIES

Ministry/Agency	No. of Professionals	Expertise Available	Financial Resources Available
Environment	Part Time on Chem. Mgt.	Chemists; Env. Engineers	Govt. Appropriation
Health	3	Physicians' Occupation; Hygienist; SM Officers	Govt. Appropriation
Agriculture	7	Graduates in Agricultural Science, Chemist, Entomologist	Govt. Appropriation
Labour/Manpower Dev't.	4	Chemists; Engineer; Physicist	Govt. Appropriation
Trade/Industry	4	Economists	Govt. Appropriation
Finance	6	Economists, Accountants	Govt. Appropriation
Transport	1	Engineer (Mech.)	Govt. Appropriation
National Security	1	Explosives specialist, Disaster Managers; Toxicologists, Pathologist, Chemists	Govt. Appropriation
Legal Affairs	1	Attorneys	Govt. Appropriation
Customs & Excise	1	Customs Officers	Govt. Appropriation
Foreign Affairs	1	Diplomats	Govt. Appropriation
Energy	6	Chem. Eng., Petroleum Eng.	Govt. Appropriation and Private Sector
Institute of Marine Affairs	5 – Full time	Chemist, Toxicologists, Microbiologist, Attorney	Part-government

10.2 ANALYSIS AND COMMENTS

The Environmental Management Authority has technical capabilities in the area of environmental standards and sampling, spatial data collection and analysis.

The staff of this agency is trained in the various areas of air pollution control. It is important to be able to recognise the sources of pollution, measurement of the level of contamination, transport dilution mechanisms and the eventual effects on human health, materials and climate.

Land contamination by lead and other substances has been studied by this agency. Remediation was done effectively and the lead waste contained at a suitably designed landfill disposal site.

There is also proficiency in environmental impact assessment, the use of Leopold matrices and the application of mitigation measures where adverse effects have been identified.

In the Ministry of Health, there is a specialised unit – the Occupational Health Unit. It is headed by a Specialist Medical Officer and has on its staff, an occupational hygienist. The Unit performs biological monitoring of workers and investigates matters of industrial toxicology. In the Chemistry/Food and Drugs Division, there are chemists, toxicologists and inspectors involved in the area of chemicals management.

The Factory Inspectorate of the Ministry of Labour and Social Development administers the Factories Ordinance. It is staffed by graduates in chemistry, physics and engineering. One of its functions is investigating industrial accidents including those involving the use and handling of toxic chemicals.

Chemical engineers are on the staff of the Ministry of Energy and Energy-based industries. They have knowledge of the range of chemicals used at oil refineries and in primary and enhanced oil recovery; they understand the processes by which chemicals are manufactured, purified and transformed into new products.

Institutional strengthening is an urgent requirement, particularly in the case of the Factory Inspectorate where there has been a steady attrition of staff and no infilling of vacancies over the years.

CHAPTER ELEVEN

RELATED ACTIVITIES OUTSIDE OF GOVERNMENT

11.1 DESCRIPTION OF ORGANISATION/PROGRAMMES

TTEMAS (Trinidad and Tobago Emergency Mutual Aid Scheme) is a non-government organisation established in June 1983. It is non-profit and focuses on industrial mutual aid and emergency preparedness services.

Its vision is to provide regional leadership in industrial preparedness and emergency response. Its mission is to provide an effective mutual aid system in the event of critical incidents and to influence the national communities to adopt policies, practices and procedures for the elimination, containment and mitigation of technological disasters.

The membership of TTEMAS is 40 and the industries include oil and gas, petroleum refining, petrochemicals (ammonia, urea and methanol) and the cement industry. It conducts emergency exercises and simulations, hosts workshops and seminars and shares experience in the management of chemicals.

Contact Points:	James Trim	1-868-636-7113
	Kenneth Noel	1-868-679-3200
	Stephen Harris	1-868-636-1522

The NSC (National Safety Council) of Trinidad and Tobago is a non-profit organisation formed to educate and influence society to adopt safety, health and environmental policies, practices and procedures that prevent and mitigate human suffering and economic losses arising from preventable causes.

The NSC serves as an impartial intermediary in bringing together safety and health professionals representing industry and labour and enthusiasts in the field. It is able to form national coalitions on key safety, health and environmental issues. It has hosted seminars, one of which was addressed by a representation of WSO (World Safety Organisation) in July 1989.

Contact Points: Lawrence Solomon

Kenneth Noel 1-868-679-3200

The OWTU (Oilfield Workers Trade Union) is one of the most powerful unions in Trinidad and Tobago. It represents workers on the production, refining and marketing sectors of the oil industry; other members come from the petrochemical industry e.g. methanol, ammonia and urea.

The Union has a well established information centre with resources relating to safety, health and environmental matters. It organises training sessions for its membership and takes an active part in accident investigations where members are involved.

Contact Point: Frank Sears 1-868-652-2701

The TTMA (Trinidad and Tobago Manufacturers Association) is an organisation fully representative of manufacturing and allied services. It provides support to its members to achieve and sustain their full potential in the areas of investment, job creation, market development and national wealth creation.

It has an Environmental, Health and Safety Committee. For the period April 2000 to March 2001, the Committee paid special attention to the role of education, both for its members and for the public.

A seminar was held on May 19, 2000 focussing on environmental matters affecting manufacturers. The Minister of the Environment gave the feature address.

The Environment, Health and Safety Committee made extensive efforts to initiate a school's project targeted at lower sixth form students. They were invited to study procedures and equipment of manufacturing plants and to discuss how environmental problems were solved.

Another seminar was held by the EHS Committee on November 20, 2000. The emphasis was on Occupational Health and Safety. The Director of Labour Administration in the Ministry of Labour, highlighted the official approach to labour legislation and the Occupational Health and Safety Bill.

Contact Point: Anthony Rahael 1-868-623-1029

AMCHAM (American Chamber of Commerce of Trinidad and Tobago), is an organisation that seeks to facilitate trade and investment opportunities between Trinidad and Tobago and the United States of America, by providing a forum for the exchange of opinions and for influencing policies designed to enhance the investment climate. In this context, AMCHAM T&T serves the needs and represents the interests of the private sector of Trinidad and Tobago.

The organisation offers assistance to foreign investors as well as local entrepreneurs at the initial stages of their business ventures. It provides valuable information to persons wishing to import or export in terms of prospective buyers, distributors, suppliers and agents.

AMCHAM has a Safety, Health and Environment Committee of forty members. This Committee promotes awareness and engenders interest in matters affecting the environment and impacting on workers' health.

Contact Point: Cathleen Kumar 1-868-627-8570

ECA (Employers' Consultative Association of Trinidad and Tobago) is the sole employers' organisation dedicated to the achievement of industrial harmony, improved productivity and increased profitability.

Since 1988 the ECA has been doing significant work in the areas of Safety, Health and Environmental Protection in the form of training programmes, projects and research

related to the local environment. It continues to be an advocate for the adoption of cleaner production techniques by industry.

Presently, the ECA is assisting companies with setting up systems to meet the requirements of the pending Occupational Safety and Health legislation. The training schedule for the year 2000 included in June, an OSH Workshop on Engineering Controls and in August, a seminar on the OSH Bill.

Contact Point: Gerard Pinard 1-868-625-4723

11.2 PARTICIPATION OF NGOs

A mechanism known as the "144 Tripartite Committee" has been meeting to address labour issues generally. The non-governmental members belong to the business community and the labour movement. It has discussed important matters such as a minimum wage and worker safety. Another important role for these entities will be seen in the Health and Safety Commission which will decide on policy matters to be executed by the Executive under the proposed legislation on occupational safety and health. Multi-stakeholders will constitute the Commission.

11.3 SUMMARY OF EXPERTISE AVAILABLE OUTSIDE OF GOVERNMENT

TABLE 11A

SUMMARY OF EXPERTISE AVAILABLE OUTSIDE GOV'T.

	Research Institutes	University	Industry	Enviro/ Consumer Groups	Labour Unions	Professional Org.	Other
Data Collection	X	X	X	X	X	X	
Testing of Chemicals	X	X	X				
Risk Assessment			X	X	X		
Risk Reduction							
Policy Analysis		X				X	
Training/ Education		X	X		X		
Research on Alternatives	X	X	X				
Monitoring					X	X	
Enforcement			X		X		
Information to Workers			X		X	X	
Info. to public				X		X	

11.4 ANALYSIS AND COMMENTS

The policy of government as genesis for the Freedom of Information Act No. 26 of 1999 is to give members of the public a general right of access to official documents of public authorities. There are exceptions in say matters of national security and of confidential business information.

Government has been making use of expertise from without. The Pesticides and Toxic Chemical Control Board includes a representative from employers' organisation with ECA. It is possible to secure the services of a consultant with specialised knowledge of the use and effects of controlled products.

Under the Environmental Management Act No. 3 of 2000, the ten-man Board includes members drawn from the following disciplines or groups, namely environmental management, ecology, environmental health, engineering, labour, community-based organisations, business, economics, public administration, law and non-profit environmental non-profit environmental non-governmental organisations. Expertise outside of government is widely used in chemicals management and environmental protection.

A number of industries have from time to time commissioned studies on their working environment in respect of emissions, both gaseous and liquid. Some of these industries include the petroleum refining, iron and steel and household chemicals. For purposes of an EIA (Environmental Impact Assessment), a company may be required to submit a chemical impact assessment to obtain planning permission for the proposed project.

CHAPTER TWELVE

AWARENESS/UNDERSTANDING OF WORKERS AND THE PUBLIC

A general duty of employers under the proposed occupational safety and health act pertains to hazard communication. The employer has to ensure that an employee who works with or in proximity to a dangerous or toxic substance received from a supplier is informed about all HAZARD INFORMATION which the employer received from the supplier, concerning that substance and all further hazard information of which the employer is or ought to be aware, concerning its use, handling and storage.

Further, an employer who produces a dangerous or toxic substance is to ensure that every employee who works with or who is in proximity to that substance is informed about all hazard information available in respect of storage, use and handling.

The public is to be informed as well. The occupier of every industrial establishment is required to take steps to protect the safety and health of the public in the vicinity of his industrial establishment from dangers created by the operation or processes carried on. He is to take special care to ensure that plant and equipment used are of such integrity and that adequate safety systems are in place as to prevent the occurrence of FUGITIVE EMISSIONS, such as chemical gaseous releases.

Importers are supplied with MSDS (material safety data sheets) which indicate physical and chemical properties of the chemical, the hazards associated with the handling, use, transportation and storage.

Workers and their representatives have access to this information and to the precautions to be taken to ensure their protection against risks involved. An important precaution is the use of suitable personal protective clothing and equipment.

Included in the emergency preparedness of PLIPDECO is the CAER programme – Community Awareness and Emergency Response. It aims at presenting loss of life or injury to health, damage to property in the event of an emergency; it indicates the steps to be taken by members of the neighbouring community when faced with an emergency including one in which there are hazardous chemicals.

CHAPTER THIRTEEN

REVIEW, ANALYSIS AND FOLLOW-UP

The chemical management programme in Trinidad and Tobago has been reasonably effective. The legal framework is in place in the form of the Pesticides and Toxic Chemical Act No. 42 of 1979. Regulations in respect of labelling and of classification have been made under the Act. The registration of pesticides has been on-going.

There is scope for the introduction of enhancement improvement. A small but necessary amendment can be made to Section 8 of the Act in which the inspector may for the purpose of exercising any of his powers enter premises "at any reasonable time". It may be asked what is a reasonable time? The word "reasonable" should be deleted.

In Section 13(3)(a), the penalty for an offence under this Section for summary conviction is a mere $500 or imprisonment for six months. The fine of $500 ought to be increased to $5,000 to serve as a deterrent. In section 13(3)(b), the present $5,000 fine should be increased to $10,000 for conviction upon indictment.

The whole question of disposal of pesticides, toxic chemicals and containers thereof, has not yet been finalised. Drafted regulations to deal with the indiscriminate discarding of materials likely to endanger health ought to be treated as a matter of urgency.

Contiguous to this, a chemical waste collection system is required. The Solid Waste Management Co. Ltd. is well suited to advise and perhaps implement such a collection system in collaboration with the Pesticides and Toxic Chemicals Control Board and the Environmental Management Authority.

Regulations pertaining to toxic chemicals as distinct from pesticides ought to be promulgated. The estimate worldwide for the number of toxic chemicals is 100,000 and the effects of ingestion, absorption and inhalation are hazardous. There is urgent need for instruments for the control of these substances. They have been drafted but are in abeyance pending some substances under the Chemical Weapons Convention 1993.

Pesticide Control Regulations have been drafted for the proper management of pest control operations. What is missing is the concept of liability insurance whereby persons other than employees are covered in the event of negligent actions on the part of pest control operators.

Under the Pesticides and Toxic Chemicals Act, regulations are in place in respect of:

(1) Registration of pesticides.

(2) Licensing of premises and

(3) Import licences.

The Trinidad and Tobago Standard, TTS 21 10 500 of 1980 is compulsory; it pertains to requirements for labelling of retail packages of pesticides. It specifies the information to be included on labels of pesticide packages intended for the retail trade and the instructions printed on any leaflets accompanying the packages.

Premises subject to inspections under the Pesticide and Toxic Chemicals Act include the following:

(1) Agro-Shops.

(2) Toxic chemical operations.

(3) Landscapers shops.

(4) Supermarkets.

(5) Pharmacies.

(6) Hardware shops.

(7) Manufacturers of mosquito coils.

(8) Paint factories where fungicides are used and

(9) Swimming pool chemicals suppliers.

There are three (3) Pesticide and Toxic Chemical Inspectors. The number of licensed premises is of the order of 400 – the premise/inspector ratio is too high so that more inspectors are required for efficient and effective control under the regulations.

Inspectors collect crop samples and submit them for pesticide residue analysis. Residues pose a severe health risk in the form of nerve damage, birth defects and cancer occurring

over a long period. However, the analytical results do not quickly reach the agricultural extension officers who are the persons interfacing with the farmers in the field. This constriction of the information flow lines represents a major flaw in the system – the farmers cannot be advised on a timely basis whether their preharvest intervals are indeed correct, that is whether their produce has been found to be posing a health risk to the general public. The time delay for this important information is too long.

A serious problem arising from the sale of pesticides is that of repackaging without authorisation. A vendor may receive his supply of a pesticide in bulk but for retail purposes, he repackages as he sees fit. In many such cases, the labelling is grossly inadequate with respect to warning marks and phrases, indication of incompatibility with other pesticides or precautions to protect agricultural or farm workers and consumers.

'A strategy is being advocated for reducing the quantities of pesticides used and the consequent lowering of production costs. It is IPM (Integrated Pest Management), an approach that is capable of achieving these objectives.

It is the co-ordinated use of pest and environmental information with available pest control methods to prevent unacceptable levels of damage by the most economical means and with least possible hazard to people, property and the environment.

Elements of an IPM programme include the following:

(1) Biological controls such as the use of predators and application of pheromones and juvenile hormones;

2) Mechanical and Physical controls;

(3) Chemicals controls;

(4) Cultural control ie: Crop rotation to avoid infestation and

(5) Genetic control ie: Introduction of disease – resistant varieties of plant material.

A better understanding of IPM is obtained by a consideration of the following factors:

(a) Preparation – awareness of the potential problems and opportunities ie:

What are the pests and what practices can be used to avoid them and

(b) Prevention – the practices that contribute to crop protection ie:.

Biological control; crop rotation; host plant resistance and site selection.

Integrated Pest Management has been used in Trinidad and Tobago before, particularly against attack from the pink hibiscus mealybug (Maconellicoccus Hirsutus) during the period 1995 to 1997. Biological control was via the beetle, ladybug Crytolaemus montrouzieri which fed on all stages of the mealybug. A sustained programmme of IPM will undoubtedly be of immense value in any phase of chemical safety management.'

A Chemical Information Centre is being established. A computer system for the purpose was donated by PAHO/WHO and there was a two-week attachment arranged for a senior officer.

The Centre will provide information relating to nomenclature synonyms, identification and molecular structure of substances. It will incorporate a hazardous substances data bank giving a broad scope in human and animal toxicity, safety and handling, as well as environmental fate of hazardous chemicals. The resources of data networks such as TOXNET will be made available to provide information on research work in the field of chemical carcinogenesis and mutagenesis.

It is feasible to include in the collections, CHIPS (Chemical Hazard Information Profiles). This is a publication of the United States Environmental Agency, Office of Toxic Substances; it contains for a particular chemical, estimates of occupational, consumer and environmental exposure, human health and environmental effects and pertinent regulations and standards.

CHRIS (Chemical Hazard Response Information System) is a set of manuals for assessing the health, safety and environmental hazards posed by chemical releases. These manuals developed by US Coast Guard should be an integral part of the Chemical Information Centre.

A relational database should be designed by a Systems Analyst who would do the following:

(1) Determine the systems requirements in collaboration with the users.

(2) Design data files.

(3) Effect data transfer and

(4) Implement the system that has report generators.

In terms of liaison between agencies, the Ministry of Energy and Energy-based industries is involved in the approval for import of a wide range of toxic chemicals. These are used both in refining and in production. In the latter, there are additives for drilling muds and chemicals for treatment of water in enhanced oil recovery. It is therefore essential that liaison be established between the Advisory Committee on Pesticides and the Ministry so that an integrated approach is made in the matter of toxic chemicals used in the oil and petrochemical industries.

Occupational safety and health ought to be an integral part of chemical safety management. This realisation should form the basis of a priority for action. The objective is to protect workers from the hazards of chemicals, to prevent or reduce the incidence of chemically induced illnesses and injuries resulting from the use of chemicals at work.

Work procedures should be devised and followed for all uses of hazardous chemicals to protect against the risks which have been identified as a result of the employer's assessment of risks. The procedures must incorporate the most effective use of the engineering control measures available. The ILO Conventions No. 170, 174 Recommendations No. 177, 181 and Codes of Practice on safety in the use of chemicals at work and PMIA (Prevention of Major Industrial Accidents) apply.

People including workers are at the centre of all social development. It is therefore critical that worker protection against chemicals at work becomes a main thrust of chemical safety management and that Occupational Safety and Health should be placed prominently in the foreground for further discussion. Indeed, a project should be formulated to achieve the objective of promoting this specialty within chemical management. The IFCS in the preamble to "Priorities for Action beyond 2000" states: ***"To protect the health of workers, special attention should be paid to OSH Concerns Caused by Chemicals".***

The aspect of training is also significant. One strengthening element for the structure of chemicals management is the training of farmers via seminars and lectures by agronomists, entomologists et al. Training in the proper use of pesticides will greatly diminish the hazards associated with abuse and misuse of these substances.

Educational institutions currently provide instruction in environmental science and occupational safety to various levels or proficiency, they include UWI, NIHERST,

Cipriani College of labour and Co-operative Studies and private institutions. Pesticide and toxic chemical inspectors can benefit immensely from training offered by the USEPA instructors either visiting or in the USA.

ANNEX

GLOSSARY

Agricultural chemical: a substance applied to the soil or to plants in the cultivation of a crop.

Consumer chemical: a substance used mainly as an antiseptic disinfectant, preservative or cleaner.

Formulation: a preparation of a pesticide with other ingredients for effective application against the pest involved.

Impact assessment: a study of the effects arising from the production, storage, use, handling, transport and disposal of toxic substances on the biota.

Industrial chemical: a compound which is feedstock to or output from a transformation process or one that is ancillary to any industrial process or operation.

Licence: written authorisation to perform as a pest control operator.

Pesticide: any substance which by itself, or in combination with others, is proposed, represented or used for destroying or controlling pests.

Pollution Prevention: avoidance of the addition of one or more chemical or physical agents to the air, water or land in an amount, at a rate and/or in a location that threatens human health, wildlife, plants or any other aspect of the environment.

Risk assessment: a study of the probabilities and magnitude of harm to human health or the environment associated with a physical or chemical agent, an activity or occurrence.

Risk reduction: a strategy involving the introduction of control measures to lower the probabilities and/or magnitude of events that are deleterious to human health and the environment.

Rural: having a low population density and being agriculture-based.

Trade: activity of buying, selling or exchanging goods and/or services.

Urban: having a high population density and being non-agriculture-based.