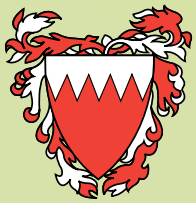


Kingdom of Bahrain
The Supreme Council for Environment

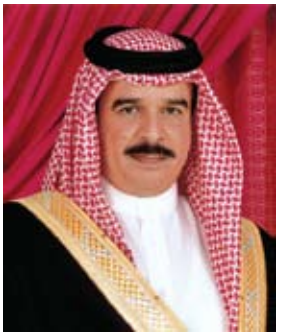
Bahrain National Profile to Assess the National Infrastructure for Chemical Safety

Updated Version
November 2012

Bahrain National Profile to Assess the National Infrastructure for Chemical Safety

The project “Capacity Building for Integrated and Sustainable Chemicals and Hazardous Waste Management” was developed with the technical assistance of the United Nations Institute for Training and Research (UNITAR) and the financial support of the Strategic Approach to International Chemicals Management (SAICM) Quick Start Programme Trust Fund.

His Royal Highness
Prince Khalifa bin Salman Al Khalifa
The Prime Minister



His Majesty
King Hamad bin Isa Al Khalifa
King of The Kingdom of Bahrain

His Royal Highness
Prince Salman bin Hamad Al Khalifa
The Crown Prince
Deputy Supreme Commander

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“Chemical Management; we aim to sustain”

The international community today needs to double its efforts and cooperation towards sustainable chemicals production and chemical safety; and should seek to create a framework within which uniform and globally valid standards can be developed.

The Supreme Council for Environment, since 1996 has being preparing and carrying out steps towards sound management of chemicals, thus enabling it to smoothly adopt the Strategic Approach to International Chemicals Management (SAICM);as well as the Agenda 21, which reflected the need for integration by recommending coordinated and integrated approaches for the sound management of chemicals and wastes.

In line with SAICM and Agenda 21, the Council plans to establish a holistic approach for chemical management aimed at protecting human health and the environment, through all stakeholders dealing with chemicals.

Furthermore, there is an urgent need to unify the various global initiatives on chemicals management, especially the international treaties on chemicals management and waste.

The Supreme Council for Environment will work hand to hand with the nations and organizations of the world, to attain sustainable chemical management.

Abdulla Bin Hamad Al Khalifa

The President

The Way Forward for Integrated Chemical's Management

The Kingdom of Bahrain has been giving importance and priority to all environmental issues and concerns. This commitment is clearly reflected in the Bahrain 2030 National Planning Development Strategies Project, which includes a development plan concentrating on the possible ways of integrating environment into the development. More precisely, it mentions how environment can support the development without having any adverse impacts. Environmental issues of major concerns are given a special attention by emphasizing on the necessity for conservation and protection of natural resources.

Moreover, the National Environmental Strategy was prepared in 2006 and is considered to be the cornerstone towards achieving sustainable development. Besides, Millennium Development Goals (MDG) fits well within the national development process concerning the national priorities for action and concerning the way how the implementation of such recommendations are going to be undertaken.

The Supreme Council for Environment is prioritize the management of chemicals in the Kingdom of Bahrain. The specific legislations, criteria, procedures exist for its safe management at all levels from its import to transportation, storage, use and handling of it's by products. The national committee on chemicals management has been formed which coordinate and cooperate with the stake holders and raise awareness on the issue. However, more dedicated efforts and strategies are required to ensure that chemicals are used and managed in a safe and sustainable manner without harming or affecting the environmental resources and public health.

On the other hand, safe disposal of chemicals, particularly those considered toxic, is essential to prevent any environmental damage. Precaution needs to be exercised to ensure its safe use over a chemical's entire life cycle.

The Kingdom of Bahrain has already defined and established a system to control the importation, use and misuse of toxic chemicals, as well as for the licensing of industrial establishments, laboratories, and chemical storages. Inspections of work operations and processes related to the use of chemicals are regularly carried out in order to determine possible sources of industrial and chemical risks, and to establish procedures for importation, handling, transportation and storage of chemicals.

Moreover, the Supreme Council for Environment has prepared and is updating the National Chemical Profile from time to time. Chapter 13 of the Profile mentions the conclusion and recommendations for the near future. It is expected that the Supreme Council for Environment will harmonize these recommendations through the establishment of 'Integrated Chemical Management in the Kingdom of Bahrain'.

Dr. Adel Khalifa Al Zayani

Director General

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Introduction

In 1992, the United Nations Conference on Environment and Development, or "Earth Summit" adopted Agenda 21 for the systemic, co-operative action required for effecting the transition to sustainable development. Chapter 19 of the Agenda is entitled "Environmentally Sound Management of Toxic Chemicals, including Prevention of Illegal International Traffic in Toxic and Dangerous Products", and has six program areas, namely:

1. Program Area A: Expanding and accelerating international assessment of chemical risks
2. Program Area B: Harmonization of classification and labeling of chemicals;
3. Program Area C: Information exchange on toxic chemicals and chemical risks;
4. Program Area D: Establishment of risk reduction programs;
5. Program Area E: Strengthening national capabilities and capacities for the management of chemicals; and
6. Program Area F: Prevention of illegal international traffic in toxic and dangerous products.

In 1994, the International Conference on Chemical Safety (Stockholm, Sweden) brought together high-level representatives from more than 100 countries to identify priorities and to establish mechanisms to implement the above programs.

In order to strengthen its national capabilities and capacities (Program Area E), Bahrain seeks assistance from the Eastern Mediterranean Regional Office (EMRO) of the World Health Organization (WHO). Two WHO experts visited Bahrain and convened a meeting during the period 16-20 May 1998. The meeting objective was to establish a national committee composed of stakeholders involved in chemical safety, to initiate the process of preparation of a National Profile to assess the national infrastructure for the management of chemicals. During the meeting, the experts presented an introduction to the National Chemical Safety Profile, its components, benefits and procedures for its preparation, using the UNITAR/IOMC guidance document. They introduced to the participants the international policy framework and recent developments concerning National Chemical Safety Profiles, including global and regional overviews of the status of profile preparation.

Objectives and Potential Benefits of the National Profile

Assess the current national control practices related to all stages of the chemical life cycle from production/import through disposal.

- Indicate current capabilities and capacities for management of chemicals;
- Provide practical information on ongoing programs and activities related to chemical safety;
- Establish a process, which can facilitate the exchange of information among parties concerned with the chemical management;
- Strengthen national decision-making related to the chemical safety;

- Establish an authoritative document, which can serve as a basis for further efforts to strengthen the national system for the management of chemicals through involvement of all concerned parties;
- Provide a basis for improved worker, public and environmental protection as a consequence of improved knowledge of potential problems and alternative means for addressing them; and
- Provide a basis for improved awareness of chemical risks among workers and the public, and help to develop a national safety culture.

The National Team

During the meeting, a National Coordinator for the preparation of the profile was nominated and a preparatory coordination team was formulated from senior officials from the following concerned ministries and non-governmental organizations:

- Environmental Control Directorate, The Supreme Council for Environment, served as the national coordinating body for the updating of the National Profile (part of the SAICM QSP project);
- Ministry of Health;
- Ministry of Municipalities and Urban Planning (Agriculture Affairs);
- Ministry of Industry and Commerce;
- Ministry of Labour;
- Authority of Oil and Gas;
- Customs Affairs - Ministry of Interior;
- Central Information Organization - Ministry of Interior;
- Bahrain Society of Chemists;
- Bahrain Society of Engineers;
- Bahrain Society of Health and Safety ;
- Academia and Research Institutes;
- The General Federation of Bahrain Trade Union; and
- Industrial Sector.

We would like to extend our sincere gratitude to other governmental and private organizations for their cooperation in proving data and information for updating the National Chemical Profile.

We highly appreciate the technical support of the United Nations Institute for Training and Research (UNITAR). We also thanks Ms. Yuri SAITO, Training Associate for review the profile

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Executive summary

Bahrain represents a unique case of a small island developing state. It is an archipelago formed of about 36 low-lying islands. Some of these islands are connected with each other by limited bridges, leading to traffic and risk of road accidents.

After land reclamation, the area of Bahrain reached about 700 km^2; most of it is dry desert land. Therefore, the limited developed urban part is very congested with residential, commercial, and industrial areas which interfere with each other with no consideration to proper buffer zoning between them. The climate is arid to hyper-arid with high air temperature and high relative humidity. The hot humid conditions last for more than six months of the year.

The "economic vision 2030 for Bahrain" is based on promoting factors that drive prosperity of the Bahraini community. Within this context, three interrelated principles emerged, which guide Bahraini ambitions: sustainability, competitiveness, and fairness. It is envisaged that national authorities will seek promotion and finding the proper environment to enable Bahraini communities achieve these objectives.

The Bahrain 2030 National Planning Development Strategies Project includes a development plan concentrating on the possible ways of integrating environment into development. More precisely, how environment can support development without negative repercussions. The National Development Planning Strategies contains five parts dealing with mostly with economic issues and social welfare. Environmental issues are given a special attention too by emphasizing the necessity for conservation and protection of natural resources.

The 2007 National Structural Strategic Plan presents a long-term vision for the Kingdom of Bahrain over the 2030 horizon. The Plan emphasizes the need to incorporate environmental considerations in the planning of all major projects in the country. The plan reflects the desire of relevant authorities to balance economic, social and environmental sustainability in an effort to achieve sustainable development.

The Kingdom of Bahrain is party to the Stockholm Convention, Basel Convention, Vienna Convention for the Protection of the Ozone Layer, and the Montreal Protocol. It is also party to the Convention on Biological Diversity, the Convention on Combating Desertification, the Framework Convention for Climate Change and the Kyoto Protocol. Moreover, the country is in the process of signing the Rotterdam Convention.

The Kingdom of Bahrain has in place a system to control the importation, use and misuse of toxic chemicals, as well as for the licensing of industrial establishments, laboratories, and chemical storages. Inspections of work operations and processes related to the use of chemicals are carried out in order to determine possible sources of industrial and chemical risks, and to establish procedures for importation, handling, transportation, and storage of chemicals. Threshold Limit Values (TLVs) and standards for chemical pollutants and toxic chemicals are being put in place, including rules, regulations and procedures to ensure that these limits are not exceeded and that efficient methods are developed to monitor and control chemical pollution and risk. The use of chlorinated pesticides was banned in 1989.

Bahrain is receiving significant amount of various types of chemicals from different parts of the world. These chemicals are imported as pesticides, cleaning materials, pharmaceutical drugs, and food additives and in many other forms. Most of the time, these chemicals enter the country without proper control of the importation and handling, due to the fact that in many cases, countries of origin export the chemicals with a lack of information on chemical composition, toxicity, etc. This

of course makes the management of chemicals difficult, and has harmful effects on the handlers, environment and public health. Due to limited capabilities, at present. only a voluntary co-ordination system for licensing of industrial projects and commercial activities exists, covering the importation, use, production, storage and disposal of chemicals.

The Supreme Council for Environment has the overall mandate for environment protection in the Kingdom of Bahrain. It has a special unit responsible for the management of chemicals through the control of import, export, storage, handling and disposal of chemicals, to ensure occupational and environmental safety in the Kingdom of Bahrain. Its Directorate of Environmental Control hosts the focal points for the Basel and Stockholm Conventions and SAICM.

The Directorate of Environmental Control is the lead organization in collaboration with a multi-stakeholder coordinating committee, comprising other organizations involved in the management of chemicals in Bahrain, namely: Customs Affairs of the Ministry of Interior; Authority of Electricity & Water; Ministry of Industry and Commerce; Agriculture Affairs of the Ministry of Municipalities and Urban Planning; Ministry of Health; Ministry of Interior; Ministry of Labor; Bahrain University; Chemists Society; Engineers Society NGOs; and other research centers.

Bahrain faces significant developments with rapid industrialization and population growth, which led to the import and use of a large amount of chemicals and generation of a broad spectrum of waste in terms of quality and quantity. As chemicals management receives greater international attention, Bahrain also has an increasing responsibility to develop sustainable national programs for the effective implementation of environmental chemicals-related conventions and SAICM across all sectors at the national level. Chemicals and waste management has thus become a major national concern and now draws intense attention as one of the priority management areas due to its environmental consequences and public health implications.

Waste management is currently considered one of Bahrain's most important challenges as it poses intricate and complex problems for urban cities. Over the past thirty years, solid wastes in Bahrain have grown in quantity and quality at an annual growth rate of 18.4%. Annual per capita waste reached 1,538 kg in 2008, making Bahrain the highest average per capita producer of domestic solid waste in the Arab region. Wastes include domestic, agricultural, industrial and medical wastes. Moreover, the total amount of hazardous waste reached 35,008 MT in 2007.

Waste management has become one of the main challenges for sustainable development in Bahrain. The country is currently struggling to manage wastes from multiple sources including households (domestic waste), industry, agriculture, and the healthcare sector. Bahrain's waste management crisis is exacerbated by the accelerated increase in waste volume combined with the limited geographical area, scarcity of safe waste-disposal sites, and the lack of environmentally appropriate technologies for waste handling and treatment. Inappropriate waste handling and disposal can result in soil, water and air pollution. Solid Waste Management (SWM) has therefore become a national concern.

Bahrain recognizes that environmental sustainability can only be reached if pursued multilaterally. Therefore, the Government of Bahrain has committed to promoting environmental protection at the international level.

Furthermore, Bahrain is moving toward the integration of chemicals and waste-related conventions. For example, the Basel Convention is actively involved in building partnerships with other key chemicals - and wastes-related - conventions or protocols, noting scientific inter-linkages, common environmental issues and cumulative knowledge or experience in domains of relevance to multilateral environmental agreements (MEAs).

This National Profile concludes with a set of recommendations to support the activation of national instruments available and the promotion of chemical safety. These include addressing: the lack of capacity to manage chemicals at national and local levels; limited or no information available on many of the chemicals currently in use or banned; and the absence of a multi-stakeholder mechanism to manage chemicals. It also highlights the most important national priorities related to chemical safety and the safe management of chemicals. Chapter 13 provides the conclusion and recommendations.

CHAPTER 1

National Background Information (Bahrain Profile)

Purpose of the chapter

To provide general background information on the country, both at the national and regional levels.

1.1 Physical and Demographic Context

1- Position and Area

- The Kingdom of Bahrain is located centrally on the southern shores of the Arabian Gulf, to the east of Saudi Arabia and to the north of Qatar, between latitude 25° 32 & 26° 20 North and longitude 50° 20 and 50° 50 East.

- The Kingdom of Bahrain is an archipelago of 40 islands, with a total area of 757.50 square kilometers. The largest island is the island of Bahrain, which includes the capital (Manama), representing 80.68% of the total area of the islands of the Kingdom. The country is connected with the Kingdom of Saudi Arabia by the King Fahad Causeway, which opened in November 1986.

- The Kingdom of Bahrain is composed of five governorates (Figure 1): Al Manamah (Capital), al Muharraq, Ash Shamaliyya (Northern), Al Wusta (Central), and Al Janubiyah (Southern), which is the largest governorate with a surface area of around 441 square kilometers. Ash Shamaliyya is the most densely populated governorate. Bahrain is divided into five municipalities (Al Manamah, al Muharraq, Ash Shamaliyya, Al Wusta, and Al Janubiyah), each with a municipal council elected every four years. These councils issue legislation and decisions within the competences stipulated by law. Municipalities represent the executive power in each governorate and are subject to the authority of the Ministry of Municipality Affairs and Urban Planning.

Table 1.1:Area of Kingdom of Bahrain by Governorate (2007 - 2009)

Year	Total Area (Sq. Km)	Governorates				
		Southern	Northern	Central	Muharraq	Capital
2007	749.63	437.00	140.64	84.56	50.24	37.19
2008	757.5	438.30	140.79	84.75	56.13	37.53
2009	760.45	438.43	141.73	84.80	57.46	38.03

2- Geography

- Bahrain is almost completely flat, the highest point being Jebel Ad Dukhan (which means Smoke Mountain), which stands a mere 134m above sea level in the central region. Apart of a narrow fertile strip along the north and north-western coast, it is generally rocky and bare. The limestone bedrock is covered with varying depths of dry or salty sand dunes, which is not conducive to plant growth, with the exception of some little wild plants that bear the difficult conditions and arid regions. The majority of Bahrain's oil wells are in this area, which consists of limestone rock covered with saline sand.

3- Climate

- The significant aspects of the general climate are cool winters with sparse rainfall, and hot summers with high humidity.
- The winter season from December to February is influenced by low-pressure systems from the Mediterranean, which travel east into the Gulf and cause periods of disturbed weather. The average temperature is 18.4 degrees Celsius and the average relative humidity is 67.8%. These disturbances are accompanied by rainfall. January is usually the coolest month where average temperatures drop to the lowest annual level of 12.5 degrees Celsius, when extreme low temperatures are experienced and prevailing winds are northwesterly.
- The summer season from June to August is generally hot with a significant increase in wet bulb temperatures. The average temperature is 35.3 degrees Celsius and average relative humidity of 41.4% in August. This month also has the highest annual daily sunshine average of 10.3 hours. Initially, the region is influenced by low pressure over Pakistan. This causes dry northwesterly winds, known locally as *Al Barah*, to become established; they persist for long periods and create more pleasant conditions than in other summer months.
- After this period, the low pressure system declines allowing the formation of southeasterly winds known as the *kaus*, which cause a steady rise in both temperature and humidity.
- June is the hottest month of the year, when average temperatures rise to their highest level, 40.0 degrees Celsius. By October, temperatures begin to decrease gradually and cloudiness increases, bringing the possibility of rain to 74.2%. Although the weather may be changeable with the possibility of thunderstorms, the most comfortable months are March, April, October and November.

1.2 Political Structure of the Country

Arabic is the official language, although Persian and English are understood widely. Urban services--including hospitals, utilities, highways, and education--have reached a high standard as a result of the influx of oil revenues, although oil income declined in the 1980s. Housing and transportation are state-subsidized, and health services and education are free.

As early as the third millennium BC, Bahrain was the site of the thriving commercial center DILMUN. In ancient times Bahrain was known for its pearling industry. After nearly eight centuries of independence as an Arab Muslim state, Bahrain came under the rule of Portugal (1521-1602) and Persia (1602-1783). Since 1783 the al-Khalifa family has ruled the country. British-Bahrain treaties were signed in 1820 and 1861, and Bahrain was under British protection from 1861.

In 1968, an agreement ended the century as a British protectorate and, by 1971, Bahrain earned total independence. Today, Bahrain is a model of stability. In 2000, as promised, the Amir inaugurated a new era of democracy in Bahrain. October of that year witnessed substantial political reforms. Citizens voted in elections that established a bi-cameral parliament. In 2001, women voted for the first time. Bahrainis today enjoy a greater voice in the laws that govern them—an uncommon freedom in the Gulf.

Box 1: Facts About Bahrain

Official Name

Kingdom of Bahrain

Land

Area (2009): 760.45 sq. km (293.61 sq. mi)
Capital and largest city: Manama

People

Population (2008): 1,103,496; density 1,457 persons per sq. km
Official language: Arabic
Major religion: Islam

Education and Health

Literacy – 15 and above-(2001): 86.55% adult population
Universities (2009): 14
Hospital beds (2009): 2086
Physicians (2009): 2481
Life expectancy (2010-2015): women- 78.3; men-73.8
Infant mortality (2008): 7.4 per 1,000 live births

Economy

GNP (1990 est.): 4,534.24 BD Million; BD 4,215.90 per capita
Foreign trade: imports (2007) - 3.07 billion; exports (1990 est.) - 1.213 billion
Currency: 1 Bahrain dinar = 1,000 fils

GOVERNMENT

Type: Monarchy
King of Bahrain: Hamad bin Isa Al-Khalifa
Government leader and prime minister: Khalifa bin Salman Al Khalifa
Legislature: Bahrain Constitution

Source: http://www.cio.gov.bh

Bahrain is a constitutional monarchy by virtue of the amended Constitution issued in February 2002. The King is the Head of the State and its highest representative. He presides over the three powers (executive, legislative, judicial). Since he came into power in 1999, His Majesty King Hamad bin Isa Al Khalifa introduced exceptional improvements to the political system and related legislation and institutional machinery within the scope of the reform project focusing on the development of the country's legislation and systems in the political, economic, and social fields. This is based on the principle of separation among the executive, legislative, and judicial powers, and the reinforcement of their complementarily.

With regard to political reform, the ratification of the National Labor Charter in 2001 is considered an important achievement, with 98.4% of votes, followed by the vote on the Bahrain Constitution in February 2002. These developments contributed to the establishment of a legislative power represented by the National Council, which is composed of a Parliament and a State Council, each composed of 40 members. Whereas the members of Parliament are elected through free direct popular election, the members of the State Council are appointed by Royal Order. The first parliamentary elections took place in 2002 for the first legislative quarter and were followed by the elections of the second legislative quarter in 2006, which witnessed the participation of political forces. It must be noted that the State Council was founded in 1992 with 31 members; the membership was increased to 40 in the following round.

Oil, first discovered in 1931, was Bahrain's principal product for many years, but since reserves are small and are expected to be depleted by the end of the 20th century, major efforts have been made to diversify the economy and develop other sources of income. These include a large oil refinery, which processes local oil and oil piped from Saudi Arabia; a huge aluminum smelter, for which electric power is obtained from natural gas; and ancillary industries based on oil refining and aluminum smelting.

Bahrain receives a variety of subsidies from the rich Gulf States. It has become a major regional banking and communications centre. Also important are the engineering workshops, warehousing facilities, and ship-repair facilities (including a dry dock for the repair of super tankers) related to Bahrain's position as a transportation and trade centre for the Arabian Gulf. The airport at al-Muharraq is a major international airport, and the port of Mina Salman offers a free trade zone. A causeway-linking Bahrain Island to Saudi Arabia was officially opened in 1986.

The Government has adopted the policy of diversifying revenue sources and expanding investments in heavy and transformational industries such as aluminum and petrochemicals, in addition to banking and financial services, and tourism. The Kingdom of Bahrain has taken great measures for ensuring its economic stability, focusing on the private sector, exploiting excesses for reinforcing development, and diversifying its revenue sources and economic structures. This appears clearly in the gross domestic product (GDP) during recent years, reflecting the strong economic revival in Gulf Cooperation Council (GCC) countries boosted by oil revenues resulting in high liquidity and reinforced Treasury revenues. All this offered great opportunities for spending on capital projects and infrastructure, thereby contributing to increased capital flows and supporting the revival of all economic fields, particularly real estate – which is still going through intense revival.

The Ministry of Finance vision for the national economy for the coming decade concentrates on building and expanding a knowledge-based economy, with six clusters of activities being selected to lead the drive. These clusters are information technology-based services, financial services, business services, healthcare, education and training, and tourism, while developing downstream industries to accelerate economic growth.

1.3 The Population by Nationality and Sex in 2010 Census

Land and People

- The two most important islands are Bahrain and Al-Muharraq, which are connected by causeway; other islands include Sitra, Umm Nassan, An Nabih Salih, Jidda, and the Hawar group. All the islands are small and low-lying. The central region of the main island, however, is a barren limestone plateau. Bahrain’s population consists of 46.0 % of Bahrainis and 52.0 % non-Bahrainis according to 2010 census.

- The ninth census was held on the 27th of April 2010. The population of the Kingdom of Bahrain reached 1,234,571, of whom 568,399 where Bahrainis and 666,172 non-Bahrainis.

Table 1.2: Population by Nationality & Sex Census 2010

Nationality	Males	Females	Total
Bahraini	287,239	281,160	568,399
Non-Bahraini	481,175	184,997	666,172
Total Population	768,414	466,157	1,234,571

Table 1.3: Population by Age Group, Nationality & Sex in Census Year 2010

Age Group	Total			Nationality & Sex					
				Non-Bahraini			Bahraini		
	Total	Females	Males	Total	Females	Males	Total	Females	Males
0-4	89,020	43,783	45,237	25,282	12,522	12,760	63,738	31,261	32,477
5-9	82,925	40,360	42,565	23,913	11,625	12,288	59,012	28,735	30,277
10-14	75,658	36,767	38,891	17,474	8,425	9,049	58,184	28,342	29,842
15-19	72,713	35,391	37,322	13,056	6,256	6,800	59,657	29,135	30,522
20-24	112,402	46,033	66,369	57,526	19,416	38,110	54,876	26,617	28,259
25-29	182,232	55,403	126,829	134,073	31,915	102,158	48,159	23,488	24,671
30-34	161,448	50,080	111,368	119,374	29,102	90,272	42,074	20,978	21,096
35-39	131,729	41,134	90,595	97,842	23,808	74,034	33,887	17,326	16,561
40-44	106,196	34,819	71,377	72,865	17,536	55,329	33,331	17,283	16,048
45-49	81,471	29,168	52,303	48,510	12,046	36,464	32,961	17,122	15,839
50-54	60,575	20,984	39,591	33,087	6,820	26,267	27,488	14,164	13,324
55-59	35,149	12,105	23,044	15,751	3,211	12,540	19,398	8,894	10,504
60-64	16,819	6,801	10,018	4,762	1,233	3,529	12,057	5,568	6,489
65-69	9,626	4,686	4,940	1,336	458	878	8,290	4,228	4,062
70-74	7,719	4,033	3,686	666	302	364	7,053	3,731	3,322
75-79	4,435	2,299	2,136	363	179	184	4,072	2,120	1,952
80-84	2,683	1,404	1,279	184	85	99	2,499	1,319	1,180
85+	1,771	907	864	108	58	50	1,663	849	814
Total	1,234,571	466,157	768,414	666,172	184,997	481,175	568,399	281,160	287,239

- The proportion of Bahrainis in the total population decreased from 62% to 46% during the period from 2001 to 2010.The percentage of non-Bahrainis increased from 38% to 54% during the same period.

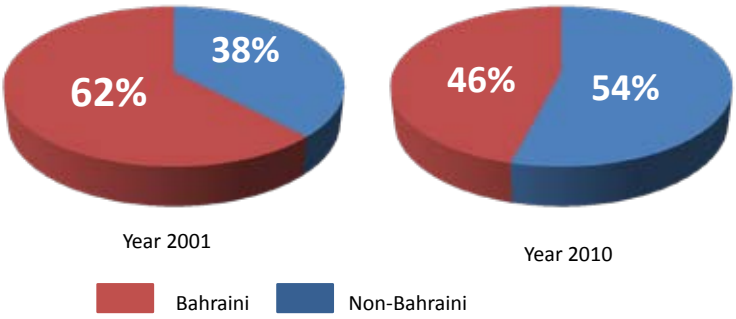


Figure 1.1 Proportion of the population by nationality

- Population in the Kingdom of Bahrain consists of two slices of inhomogeneous segments of community groups, Bahraini and non-Bahraini. Each has its own demographic, social and economic development characteristics that distinguish them from each other. The Bahraini population growth can be attributed mainly to factors of natural increase, while the net foreign workers into the country are the main source of population growth for non-Bahrainis. Average annual total population growth during the period from 2001 to 2010 for the population was 7.38%, 3.82% for Bahrainis and 11.77% for non-Bahrainis.

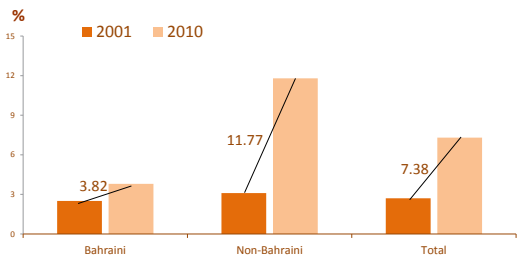


Figure 1.2: Annual Growth Rate of the Population by Nationality

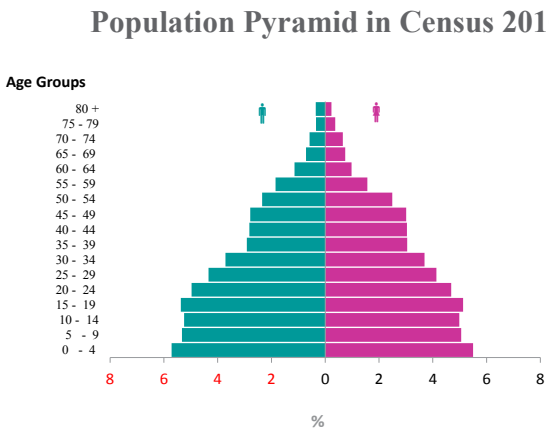


Figure 1.3: population pyramid for Bahrainis 2010

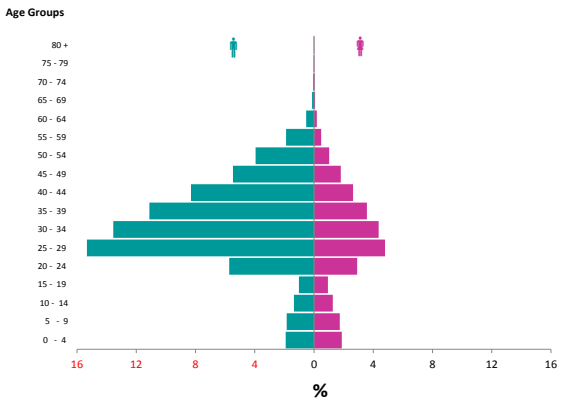


Figure 1.4: population pyramid for Bahrainis 2010

Table 1.2:Population By Nationality & Sex in Years (2001 – 2009)

Year	Total			Nationality & Sex					
				Non-Bahraini			Bahraini		
	Total	Females	Males	Total	Females	Males	Total	Females	Males
2001	661,317	274,605	386,712	251,698	71,895	179,803	409,619	202,710	206,909
2002	710,554	292,358	418,196	283,307	80,924	202,383	427,246	211,433	215,813
2003	764,519	311,619	452,900	318,888	91,087	227,800	445,632	220,532	225,100
2004	823,744	332,549	491,195	358,936	102,527	256,409	464,808	230,022	234,787
2005	888,824	355,323	533,501	404,013	115,403	288,610	484,810	239,920	244,890
2006	960,425	380,141	580,285	454,752	129,896	324,856	505,673	250,245	255,428
2007	1,039,297	407,223	632,074	511,864	146,209	365,654	527,433	261,013	266,420
2008	1,103,496	426,906	676,590	561,909	158,931	402,978	541,587	267,975	273,612
2009	1,178,415	446,418	731,997	620,404	170,418	449,986	558,011	276,000	282,110

Table 1.5: Private Sector Education (No. of Students, Teachers, schools) in years (2005/2006 -2007/2008)

Academic Year	Schools			Teachers			Students		
	Total	Females	Males	Total	Females	Males	Total	Females	Males
2005/2006	203	101	102	10,836	6,618	4,218	129,110	64,868	64,242
2006/2007	204	101	103	11,117	6,818	4,299	124,852	62,850	62,002
2007/2008	204	101	103	11,479	7,034	4,445	125,580	63,104	62,476

1.4 Releases of Concern by Major Economic Sectors

Oil, first discovered in 1931, was Bahrain's principal product for many years, but since reserves are small and are likely to be depleted by the end of the 20th century, major efforts have been made to diversify the economy and develop other sources of income. These include a large oil refinery, which processes local oil and oil piped from Saudi Arabia; a huge aluminum smelter, for which electric power is obtained from natural gas; and ancillary industries based on oil refining and aluminum smelting.

Bahrain receives a variety of subsidies from the Gulf States. It has become a major regional banking and communications center. Also important are the engineering workshops, warehousing facilities, and ship-repair facilities (including a dry dock for the repair of super tankers) related to Bahrain's position as a transportation and trade Centre for the Arabian Gulf. The airport at al-Muharraq is a major international airport, and the port of Mina Salman offers a free trade zone. A causeway linking Bahrain Island to Saudi Arabia was officially opened in 1986.

Dates and alfalfa can be grown extensively, especially on the northern shore of Bahrain Island because of the spring waters there. Rice, citrus fruits, and vegetables are also grown, although yields are low, and food must be imported.

1.5 Industrial, Agricultural, and Other Key Economic Sectors

Overview of the Industrial and Agricultural Sectors

Table 1.6: Gross Domestic Product by type of Economic Activity (BD Million) 2009

SECTOR	2008	2009
1 _ The non-Financial Corporations	6,420	5,337
Agriculture & Fishing	27	32
Agriculture	17	21
Fishing	10	11
Mining & Quarrying	2,421	1,728
Crude Petroleum & Natural Gas	2,362	1,677
Quarrying	59	51
Manufacturing	1,347	1,071
_ Electricity & Water	84	106
_ Construction	429	325
_ Trade	656	554
_ Hotels & Restaurants	163	179
Hotels	100	108
Restaurants	63	71
_ Transport and Communication	479	516
_ Social & Personal Services	257	315
Private Education Services	111	146
Private Health Services	46	57
_ Other Social & Personal Services	100	112
_ Real Estate & Business Activities	557	512
Real Estate	429	357
Business Activities	128	155
2 _ The Financial Corporations	1,678	1,557
Financial Institutions	449	487
Offshore Financial Institutions	917	745
Insurance	313	324

SECTOR	2008	2009
3 _ Government Services	914	943
Government Education Services	203	207
Government Health Services	110	114
Other Government Services	602	622
4 _ Private Non-Profit Institutions Serving Households	6	7
5 _ Households with Employed Persons	45	53
6 _ Minus Financial Intermediation Services Indirectly Measured	(833)	(715)
7_ GDP at Producer Prices	8,230	7,181
8 _ Import Duties	99	83
GDP at Purchasers' Prices	8,329	7,264

Main agricultural areas are concentrated along the western coast of Bahrain main island. Major agricultural products include, among others, date palms, vegetables and forage crops. Despite the difficulties facing agriculture in Bahrain due to soil nutrient deficiencies, scarcity of irrigation water, and the limited supply of skilled workers, agricultural production has increased because of crop intensification practices and expansion of cultivated areas. Rice, citrus fruits, and vegetables are also grown, although yields are low, and food must be imported. Due to its limited area, arable lands do not exceed 6,000 ha. Natural vegetation is degraded and mostly composed of xeric and halophytic vegetation. Main species are composed of low shrubs and few native fruit trees as well as many exotics. Permanent crop areas occupy a little bit more than 4,000 ha, which is steadily declining according to the statistical figures of 2009. The production is steady while its value is increasing. Agriculture contributes to food security and most importantly provides job opportunities for more than 3400 people.

Table 1.7: Production of Different Vegetable Crops by Area, Quantity and Value (2007/2008)

Crops	Value in 1000 BD	Production in Ton	Area in Donum
Tomatoes	1,256	4,274	783
Cabbage	212	845	261
Cauliflower	198	818	255
Lettuce	321	747	281
Carrots	83	244	85
Onions (Green)	208	846	364
Eggplants	368	1,172	235
Root Beet	...	159	67
Turnips	...	73	29
Potatoes	11	42	19
Snake Cu'mber	228	691	133
Watermelon (Red)	38	155	40
Cantaloupes	204	758	167
Okra	452	682	309
Marrow	362	1,059	222
Pumpkin	233	798	144
Other Kinds	...	3,866	2746
Total	4174	17229	6140

Table 1.8: Total Area under Vegetable Crops By Municipalities in Donums (2007-2008)

Governorate	Area
Capital	932
Muharraq	268
Northern	4,441
Central	401
Southern	98
Total	6140

1.5.1 Mining sector:

OIL

Despite its minor role as an oil producer, the country's economy depends heavily on hydrocarbon exports, mostly refined products. Petroleum production and refining account for more than 60% of Bahrain's export receipts and 70% of government revenues.

The vast majority of Bahrain's total energy consumption comes from natural gas, with the remainder supplied by oil. Hydrocarbons also provide the foundation for Bahrain's two major industries: refining and aluminum smelting.

Bahrain's proven oil reserves stood at 125 million barrels as of January 2011, according to Oil and Gas Journal, all of which are located in the Awali field. In addition to the 46,000 barrels per day produced in the Awali field, Bahrain and Saudi Arabia share the 300,000 bbl/d of oil production much of its oil in the from the offshore Abu Safah field.

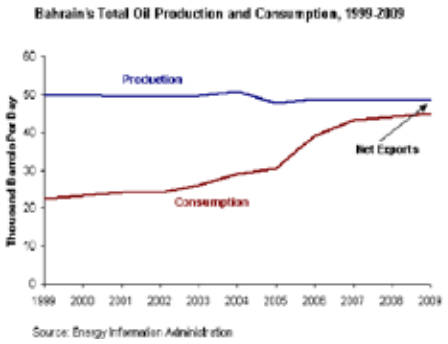


Figure 1.5: Bahrain's total oil production and consumption, 1999-2009

Unlike other Gulf States, Bahrain exports refined petroleum products rather than crude oil. Bahrain's domestic oil pipeline network is rather limited, focused primarily on delivering crude oil from the Awali field to the refinery at Sitra. Because domestic production is much lower than the country's refining capacity, Bahrain imports about 210,000 bbl/d of Arab Light crude oil from Saudi Arabia via a subsea pipeline linking the two countries. Bahrain Petroleum Company (BAPCO) refines this crude oil and exports much of it via tanker. Most of Bahrain's exports go to India and other Asian markets. Joint Bahrain-Saudi Arabian crude oil production from the offshore Abu Safah field is sold from the Ras Tanura terminal in Saudi Arabia, the world's largest export terminal.

Bahrain's production has remained relatively stable over the last decade, while domestic consumption surged, resulting in decreased exports, particularly since 2005, as shown in Figure 1.5. As Bahrain's economy diversifies and energy consumption grows in petrochemical and aluminium production, exports likely will continue to decrease. Exports from Bahrain fell from 27,000 bbl/d in 2005 to 3,000 bbl/d in 2009.

In 2010, Bahrain produced an estimated 46,000 bbl/d of total oil liquids, of which 35,000 bbl/d was crude oil. This amount excludes joint production from the Abu Safah field, of which Bahrain's share is about 150,000 bbl/d. During 2010, Bahrain consumed an estimated 45,000 bbl/d of oil.

Bahrain is one of the oldest oil-producing countries in the Persian Gulf. Current crude oil production is entirely from the Awali field and is well below the country's peak production of 75,000 bbl/d in the 1970s. To help offset continuing declines in oil output, BAPCO announced that it will drill numerous new wells at the Awali field in 2011. In October 2009, BAPCO formed a joint operating company with Occidental, Tatweer Petroleum Company, which has commenced drilling for oil in 2010 in the Awali field.

Bahrain's oil sector is dominated by the State-owned Bahrain Petroleum Company (BAPCO), which is charged with the exploration, production, refining, marketing, and distribution of Bahraini oil for domestic use and the international market. The National Oil and Gas Authority (NOGA) is the primary body with regulatory and oversight authority as well as policy-making functions for the oil sector. A NOGA holding company administers the government's stakes in various energy companies, including the government's 100% stake in BAPCO, 75 percent in Bahrain National Gas Company (BANAGAS), 60 percent stake in Bahrain Aviation Fuel Company (BAFCO) (the aviation fuel company) and its one-third share of Gulf Petrochemical Industries Company (GPIC).

Bahrain has 262,000 bbl/d of refining capacity at the BAPCO-owned Sitra facility, according to Oil and Gas Journal. Plans for the expansion of the Refinery include laying new pipelines to import crude from Saudi Arabia and increasing refining capacity at the facility. About one-sixth of the crude used by the refinery originates from the Bahrain oilfield and the rest is pumped from Saudi Arabia via a 33-mile pipeline. This ageing pipeline will be decommissioned after the construction of the "New Arabia" pipeline, a 71-mile, 350,000-450,000-bbl/d capacity feed running between Saudi Arabia's Abqaiq oil processing center and Bahrain's refinery at Sitra.

NATURAL GAS

Bahrain's proven natural gas reserves stood at 3.25 trillion cubic feet (Tcf) as of January 2011, according to Oil and Gas Journal, much of it associated gas from the Awali oil field. In 2009, the country produced and consumed 444 billion cubic feet (Bcf) of natural gas. Figure 1.6.

The Bahrain National Gas Company (BANAGAS) was established in 1979 to capture associated natural gas at the Awali oilfield that had previously been flared. Bahrain formed BANAGAS to process associated gas into marketable products and supply residual gas for local industrial use. BANAGAS is three-quarters state-owned, with the remainder owned by the Arab Petroleum Investment Corporation (APIC) and Caltex Bahrain (Chevron) at 12.5 percent each.

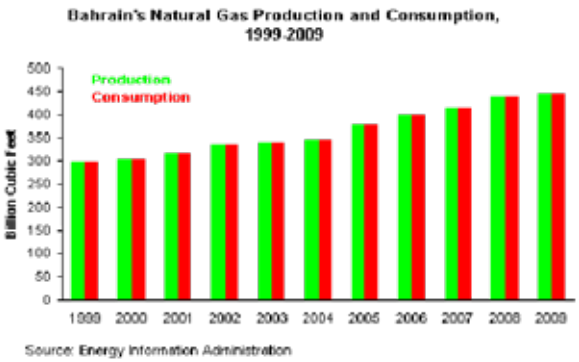


Figure 1.6: Bahrain's natural gas production and consumption, 1999-2009

Bahrain consumes all of its natural gas production domestically in power plants, enhanced oil recovery (EOR) projects, or in heavy industry, where natural gas is used as a feedstock. The largest domestic consumer of natural gas is Aluminum Bahrain (ALBA), which is one of the largest aluminum smelters in the world. ALBA also operates a large natural gas-fired power plant. BANAGAS operates a two-train gas processing plant, which has the capacity to process 300 million cubic feet of gas per day. The processing plant extracts propane, butane and naphtha from associated gas (from oil wells) at the plant. Liquefied propane and butane are

transferred to refrigerated form. Storage tanks located at the Sitra port for ship loading, while naphtha is sent to the Bahrain Petroleum Refinery (BAPCO) for storage and subsequent export.

Natural gas demand in Bahrain has grown rapidly in recent years and is expected to continue to do so in the coming years as a result of greater natural gas requirements for power plants and energy-intense domestic industry. To help meet rising demand, NOGA is leading an effort to increase the country's natural gas supply. Over the last five years, annual production has grown by an average of 5 percent, however Bahrain will need to increase its natural gas production more significantly to keep up with the rising demand. In the interim, the Government is seeking out supply agreements with neighboring countries.

1.5.2 Water sector:

The demand for water during the period 2004-2005 continued at a challenging rate reaching a peak of 105 MIGD. To meet the high demand, the Electricity and Water Authority undertook key steps to increase the water production levels as well as to expand the water transmission and distribution networks. Works on the rehabilitation of Ras Abu Jarjur RO plant was completed during this period; its production level was increased by 4 MIGD, achieving a total plant production of 16 MIGD.

New water wells were also constructed and new submersible pumps were installed at a depth of 60 meters to increase the ground water abstraction to the station. Furthermore, a process to restore the ground water wells in Muharraq (A) station, which had been decommissioned in July 2001, was awarded to a German company specialized in this field. In addition to the above works rehabilitation and reuse of ground water wells at Hamala Station was started.

To increase the production of Al Ddur RO Plant to 10 MIGD a contract was signed with a consultant to carry out the necessary studies and design. The country's water transmission network is also witnessing huge expansion work to cater for the increase in the water production from al Hid power company, which will add extra 60 MIGD of potable water, achieving a total production of 90 MIGD.

Table 1.8: Water Production Comparison between 2007 & 2009

Station	Water Production (Million Imperial Gallon)	
	2008	2009
AL-Hidd Power Company	22369.87	30222.09
Sitra Power and Water Station	7857.01	5540.32
Ras Abu Jarjur R.O. Desalination Plant & Addor R.O	7401.41	6989.46
ALBA	2092.25	1876.36
Ground Water	6273.11	3925.68
Total	43181.29	47711.84

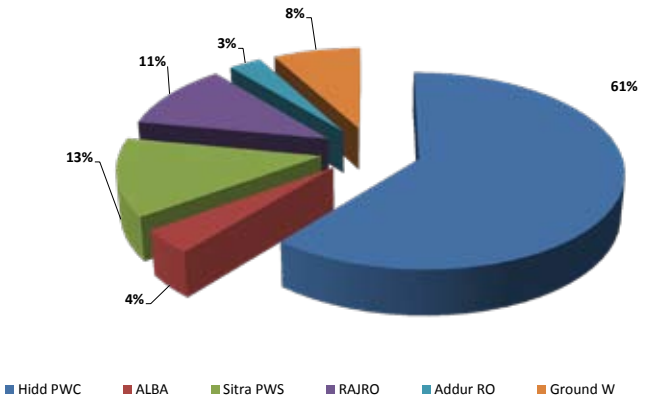


Figure 1.7: Daily water production 14 Dec 2011

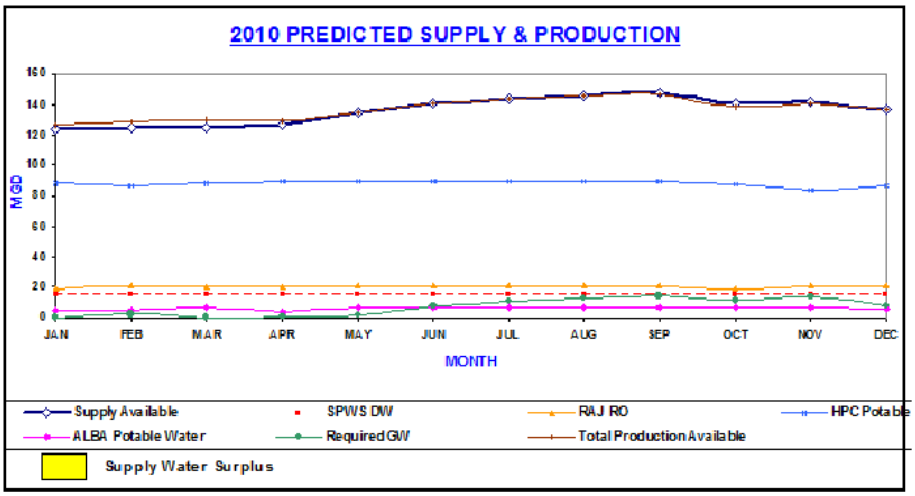


Figure 1.8: The predicted supply and production for 2010

Table 1.9: List of governmental distillation plants manufacture the drinking water

#	Name of plant	Capacity/day
1	Addur	4.5 million gallons
2	Abu jarjoor	16.5million gallons
3	Sitra power station	18 million gallons

Assessments for waste:

The waste water contains a high level of total dissolve salt (TDS) and traces of chemicals used to treat the water during the distillation process, such as anti-scale, anti-foaming, sodium sulphite, nitrate and chlorine.

Table 1.10:List of non government plants manufacture the drinking water

#	Name of plant	Capacity/day
1	Hid water plant	80 million day
2	ALBA plant water	4.5 million gallons

Assessments for waste:

Although the waste water consist a high level of total dissolve salt (TDS) and traces of chemicals used to treat the water during the distillation process as anti scale, anti foaming , sodium sulphite, nitrate and chlorine.

1.6 Assessment

Fast industrialization in the past decades, especially in the field of energy-intensive industries, has had significant impacts on the environment. The primary source of energy used in the country is combustion of natural gas and mineral-oil-based fuels. Bahrain hosts one of the largest aluminium plants in the world with a production capacity of over 850,000 tones per year; the largest iron plant produces 4 million tones of iron ore pellets annually and there are more and more industries moving to Bahrain due to the enabling financial and economic environment. These industries on the other hand release increasing amounts of CO2, other green-house gases, POPs and other pollutants. The challenges for the Government are to maintain this economic growth in an environmentally sound manner.

Bahrain is receiving significant amount of various types of chemicals from different parts of the world. These chemicals are imported as pesticides, cleaning materials, pharmaceutical drugs, and food additives and in many other forms. Most of the time, these chemicals enter the country without proper control on the importation and handling, due to the fact that in many cases countries of origin export the chemicals with a lack of information on chemical composition, toxicity, etc. This of course makes the management of chemicals difficult, and has harmful effects on the handlers, environment, and public health. Due to limited capabilities, at present, only a voluntary co-ordination system for licensing of industrial projects and commercial activities is in place, covering the importation, use, production, storage and disposal of chemicals.

CHAPTER 2

Chemical Production, Import, Export, Storage, Transport, Use and Disposal

Purpose of the chapter

To provide basic information about the existence of chemicals, through production and import, as well as concerning the storage, transport, use, export, and disposal of chemicals. This chapter also includes information on the handling of chemical waste in the country.

2.1 Background

Existing regulatory schemes and processes for assessing new chemicals

Registration of banned and restricted chemical substances are regulated by Resolution Number (7) of the year 2002 relating to the control of the import and the use of banned chemicals and substances subject to limitations.

Banned chemicals and restricted chemicals can be any gas, liquid or solid substance on the list attached to the resolution. These chemicals according to the regional and international organizations or researches, studies and references have proved to be highly dangerous to humans, animals, and plants. They may also badly affect the environment either due to their toxicity, explosiveness, inflammability or corrosiveness. They may alone or with other substances have hazardous effects on public health or the environment.

Banned chemicals are substances whose import, use and production are not allowed within the territory of the Kingdom. Restricted chemicals are substances that can be used for a specific activity only. Their use is not allowed for any other purpose than for the specific use stipulated in the regulations issued by the Supreme Council for Environment with the consent of the official bodies.

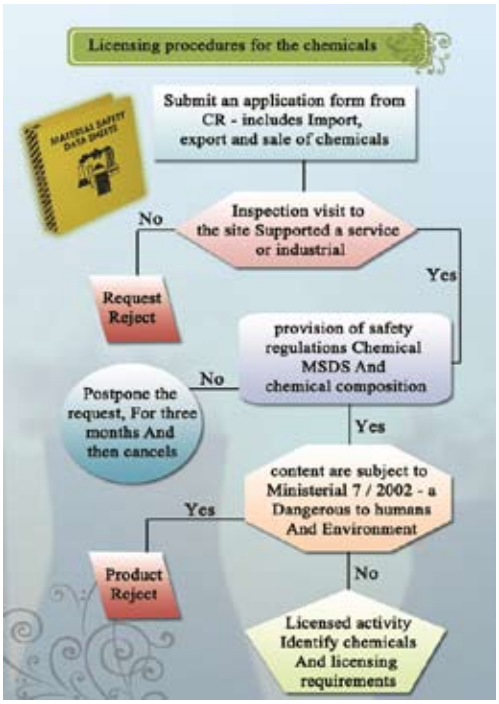


Figure 2.1: Licensing procedures for chemicals

The procedure for licensing chemicals in shown in Figure 2.1. Three types of permissions are granted by the Chemical Safety Group (CSG). These are as follow: import, export or selling chemicals and chemical products, asbestos removal, import, export and selling of ozone depleting substances and their alternatives. Only registered importers of chemicals are allowed to import, use and sell chemicals to local users. Agricultural chemicals, pesticides, detergents and cosmetics are excluded from this procedure. The CSG permits users and importers of chemicals based on Ministerial Order 5 of 2005. The conditions are a) the chemical activity should be permitted in the services or industrial areas and b) the location or activity should be at least 60 meters away in all directions from residential areas.

Through Ministerial Order 7 of 2002, Material Safety Data Sheets (MSDS) of chemicals and chemicals products need to be submitted to the CSG.

The current list of banned and restricted chemicals was prepared by the Environmental Control Directorate. This list was chosen from PIC Decision Guidance Documents. For this list of chemicals, data on their toxicity, carcinogenicity, resistance to degradation, and uses were determined from the IRPTC Computer software, which had been provided by UNEP/ROWA. Among these chemicals, 44 materials have been added to the national list of banned and restricted chemicals, including the 12 initial POPs.

2.2 Chemical Production, Import and Export

The purpose of Table 2.1 is to get an understanding of the extent, and nature, of chemical production, import, export and use in the country.

Table 2.1: Chemical Production and Trade

Type of Chemical	Production/ manufacturing (Unit/Yr.)	Imports (Kg/Yr.)	Formulation/ Packaging (Unit/Yr.)	Exports (Kg/Yr.)
Pesticides • **Agricultural** *For 2010*	- -	715Kg 4600L	- -	- -
• **public health** *For 2010*	- -	12520 Kg 2161L	- -	- -
• **consumer use***		-	- -	-
Fertilizers • **Agricultural** *For 2007* *For 2009* *For 2010*	- -	1,728 Ton 13739L, 44Ton 25Ton	- -	- -
Petroleum Products *For* 2009 statistic	95,597,896	- -	- -	81,344,236 -
Industrial (use in mfg. / processing facilities) 2010	-	23150414177	-	97606595
Consumer Chemicals Cosmetics 2010 Cosmetics (Nov. 2011)	- -	- 3559 pieces 6251 pieces	- -	- -
Drugs* (2010)	- -	- -	- -	- -
Explosives 2009 2010	- -	1149 kg 515 kg	- -	- -

* data is not available or scattered; this gap will be mentioned in Chapter 13.

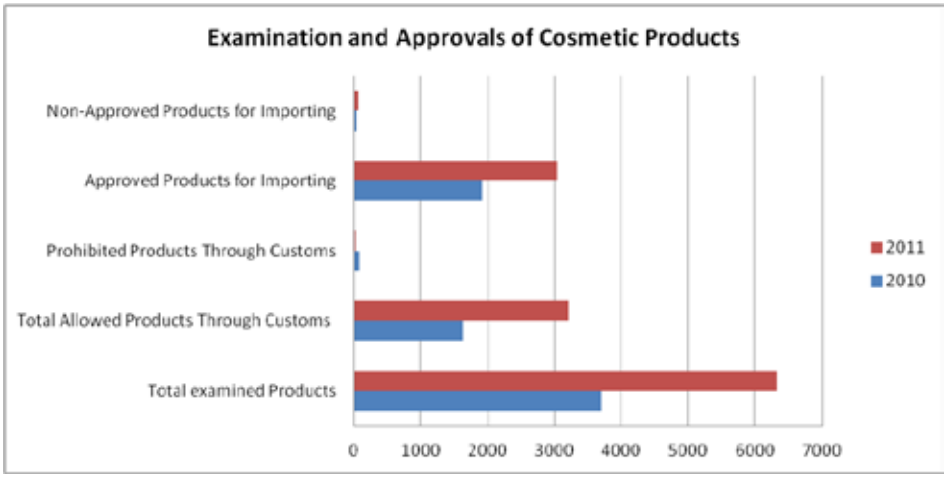


Figure 2.2: Examination and approvals of cosmetic products

Table 2.2: Exporting and Importing Countries

Type of chemical	Exporting Countries	Importing Countries
Pesticides	India	France, Switzerland, UK, Germany Egypt, Jordan, KSA, China,
Fertilizers	NA	Holland, KSA, UK, Australia
Petroleum Products	NA	NA
Industrial Chemical *	China, India, Italy, UK, KAS, France, US,UAE, Syria, Kuwait, Egypt, Germany, Korea, Japan , Iran, Iraq…..etc*	NA
Consumer	NA	NA

* Foreign Trade Statistics for 2010

2.2.1 Chemical Use by Categories

Table 2.3: Chemical Use by Categories

Type of Chemical	# of Tons used per year in the country
Pesticides - Agricultural	2009: (8564L -4358 Kg) 2010: (7584.4L- 3046 Kg)
- Public Health	Cal. as average from Annex A-P1 :38442 kg-2628L
- Consumer use	Represented as list of pesticide companies Annex A-P3
Fertilizers	2,987.75 (as An average from Annex B)
Petroleum Products	2009 statistic: 9065459 2009: 9067 (Qty in 000 US Barrels)
Industrial Chemicals	NA
Consumer Chemicals	NA
Drugs	NA
Explosive	NA

NA: Not Available

T able 2.4: Pesticides Consumed by Ministry of Health

Type	2008		2007		2006		2005		2004	
	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)
Insecticides	12948	2603	12,904	2,336	13,061	1,857	11,112	2,620	310	3,002
Rodenticide	10283	125	29,868	50	30,200	26	32,524	211	39,000	310
Total	23231	2728	42772	2386	43261	1883	43636	2831	39310	3312

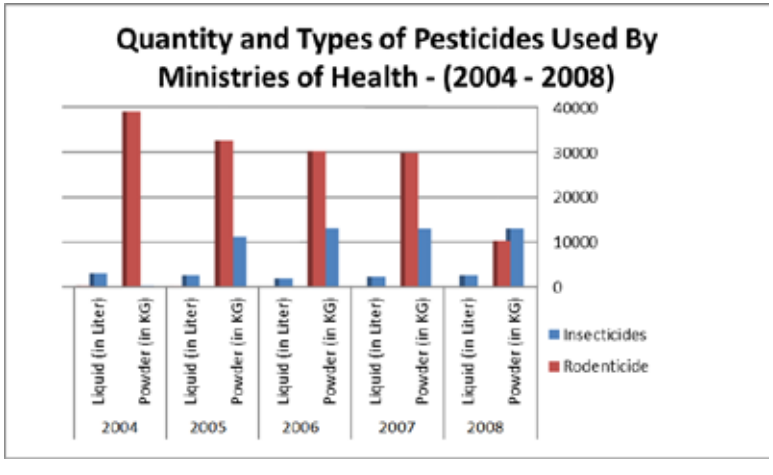


Figure 2.3:Quantity and types of pesticides used by ministries of health (2004-2008)

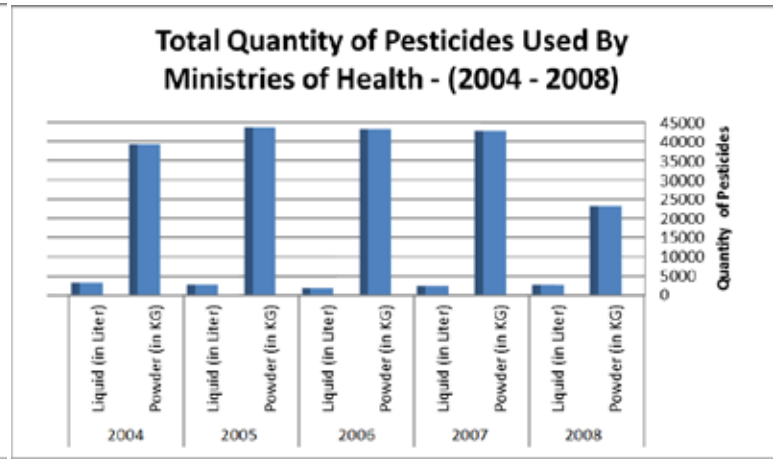


Figure 2.4:Total Quantity and types of pesticides used by ministries of health (2004-2008)

Table 2.5: Pesticides Consumed by Agriculture

Quantities of Pesticides Consumed by Agriculture	2009		2008		2007		2006		2005		2004		2003		2002	
	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)	Powder (KG)	Liquid (L)
1. Insecticide	1230	6901	1451	4548	2435	5785	3216	8867	1506	7415	1565	6580	1719	3894	1485	6323
2. Fungicide, Bactericide & Trace Elements	739	154	1016	167	1013	149	1000	245	780	154	967	17	1363	79	948	201
3. Acaricide, Adhesives Wetting Agents Molluscide & Rodenticide	528	330	754	677	1355	812	1388	511	1388	514	809	455	1001	321	719	189
4. Herbicide & Nematocide	1223	1515	1614	220	886	2,755.00	832	1228	832	1553	164	1758	555	704	223	802
Total	3720	8900	4835	5612	5689	9501	6436	10851	4506	9636	3505	8810	4638	4998	3375	7515

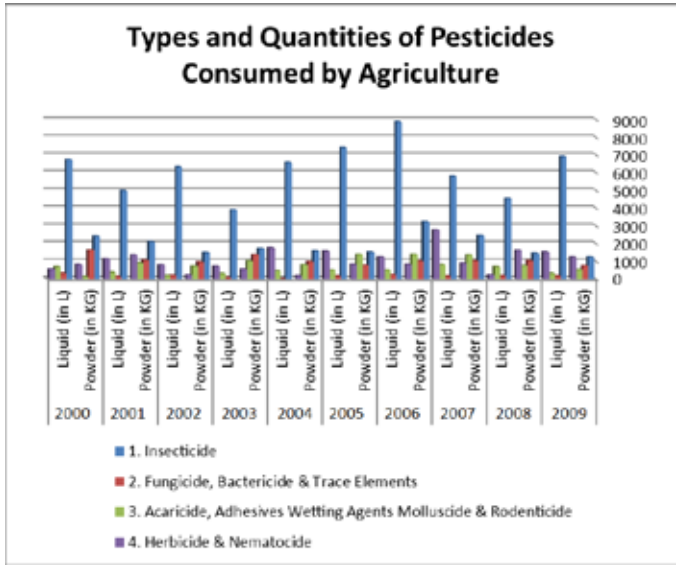


Figure 2.5:Quantity and types of pesticides used by Agriculture (2004-2008)

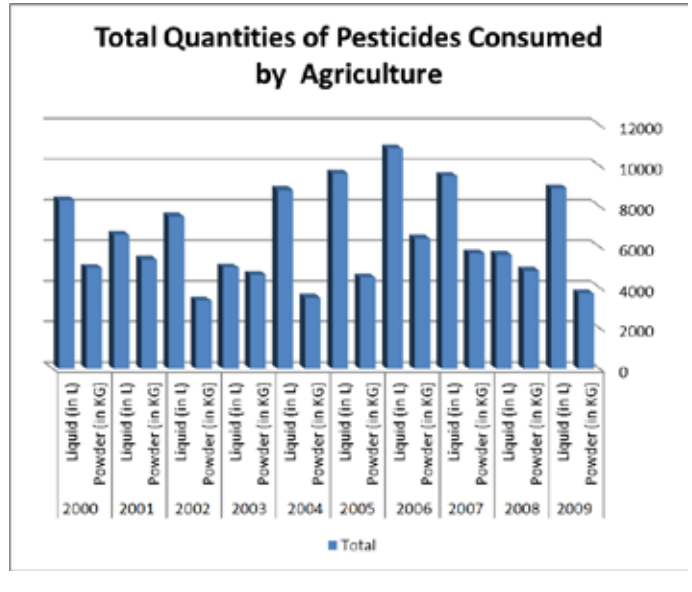


Figure 2.6:Total Quantity and types of pesticides used by Agriculture (2004-2008)

Table 2.6: Quantities of Fertilizer Consumed by Agriculture & Ministry of Health

Quantities of Fertilizers Used in Agriculture Sector (in Ton)	2007	2006	2005	2004	2003	2002	2001	2000	Total from 2000-2007	Avg from 2000-2007
- Nitrophoska 15-15-15%	885	1,516.00	1,334.00	666	835	798	816	761	7611	951.375
- Urea 46%	832	4,441.00	4,577	5,251.00	270.5	268	272	264.5	16176	2022
- Superphosphate P2 05 16%	11	50	…	…	26	14	5	9	115	14.375
Total	1,728.00	6,007.00	5,911.00	5,917.00	1,131.50	1,080.00	1,093.00	1,034.50	23,902.00	2,987.75

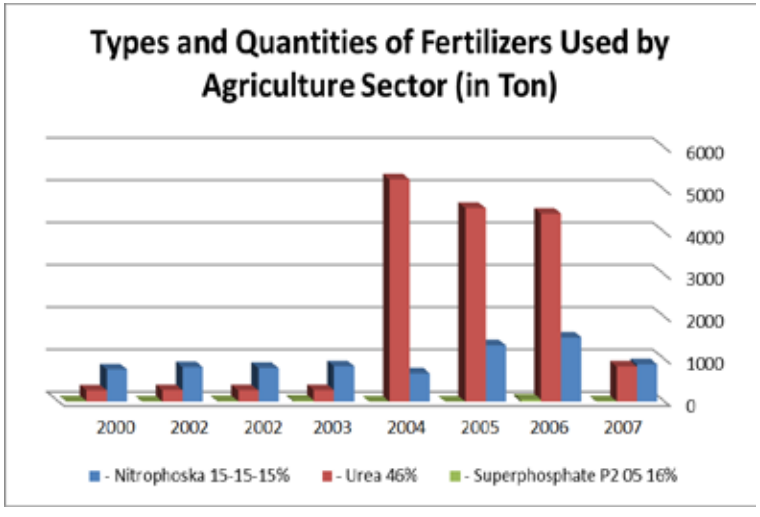


Figure 2.7: Types and Quantity of Fertilizer used by Agriculture Sector

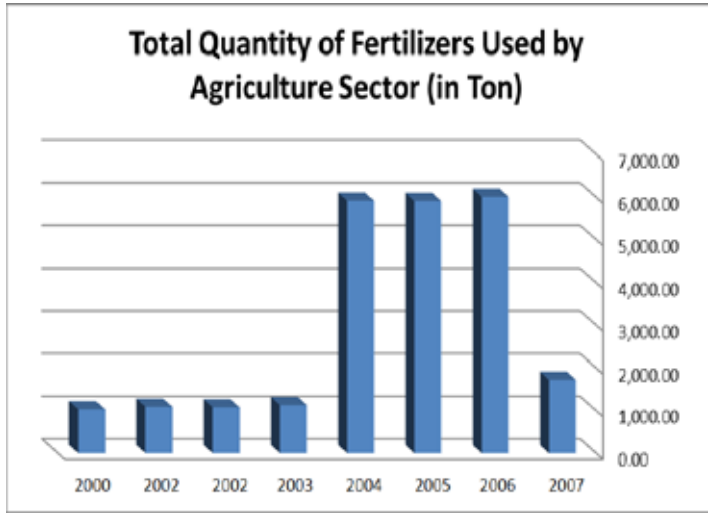


Figure 2.8:Total Quantity of Fertilizer used by Agriculture Sector

Table 2.7: Part of industrial statistic from 2000-2009

	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
Annual Production of Crude Oil	11,750	12,027	12,552	13,085	13,347	13,647	13,720	13,800	13,656	13,732
Crude Oil Runs to refinery - Bahraini Oil	11,868	11,913	12,557	13,085	13,352	13,625	13,715	13,905	13,637	13,817
- Saudi Oil (Imported)	81,524	82,299	82,605	81,344	83,877	79,432	79,179	76,887	74,031	80,296
Processed Oil	95,598	94,212	95,163	94,429	97,229	92,669	92,350	91,122	87,765	93,737
Petroleum Products in Refinery Factory (Qty in 000)	72,325	96,367	97,904	96,218	97,716	92,670	92,349	91,121	87,766	98,106
Petroleum Products Marketed Locally (Qty in 000 US Barrels)	9,067	9,060	8,328	7,629	11,780	10,563	9,619	8,695	7,882	7,477
Exported Petroleum Products Locally (Qty in 000)	81,344	81,594	86,904	83,446	90,950	89,993	89,186	89,765	87,663	90,964
Value of Exported Oil (in 000 US $)	5,370,130	8,636,188	7,106,323	5,923,706	5,066,865	3,450,058	2,631,077	1,763,289	2,021,739	2,406,588
Value of Imported Crude Oil (in 000 US $)	5,147,361	7,895,912	5,756,336	5,088,456	4,219,780	2,742,295	2,192,921	1,868,088	1,696,655	1,999,331

Petrochemical Industry Statistics	**2009**	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**
Petrochemical Products by Type (Qty in Metric Ton)	1,534,349	1,545,488	1,373,224	1,481,896	1,337,817	1,286,907	1,316,515	1,495,902	1,477,464	1,332,631

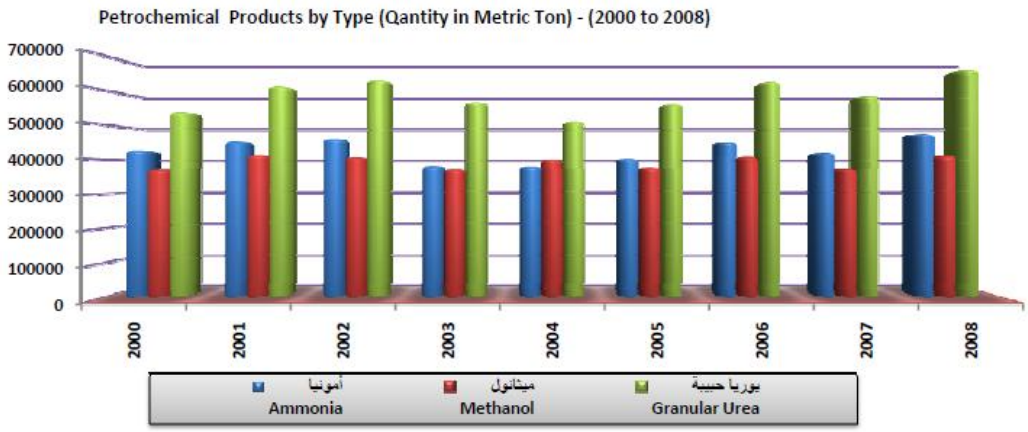


Figure 2.9:Petrochemical Products by types (2000-20008)

Table 2.8: List of countries exporting to the Kingdom of Bahrain (chemical industry products), 2010

Country	Import Value (BD)	Import Weight (kg)
AFGHANISTAN	1266.528	2500
ALGERIA	5593.616	9392
ARGENTINA	107116.977	38459.12
AUSTRALIA	137380456.5	491275614.8
AUSTRIA	585757.688	136098.87
BAHRAIN	7481.159	3767
BANGLADESH	3411.566	2315.83
BELGIUM	4784946.983	1303687.733
BONDED AREAS	51267	30910
BRAZIL	7176351.015	50282476.73
BULGARIA	13311.168	359.4
BURMA	3340	3290
CANADA	1447764.442	738117.834
CHAD	221.668	10
CHILE	210.72	27
CHINA	25770375.33	31287186.29
COLOMBIA	5320.93	1180
COSTA RICA	8223.778	149.564
CUBA	88	100
CYPRUS	642819.212	48852
CZECH REPUBLIC	90532.968	27810.991
DENMARK	3843608.717	1374087.959
DOMINICA	258.596	12
DOMINICAN REPUBLIC	13783.321	608.7
ECUADOR	5450.08	738
EGYPT	1166223.389	44964556.37
ESTONIA	130.549	32

Country	Import Value (BD)	Import Weight (kg)
FINLAND	286078.122	36749.446
FRANCE	17272294.44	3303869.208
GERMANY	21812100.66	37619306.94
GREECE	163607.003	70447.158
HONG KONG	58114.512	20747.4
HUNGARY	79126.094	35984.8
ICELAND	21882.088	4596
INDIA	16994415.5	380979513
INDONESIA	1043515.35	1256935
IRAN	467507.25	4403537.4
IRAQ	1516	20000
IRELAND	5611303.062	196910.75
IRISH REPUBLIC	14234	827
ITALY	10128323.34	10832990.18
JAPAN	2937847.822	612010.964
JORDAN	3449572.932	2636369.654
KENYA	158.447	13.28
KIRIBATI	522.674	37
KOREA	439619.518	328518.05
KUWAIT	817672.469	2517863
LATVIA	20938.476	19231
LEBANON	418903.09	532071.615
MACAO	4509.721	237
MALAWI	3491.974	540
MALAYSIA	524521.51	684819.442
MALTA	65273.512	59401.06
MEXICO	976131.876	2011154.109
MONACO	33513.151	1132
MOROCCO	10339.579	36209
NETHERLANDS	4864287.763	1934424.752
NETHERLANDS ANTILLES	6252.795	7740
NEW ZEALAND	134772.289	23713.04
NIGERIA	2312.058	1477
NORWAY	118275.661	36045.36
OMAN	2220270.324	3033235.82
OTHER COUNTRIES	4633	1276
PAKISTAN	131578.441	501480
PALAU	48.54	299
PARAGUAY	142.62	15
PHILIPPINES	179689.454	146262.33
POLAND	725818.715	879865.436
PORTUGAL	126718.105	52449.103
PUERTO RICO	44683.676	2132
QATAR	90659.489	263835.71
ROMANIA	134.928	147
RUSSIAN FEDERATION	33852.131	31153.808
SAUDI ARABIA	21395898.13	111519716.5

Country	Import Value (BD)	Import Weight (kg)
SINGAPORE	731895.357	457560.277
SLOVAKIA	23840.563	7286
SLOVENIA	4797.099	1026
SOUTH AFRICA	2416295.506	21920849225
SOUTH KOREA	28425	39346
SPAIN	4908767.786	946306.675
SRI LANKA	20933.961	39634.6
SWEDEN	1775221.921	751066.014
SWITZERLAND	10016461.13	294976.89
SYRIA	163379.088	277350.2
TAIWAN	209592.687	246988.42
TANZANIA	1083.889	5
THAILAND	1076961.225	522818.281
TUNISIA	777729.206	1537923
TURKEY	1088188.924	1226449.948
UKRAINE	31068.872	21179
UNITED ARAB EMIRATES	18920408.58	25191305.67
UNITED KINGDOM	17072153.7	4895700.193
UNITED STATES OF AMERICA	19853765.74	4911254.365
VIETNAM	14199.504	6320.5
YEMEN	7309.918	825
TOTAL	**375,994,854**	**23150414177**

Table 2.9: List of countries importing from the Kingdom of Bahrain (chemical industry products), 2010

Country	Export Value (BD)	Export Weight (kg)
ARMENIA	48595	1370
AZERBAIJAN	55561	1178
BAHRAIN	51267	30910
BANGLADESH	4584	6900
CHINA	533	460
Duty Free Airport	178439	14695
Duty Free Seaport	1729	740
EGYPT	1613	33
GERMANY	2030	3877
INDIA	2948505	26405440
IRAN	20397	77975
JAPAN	20763	500000
JORDAN	4620	1394
KUWAIT	1940547	7610048
MALDIVES	9060	14000
NETHERLANDS	18490	1284
NIGERIA	21442	60000
NORWAY	12217	7466
OMAN	1166242	1818001
PAKISTAN	55054	144612
PHILIPPINES	30819	3317

Country	Export Value (BD)	Export Weight (kg)
QATAR	3509364	14652634
REPUBLIC OF YEMEN	61541	192674
ROMANIA	20476	16000
SAUDI ARABIA	6157057	10803569
SINGAPORE	88644	281900
SYRIA	23854	4686
THAILAND	2412624	22016000
TURKEY	33848	48000
UKRAINE	10313	160
UNITED ARAB EMIRATES	4363825	12887272
Grand Total	**23,274,053**	**97606595**

Table 2.10: Examples of some chemical industry products exported from and imported to Bahrain in 2010

COMMODITY	Import value (BD)	Import Weight (KG)	Export value	Export Weight (KG)
FLUORINE, CHLORINE, BROMINE AND IODINE.	3,960,439	36,634,670	7,473,710	46,169,652
ACYCLIC HYDROCARBONS.	1,045,857	3,398,992	11,361	33,735
GLANDS AND OTHER ORGANS FOR ORGANOTHERAPEUTIC USES, DRIED, WHOTHER OR NOT POWD- ERED; EXTRACTS OF GIANDS OR OTHER ORGANS OR OF THEIR SECRETIONS FOR ORGANO-THE- RAPEUTIC USES; PREPARED FOR THERAPEUTIC OR PROPHYLACTIC USES.	2,990,866	622,947	24,315	7,876
ANIMAL OR VEGETABLE FERTILLSERS, WHETHER OR NOT MIXED TOGETHER OR CHEMICALLY TREATED; FERTILISERS PRODUCED BY THE MIXING OR CHEMICAL TREATMENT OF ANIMAL OR VEGETABLE PRODUCTS.	1,243,953	7,534,955	2,409,000	22,000,000
TANNING EXTRACTS OF VEGETABLE ORIGIN; TANNINS AND THEIR SALTS, ETHERS, ESTERS AND OTHER DERIVATIVES.	9,984,031	11,418,750	93,958	138,777
ESSENTIAL OILS (TERPENELESS OR NOT), INCLUDING CONCRETES AND ABSOLUTES; RESINOI IDS; EXTRACTED OLEORESINS; CONCENTRATES OF ESSENTIAL OILS IN FATS, IN FIXED OIL IN WAXES OR THE LIKE.	6,741,809	1,559,787	8,076,522	1,193,853

COMMODITY	Import value (BD)	Import Weight (KG)	Export value	Export Weight (KG)
SOAP; ORGANIC SURFACE-ACTIVE PRODUCTS AND PREPARATIONS FOR USE AS SOAP, IN THE FORM OF BARS, CAKES, MOULDED PIECES OR SHAPES, WHETHER OR NOT CONTAINING SOAP.	12,877,590	19,176,661	183,784	657,487
CASEIN, CASEINATES AND OTHER CASEIN DERIVATIVES; CASEIN GLUES.	664,698	3,120,400		
PROPELLENT POWDERS.	349,984	45,176		
PHOTOGRAPHIC PLATES AND FILM IN THE FLAT, SENSITISED, UNEXPOSED, OF ANY MATERIA OTHER THAN PAPER, PAPERBOARD OR TEXILES; INSTANT PRINT TILM IN THE FLAT, SENSI- TISED, UNIXPOSED, WHETHER OR NOT IN PACKS.	2,253,552	475,874		
ARTIFICIAL GRAPHITE; COLLEIDAL OR SEMICLOOLIDAL GRAPHITE; PREPARATIONS BASED ON GRAPHITE OR OTHER CARBON IN THE FORM OF PASTES, BLOCKS, PLATES OR OTHER SEMI- MANUFACTURES.	22,423,155	21,984,474,508		
TOTAL	**64,535,933**	**22,068,462,720**	**18,272,650**	**70,201,380**

2.3 Storage of Chemicals and Related Issues

2.3.1 Storage of Pesticides

Storage locations of pesticides are checked upon each registration request. Generally, the locations are appropriate and comply with the law.

Obsolete pesticides and empty containers are generally landfilled in the hazardous waste landfill site or exported. The use of chemicals requires proper personal protective equipment (PPE) to protect the user from harm of chemical dangers such as spills. The basic protective clothing including water and acid proof coats, acid proof sole boots, gloves, masks and goggles are provided for the sprayers. The knowledge of the importance of proper protective clothing is high. Employees are receiving regular training and their activities are continuously supervised. Trainings are also provided for farmers on integrated pest management (IPM) and the use of PPE

The level of knowledge on POPs pesticides is still very low. During the oral interviews, it was observed that most of the farmers and industry personnel did not know much about POPs.

2.3.2 Storage of Chemicals

According to Ministerial Order Number (4) of the year 2006 with respect to the Management of Hazardous Chemicals, "a licensed party shall not establish, expand, change, build or remove any part of a licensed warehouse, unless a written approval is obtained from the General Directorate for the Protection of the Environment and Wildlife in agreement and coordination with the other relevant authorities", and Appendix 1 lays down the conditions of storage.

Table 2.11: Bulk Chemical Storage and Warehousing Facilities

Chemical Type		Size/Capacity (Volume in cubic meters or weight in tons)	Type of Facility	Location Area (Port, Industrial Complex, Urban, Rural)	Labeling; Health and Environment Protection Measures
Pesticides	**Public Health Directorate**	Store1: 4mx10mx3m = 120m^3 Store2: 4mx5mx3m= 60m^3 Store3:10mx9mx3m= 270m^3	Closed Stores, have ventilation, No A/C	Tobly Environmental Health Centre	Board on the door (Pesticides Store)
	Consumer use	40 cubic meter	completely enclosed with precast, sealed, fire, air & water resistance	Urban	Health and environment protected
		Approx 100 cubic meters storage capacity.	Completely enclosed, bounded.	Industrial complex.	Manufacturers labeling. No special precautions required.
		Flat storage area,1000sqmeter Storage on pallets	One and partly covered warehouse, area sufficient space given the pallets	Sitra	As per local regulations
Fertilizers		Ammonia 40.0 Tons	In double integrity storage tank	Industrial Complex	Labeling Provided
		Urea	In bulk storage	Industrial	Labeling

Chemical Type	Size/Capacity (Volume in cubic meters or weight in tons)	Type of Facility	Location Area (Port, Industrial Complex, Urban, Rural)	Labeling; Health and Environment Protection Measures
	100.0 Tons	silos	Complex	Provided
Petroleum Products	See the Annex			
Petrochemical Products	Methanol 40 tons	In storage tank	Industrial Complex	Labeling Provided
Industrial Chemicals (used in manufacturing/ processing facilities) **(Public health)**	165	Close store , good ventilation by central A/C	(2 stores for drugs and chemical) at public health laboratory Building in the corner and the middle close to emergency door	Chemical store board on the door
Consumer Chemicals*				
Chemical Waste	Chemical waste is treated or disposed	Incinerator landfill	Alba industrial area	
Other Chemicals (unknown/mixed use) (Environment)	Liquids – Organic Solvents :9.60 m^3 Liquids – Acids & Bases :5.15 m^3 Solids :15.05 m^3	Completely enclosed	Urban	Health and Environment Protected

* information was requested, but was not received or not available.

Table 2.12: Supply Chain for Bulk Chemical Distribution and Transportation

Chemical Type		Type of Transportation Facility: Maritime, Inland waterway, Rail, Road, Air	Approximate Capacity (Volume in cubic meters or weight in tons transported by year)	Labeling; Health and Environment Protection Measures
Pesticides	**Agricultural**	NA		
	Public health	Ordinary car, not special	0.45 TONS	NO, MINISTRY PICKUP CAR USE
		Six wheel, all sides covered only back side opened	188850 Kg	No, Ministry of Health six wheel use
	Consumer use	Company 1: Road ------ Company 2: Imported via maritime, air or road. Transported within Bahrain by road. ------ Company 3: Maritime (sea Freight)	4tons ------ Approx 45 cubic meters per annum. ------- Approx. 15 tons	Health and environment protected ------- Manufacturers labeling. No special precautions required ----- As per Local regulations
Fertilizers		Ammonia Export by Maritime	Export during 2011= 71,536 Tons	Labeling provided
		Urea Export by Maritime	Export during 2011= 663,747 Tons	Labeling provided
Petroleum Products*				
Petrochemical Products		Export by Maritime	Export during 2011= 435,286 Tons	Labeling provided
Industrial Chemicals		Refer to Annex 2 & 3		

Chemical Type	Type of Transportation Facility: Maritime, Inland waterway, Rail, Road, Air	Approximate Capacity (Volume in cubic meters or weight in tons transported by year)	Labeling; Health and Environment Protection Measures
(used in manufacturing/ processing facilities)			
Consumer Chemicals*			
Chemical Waste	Road	Refer to section 2.5	-
Other Chemicals* (unknown/mixed use)			

* information was requested, but was not received or was not available.

Table 2.13: Chemical Waste Generation and Trade

Type of Chemical Waste*	Generation (tons/year)	Export (tons/year)	Import (tons/year)
For Public health: METHANOL, ACETONITRILE AND BUFFERS	**0.4**	**NIL**	**1.3**
For Petrochemical (GPIC): Spent Catalyst	**100 m3 per year**	**100 m3 per year**	**NIL**

* More information contained in section 2.5.

2.4 Transport of Chemicals and Related Issues

2.4.1 Transport Sector

Bahrain is in the midst of a massive infrastructure upgrade in a bid to place itself as a regional center of transport. Progress is already visible on the ground, with the centerpiece of the Kingdom's logistics plan, the colossal Khalifa bin Salman Port (KBSP), designed to replace Manama's Mina Salman Port. The nearly $350m KBSP harbour is expected to boost the country's container capacity from approximately 400,000 twenty-foot equivalent units (TEUs) to 1.1m TEUs.

The Khalifa Bin Salman Port (KBSP) has now been in operation for over a year and its effect on Bahrain's shipping sector is being felt. The port was conceived as a way to enable container lines to pull in to Bahrain directly, offering Bahraini shippers a direct route for imports and exports, rather than the Kingdom being reliant on transshipped goods from ports such as the UAE's Jebel Ali. KBSP, which is operated by APM Terminals, the port operating unit of A.P. Moller Maersk, is also expected to become a transshipment hub in its own right.

With increased capacity, Bahrain aims to take advantage of its geographical position to establish itself as the gateway to the Northern Gulf as far as Kuwait. In order to fully capitalize on the new port, new infrastructure is also being constructed on land. A 1-sq-km logistics zone (Bahrain Logistics Zone) very near to the port provides ample opportunity for private investment. KBSP, too, is now in private hands after the February 2009 official handover to APM Terminals Bahrain, a joint venture, which won a 25-year concession to operate the port. The importance of KBSP is enhanced by Bahrain's direct link to the Saudi Arabian market via the King Fahd Causeway, a four-

lane highway completed in 1986, but now in need of greater capacity. As a result, the international transit link is being upgraded through a $17m five year plan, currently in progress, which aims to increase vehicle capacity by 300%. The most publicized road project by far is the Bahrain-Qatar Causeway, which will span a total of 40 km to connect the Kingdom with its eastern neighbor.

Construction of the Bahrain-Qatar Causeway is expected to start in the near future. All infrastructures in both States are ready. The tendering has also been finished. Upon completion, the Causeway will make what is now a five-hour journey by car a mere 30-minute drive. Meanwhile, Bahrain is also upgrading its internal highways with about $685m earmarked to increase capacity. In the air, the Kingdom's skies are busier than ever before, with passenger traffic growing at a healthy clip of 20% per year. Expansion of the Bahrain International Airport has become a necessity and plans are set to be revealed soon. Of course, the economic downturn has raised questions about future traffic patterns in the short term, but projects are moving ahead and infrastructural improvements still stand as an integral aspect of the Vision 2030 plan.

The release of dioxins and furans in the transport sector depends primarily on the type of fuel burned as well as the engine type. The use of leaded fuel leads to higher emissions of dioxins and furans in the air as compared to other fuel types. In Bahrain, unleaded gasoline was introduced in 2000 and consequently leaded gasoline was phased out. Recently, the sulfur content of the diesel fuel was reduced to international standards. The overall estimated annual consumption for all the types of fuels amounts to 698,280 tonnes, resulting in an annual release of dioxins and furans of 0.011 g TEQ/a in the air.

Legislations and Related Issues with regard to storage and transportation

Ministerial Order No. (4) of the year 2006 with respect to the Management of Hazardous Chemicals: This Order applies to all activities that include management of hazardous chemicals such as their production, storage, transportation, multi-purpose uses and educational, training or research purposes or any other activity linked to the use or handling of hazardous chemicals determined by the General Directorate for the Protection of the Environment and Wildlife. Article 10 states the conditions of transportation and Article 11 and Appendix 1 outline the conditions of storage.

Ministerial Order No.(3) of the year 2006 with respect to the Management of Hazardous Waste Management: This Order aims at putting in place an appropriate monitoring and control system with a view to controlling the operations of generating, storing, transporting and treating hazardous waste. It also seeks to introduce a suitable supervision and control scheme for the operations of generation, storage, transportation and treatment of hazardous waste and the disposal or exportation thereof, with a view to controlling such waste and preventing pollution of the environment and damage to public health. *Chapter 4 of this Order specifies the duties of the transporter in detail.*

The Ministry of Interior- The General Directorate of Traffic is Control transportation of chemicals through public roads. The implementation regulation of road traffic Law states:

- If the vehicle is provided with a water or liquid tank (Article-70)
  The Tank must meet the following requirements:
  1. It must be made of strong metal according to the standard specifications in these cases. The liquid must not be allowed to leak from it;
  2. It must be fixed on special hinges in a safe way, and it must be oval or spherical;
  3. Its filling aperture must be fixed at the highest point, must be closed tightly and equipped with a tap for discharging the liquid that can be turned off, and light enough so that the liquid does not leak;

4. It must be equipped with a safety valve to ensure leakage of gases when pressure increase inside the tank; and
5. Drinking water and nutrition liquid tanks must be lined with galvanized tin or a similar substance and coated with a rust-proof substance so as not to transact chemically with the liquid. A water tank must carry a distinctive sign.

- If the vehicle produces dust, bad smells etc. (Article-71)
  If the vehicle's box or tank specified for carrying material produces dust, bad smells or anything that may inconvenience, disturb or endanger third parties, such as gypsum, lime, cement, sand gravel, coal, garbage or fertilizers, the box or tank must be closed tightly or covered with a strong lid to avoid the emission of any dust or smells from the load during circulation of the vehicle.

Ministerial Order No.(31) of the year 1977 with respect to "provision for the protection of workers from the hazards of highly flammable liquids and liquefied petroleum gases" regarding the general requirement of storage and transportation, such as:

- Article (5) states that all highly flammable liquids shall be stored in suitable, fixed and well ventilated warehouse;
- Article (7) states that all liquefied petroleum gas shall be stored in suitable underground reservoirs or in fixed tanks, or in pop-line and pumps that are kept in a safe position in order to prevent accidents;
- Article (8) states that if any highly flammable liquids are to be conveyed within a factory, they should be conveyed through storage, constructed, installed, place and maintained system to avoid leakages.

2.5 Chemical Waste Management

The growth of the industry requires the extensive use of chemicals and generates industrial and hazardous wastes. To facilitate sustainable development, the Government has created capacity for chemicals and waste management.

Bahrain is party to several environment and chemicals-related conventions. The Ministerial Order No. 3 of 2006 Concerning the Management of Hazardous Wastes and the Ministerial Order No. 4 of 2006 Concerning the Management of Hazardous Chemicals provide for the sound management of chemicals and wastes, including POPs. These legal measures assure that chemicals and wastes are managed in an environmentally sound manner.

Waste management is currently considered one of Bahrain's most important challenges as it poses intricate and complex problems for urban cities. Over the past thirty years solid wastes in Bahrain have grown in quantity and types at an annual growth rate of 18.4%. Annual per capita waste reached 1,538 kg in 2008, making Bahrain the highest average per capita producer of domestic solid waste in the Arab region. Wastes include domestic, agricultural, industrial and medical wastes. On the other hand, the total amount of hazardous waste reached 35,008 metric tons (MT) in 2007.

Waste problem has become one of the main challenges for sustainable development in Bahrain. The country is currently struggling to manage wastes from multiple sources including household (domestic), industrial, agricultural, and medical. Bahrain's waste management crisis is exacerbated by the accelerated increase in waste volume as problems related to limited geographical area, scarcity of safe waste-disposal sites, and lack of environmentally appropriate technologies for waste handling and treatment prevail.

2.5.1 Waste disposal capacity

The Hafira Industrial Landfill Site (Figure 2.10) Project was initiated by the Supreme Council for Environment to protect the fragile environmental resources of the country and to safeguard the public health of the residents. The project was planned and designed by the Supreme Council for Environment staff. Many suitable sites were chosen and a techno-environmental study was carried out to select the most environmental friendly site. The landfill site was constructed in Hafira area under the supervision of Public Commission staff utilizing its own resources.

Figure 2.10: The Hafira Landfill from Google Earth

The landfill provides industrial waste disposal facilities for the industrial waste generated in Bahrain, accommodating semi-hazardous and hazardous industrial waste. The site is located in Hafira area behind Asker; it is spread over an area of around 125,400 m^2 and has a volume of 746,000 m^3. The site is designated as a Class II landfill having three disposal cells and three evaporation ponds for treating the landfill leachate and liquid industrial waste. Two ground water monitoring boreholes have been provided to monitor the ground water quality.

Due to this project, many industries have now taken serious approach of reducing and minimizing their waste and are disposing their waste in line with the government directives. Moreover, the pollution generated from huge industrial waste quantities has been greatly minimized and the impacts on public health have been drastically reduced due to waste containment and disposal at the landfill site.

The Hafira Industrial Landfill Site Project is a part of implementing sustainable and integrated waste management in Bahrain. It has enhanced the environmentally friendly image of the country and is providing a window for possible investors/sponsors to invest in industrial and commercial projects, which is greatly helping the local economy. Environmentally, the project benefits are significant, including reduction of industrial waste quantities, elimination of accumulated waste at industries, protection of workers' health, and safeguarding of environmental resources.

The Hafira Industrial Landfill with a capacity of 746,000 m^3. It has been operating since February 2001. The Public Commission won the prestigious National Green Apple Award in November 2005 for its Hafira Industrial Landfill Site Project for environmental best practice. The Green Apple trophy was awarded in a glittering ceremony, which was held at The House of Commons, London, on Tuesday, November 8, 2005.

Due to generation of hazardous waste from its activities and as an integral part of environmental protection, BAPCO has planned and constructed a dedicated landfill site at its premises located on King Hamad Highway within the BAPCO boundary. BAPCO has built a Class-1 hazardous waste landfill site with composite lining system having leachate collection and leakage detection system. The landfill site is built in accordance with the US-EPA environmental regulations and guidelines. The landfill site measures 172 m x 94 m with a base area of about 16,132 m^2 and average bund height of 2.4 m. The landfill was opened in July 2010. It is expected to take about 10-12 years to fill the landfill site.

An incineration system for treating the generated healthcare wastes (i.e. clinical, pharmaceutical, infectious, anatomical, and chemical wastes) has been operating since April 2002. It is considered as a major milestone in environmental protection and part of the national strategy to reduce and treat the hazardous wastes in the country. It has two lines and is capable of incinerating 250 kg medical waste daily. The feeding system, the temperature of the furnace, and the air pollution control system are controlled automatically. The temperature of the combustion chamber is 1100°C, which is high enough to destroy all Annex C POPs, while the temperature in the APC is below 200°C, which is cool enough to avoid the de-novo formation of POPs (Figure 2.11).

Figure 2.11: Medical waste incinerator

In some cases, hazardous waste is exported for disposal, or implement waste exchange policy (This is a mechanism for recycling and/or reusing the chemicals. This policy of waste exchange attempts to link industrial waste generators with waste recyclers or companies that can use 'waste' as a raw material input to their product(s) among national organizations (especially laboratories) to avoid disposal of chemicals.)

2.5.2 Legislations and Related Issues

Inappropriate waste handling and disposal can result in soil, water and air pollution. Solid waste management (SWM) has therefore become a national concern. In this context, the following measures were taken by authorities:

- A multi-disciplinary committee for environmentally sound management of waste and chemicals was established with the main task of preparing a national strategy for implementing Agenda 21;
- Decree No.4 was issued in 2005 to regulate disposal of used oil wastes;
- Decree No.3 law was issued in 2006, which regulates disposal of hazardous wastes;
- A public awareness campaign was launched to reduce/minimize wastes and rationalize consumption;
- A number of initiatives were launched. These include, setting standards and environmental criteria for waste management, encouraging recycling of wastes, and building a waste data base for monitoring and management purposes;
- Integrated waste management concept has been promoted and its establishment is needed;
- The State of the Environment report was prepared in 2009; and
- The National Environmental Strategy was prepared in 2006.

This section summarizes the total amount of chemical waste produced per year, including the type and nature of the waste generated in Kingdom of Bahrain.

Table 2.14: **Summary of Estimated Waste Generation in Bahrain-2010**

#	Waste Category	Production (t or gal/yr.)		
		2009	2010	Mid 2011
1	Solid Waste	112,174	138,775	67,185
2	Oily waste & sludge	3,943,704	4,929,630	2,487,899
3	Liquid waste	1,328,468	1,485,325	807,973
4	Tarry pitch	□ 1,000,000 accumulation	□ 1,000,000 accumulation	□ 1,000,000 accumulation

Table 2.15: Estimated Quantities of Hazardous Solid Waste Generation

#	Type of Waste Generated	Production (m^3/yr.)		
		2009	2010	Mid 2011
1	Spent Pot Lining	6000	8980	3840
2	Secondary Aluminum Dross	400	-	120
3	Fly Ash	76	32	31
4	Expired Paint	8	136.54	0.9
5	Used Garnet	-	-	48
6	Asbestos	326.5	206.31	28.5
7	Calcium Nitrate Sludge	355	83.4	108
TOTAL		**7165.50**	**9438.25**	**4176.40**

Table 2.16: **Estimated Oily Waste & Sludge Generation-2010**

#	Type of Waste Generated	Production (gallon/yr.)		
		2009	2010	Mid 2011
1	Oily Waste	3,943,704	4,929,630	2,487,899
2	Oil Slop	269,914.90	260,388.585	171,948.99
3	Oily & Chemical Waste	120,000	140,000	65,000
TOTAL		4,333,619	5,330,019	2,724,848

Table 2.17: Estimated Quantities of major Liquid Waste Generation

#	Type of Waste Generated	Quantity(gallon/yr.)		
		2009	2010	Mid 2011
1	Chemical Water mixed	280,000	300,000	170,000
2	Organic Waste (Blood in Water)	31,700.646	30,200.10	14,500
3	Paint Water mixed	460,000	500,000	300,000
4	Caustic Water Sludge	320,000	300,000	140,000
TOTAL		1,091,701	1,130,200	624,500

2.6 Unintentionally generated chemicals

The Environment Control Directorate is working with industrial companies to control pollution emitted from operations of industries and in this respect, a number of industries submitted their plans to reduce pollutants. Bahrain National Gas Company for example adopted certain codes and measures to minimize environmental damage, including monitoring of raw materials, liquid, and solid wastes, and controls on emissions. Furthermore, the company adopted a clean production policy ("no venting, no flaring"), safe and secure operational practices and "accepting responsibility for the protection of the environment in all aspects of its operations." The policy of caring for the environment that the Environmental Authority is promoting and industry's acceptance of such an approach reflects a change in mentality of industrial sectors in the country, which in turn promote environmental accountability among companies working in Bahrain. Other industries like Aluminium Bahrain (ALBA), Bahrain Petroleum Company (BAPCO), Gulf Petrochemicals Industries Company (GPIC) follow the same trend.

2.7 Assessment

This section provides an analysis of the main problems and priorities related to chemical production, import, export, handling and use.

In order to diagnose and prioritize potential problems related to chemicals import, production, and use, a survey was carried out to find the main environmental problems which are associated chemicals in Bahrain. This questionnaire was sent to governmental and industries.

These organizations were selected to answer the questionnaire with the purpose of determining the priority ranking through the identification of the level of concern to each problem, determination of the ability to control the problem, and the availability of statistical data.

The purpose of Table 2.18 is to provide additional information and a general analysis with respect to identified problem areas, including, for example, the ranking of priority areas of concern.

Table 2. 18: Priority Concerns Related to Chemicals

No.	Nature of problem	Scale of Problem			Level of Concern			Ability to control problem			Availability of statistical data *		
		Local	National	Regional	Low	Medium	High	Low	Medium	High	Sufficient	Insufficient	No data available
1	Air Pollution	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Marine & Coast Pollution	✓	✓				✓		✓	✓	✓	✓	
3	Ground Water Pollution												
4	Soil contamination	✓				✓	✓		✓	✓	✓		✓
5	Chemical Residues in Food		✓				✓			✓	✓		
6	Drinking water Contamination		✓				✓			✓	✓		
7	Hazardous Waste Treatment / Disposal	✓	✓		✓	✓			✓	✓	✓	✓	
8	Occupational Health: Agriculture		✓			✓			✓				✓
9	Occupational Health: Industrial	✓			✓	✓	✓		✓	✓	✓		
10	Public Health		✓		✓	✓		✓		✓	✓		✓
11	Chemical Accidents: Industrial	✓			✓		✓		✓	✓	✓		
12	Chemical Accidents: Transport	✓	✓		✓	✓	✓	✓		✓	✓	✓	
13	Unknown Chemical Imports		✓		✓		✓			✓	✓		

No.	Nature of problem	Scale of Problem			Level of Concern			Ability to control problem			Availability of statistical data *		
		Local	National	Regional	Low	Medium	High	Low	Medium	High	Sufficient	Insufficient	No data available
14	Storage/ Disposal of Obsolete Chemical	✓	✓		✓	✓	✓			✓	✓	✓	
15	Chemical Poisoning/ Suicides		✓				✓	✓					✓
16	Persistent Organic Pollutants												

1. Air pollution

This problem has been associated with oil refining, aluminum smelting, petrochemicals, car emissions, use of pesticides (both for public health and agriculture), power stations, construction, metal welding and fabrication, asphalt plants, gold smithing, fiber glass industries, paint spraying, and medical waste incineration. There are specific chemicals of concern. These chemicals are PVC, dust, inorganic mineral powders, polymer powder, aromatic and aliphatic hydrocarbon solvents, NOx, Lead compounds, Chromate, Fluorides, Carbon Monoxide and Dioxide, glass paint, carbon dust, H2SO4, gel-coat, toluene, diisocyinate amine, refrigeration gases, caustic soda, detergent powder, ammonia, Polypropylene, and polyethylene.

The problem of industrial air pollution is localized in the industrial regions in the southern and eastern parts of the country.
The problem of traffic pollution is localized on the main roads of the main cities (Manama, Muharraq, Sitra, South ALBA….).

Small-scale industries such as workshops, garages, gold smithing and refining shops are located in residential areas in the middle of the cities.

The level of concern and ability to control this problem was found to be high, and the majority of the organizations questioned found that there is sufficient statistical data available.

2. Marine and Coastal Pollution:

The problem is localized in the eastern and southern parts of the country. The main sources of this problem are the industrial effluents such as sand washings, discharges from sewage treatment plants, oil from ports, and uncontrolled dumping of waste like grease and lubricants. Major chemicals of concern are fluorides, heavy metals, suspended solids, sodium sulfide, acid, toxic metals, CaCO3, TiO3, pigments, SO3, and H_2SO_4.

The level of concern and ability to control this problem was found to be high, and the majority of the organizations questioned found that there is sufficient statistical data available.

3. Pollution of Ground Water

Ground water pollution is likely to be due to the storage of toxic waste in the yards of industries, waiting to be dumped in the new disposal site. It is also possibly attributable to leakage of underground tanks or pipes containing or carrying chemicals such as fuels. The problem is localized at sites where old filling stations exist. Pesticides sprayed by public health workers in the drainage pits might worsen the problem. Industrial and household spillage of chemicals might seep into the shallow aquifers.

This problem is fully under the control of the Authority of Electricity and Water.

4. Soil Contamination

Soil contamination is an important problem of industrialization. People have become increasingly aware of the adverse consequences of industrial development. Soil has become polluted to an extent that has created public concern. Hazardous chemical wastes have been excessively discharged as byproducts by industries. e.g. lubricants, paints, spirits, acids, beryllium, cyanide, alcohol, sulfides, alkaloid, chlorophenols, and many others. Agriculture has also contributed to soil

pollution due to the various pesticides, herbicides and other chemicals used. Many of these chemicals have high toxic effects on health.

The level of concern and ability to control this problem was found to be high, and the majority of the organizations questioned found that there is sufficient statistical data available.

5. Chemical Residues in Food

Chemicals pose a great risk to health. They may get into food by various means and at any stage of food processing. Chemicals can reach food during growing/rearing, harvesting, transportation, storage, and preparation. The most important sources of chemical residues in food and drinks are from pesticides, herbicides, fertilizers, disinfectants, spillage, open dumping of industrial wastes, chemical additives, and chemicals dissolved from the containers and packaging materials. Such chemicals might not only harm the health of people but also alter the color, taste, and smell of food items. The problem of chemicals is greater if food is acidic. Acidic food enhances reaction and leaching of such chemicals from containers into foods.

6. Drinking Water Contamination

There are many sources of contamination of drinking water, the majority of which are man-made. Chemical contamination may involve nitrates. The most important sources of nitrates are excessive use of fertilizers in the agricultural areas. The use of pesticides can also contaminate water. Heavy metals such as lead, arsenic, cadmium, mercury, and aluminum from human activities create concern. Seepage of chemicals from landfills is also an important source of underground water pollution. Discharge of chemical effluent into water should not be ignored.

The public health laboratory control chemical residues in food and drinking water contamination. The level of concern and ability to control this problem was found to be high, and there is sufficient statistical data available.

7. Hazardous Waste Treatment/Disposal

Hazardous chemical wastes are mainly produced in hospitals, industries, and laboratories. The production of hazardous chemical wastes is believed to be one of the major results of industrialization. The quantity of hazardous wastes is increasing due to industrial development. The most important sources are iron and steel, nonferrous metals, and the primary and secondary chemical industries. Hazardous wastes are sometimes disposed of on land, in water or in the sea. Some of the hazardous wastes are recycled. Lack of proper disposal sites and the non-systematic classification of hazardous wastes make it difficult to have an efficient management of such wastes.

Chemicals of concern are solid PVC, oil, mildly hazardous isocyinate, medical waste, toluene diisocyinate, methylene chloride amine, caustic soda, borax, butanol, perchloroethylene, water base ink, H_2SO_4, HCl, NH_3, polyethylene, polypropylene, lead, methylene biorthochloroanline (MOCA) - an ionic and cationic surface active compounds, water (contains emulsion paints), hydrocarbons, cyanide, chromium, fluorescent substances (FITC, TMB), and urea peroxide solution.

The level of concern is found to be low, but the ability to control this problem was determined to be high, and the majority of the organizations questioned found that no statistical data is available.

8. Occupational Health Agriculture

Though the regulations and rules of the Ministry of Works and Agriculture require the application of proper handling methods and the use of personal protective clothing and equipment, there are many violations of these rules and regulations. Chemicals of concern are Organo-Phosphorous pesticides and fertilizers.

We need more investigation into this problem. The number of private companies has increased and not all are under control. This problem is of high concern.

9. Occupational Health Industry

This problem is mainly on industrial sites. It exists mostly in small-scale industries. The specific chemicals creating concern are aromatic hydrocarbons, vinyl chloride, NOx, Lead, Chromate, Fluorides, Carbon Monoxide and Dioxide, asbestos, glass paint, carbon dust, H_2SO_4, gel-coat, toluene, diisocyinate amine, caustic soda, detergent powder, and ammonia, polypropylene and polyethylene.

The level of concern and ability to control this problem was found to be high, and the majority of the organizations questioned found that there is sufficient statistical data available.

10. Industrial Chemical Accidents

The specific chemicals creating concern are plant circulating cooling water additives, boiler water additives, laboratory chemicals, caustic soda, borax, butanol, perchloroethylene, H_2SO_4, thinner, aluminum, ink, mineral powder, polymers, coat tar oil, acids, flammable material, chlorine, ammonia, hydrazine.

The level of concern is found to be low to medium and the ability to control this problem was determined to be high. The majority of the organizations questioned found that sufficient statistical data is available.

11. Transport Chemical Accidents

The specific chemicals creating concern are solvents, oils, lubricants, H_2SO_4, thinner, ink, caustic soda, paints, methane, coat tar oil, methanol, chlorine, ammonia, and acids.

The level of concern and ability to control this problem was found to be high and the majority of the organizations questioned found that sufficient statistical data is available.

12. Unknown Chemical Imports

Bahrain is importing large amounts of various types of chemicals from different parts of the world. These chemicals are imported in the form of pesticides, cleaning materials, pharmaceutical drugs, food additives, and many other forms. Most of the time, these chemicals enter the country without proper control of the importation and handling, due to the fact that in many cases, countries of origin export the chemicals with a lack of information on chemical composition, toxicity etc. This, of course, makes the management of chemicals difficult and causes harmful effects to the handlers, environment, and public health.

The level of concern is found to be medium, and the ability to control this problem was determined to be high, and sufficient statistical data is available.

13. Storage / Disposal of Obsolete Chemicals

This problem is due to the absence of a suitable disposal site for hazardous chemicals. It is a localized problem in some industries, workshops, and laboratories. Large amounts of industrial wastes are kept in the yards of some industries, waiting for the disposal site to be built. The major chemicals of concern are: ionic and cationic surface active compounds, sulfur sludge, sodium sulfate, meta-bisulfate, cryolite waste of aluminum smelter, soda ash, sulfur, caustic soda, isopropanol, alkyl resin, acids, laboratory chemicals, and oil sludge.

The level of concern of this problem is high, ability to control it is high, and the majority of the organizations questioned found that the availability of statistical data about it is sufficient.

14. Chemical Poisoning / Suicides

The major chemicals of concern are: organic solvents, paracetamol and other acute-poisonous chemicals.

The level of concern is found to be high, but the ability to control this problem was determined to be medium, and no statistical data is available. The priority ranking of this problem is medium (3/5).

15. Persistent Organic Pollutants

A list of hazardous chemicals was prepared by the Environmental Control Directorate, the importation, production, storage, transport, commercialization and use of which are prohibited or severely restricted. This list was chosen from PIC Decision Guidance Documents. For this list of chemicals, data on their toxicity, carcinogenicity, resistance to degradation, and uses were determined from the IRPTC Computer package, which had been provided by UNEP/ROWA. Among these chemicals, 44 materials are POPs, including the 12 POPs which were recommended by IFCS to be substituted. The Environmental Control Directorate is the Focal Point for IFCS and UNEP POPs.

In 1982, voluntary action was undertaken by the electricity departments in the country to substitute the oil containing PCBs from the electric capacitors and transformers of the main stations. Those capacitors and transformers were sent to the UK for treatment, and replaced by new capacitors and transformers containing mineral oil or silicon oil. A survey was planned to identify other sources of PCBs, but it was not implemented due to shortage of manpower.

An application to reclaim PCB oil from imported transformers and capacitors and to de-chlorinate the reclaimed oil was received from some industries. The project was evaluated by a technical team with representatives from the Environmental Assessment Section, Pollution Control Section, and Waste Management Section. The team suggested that the project should be rejected.

No information is available due to the POPs inventory is not yet conducted.

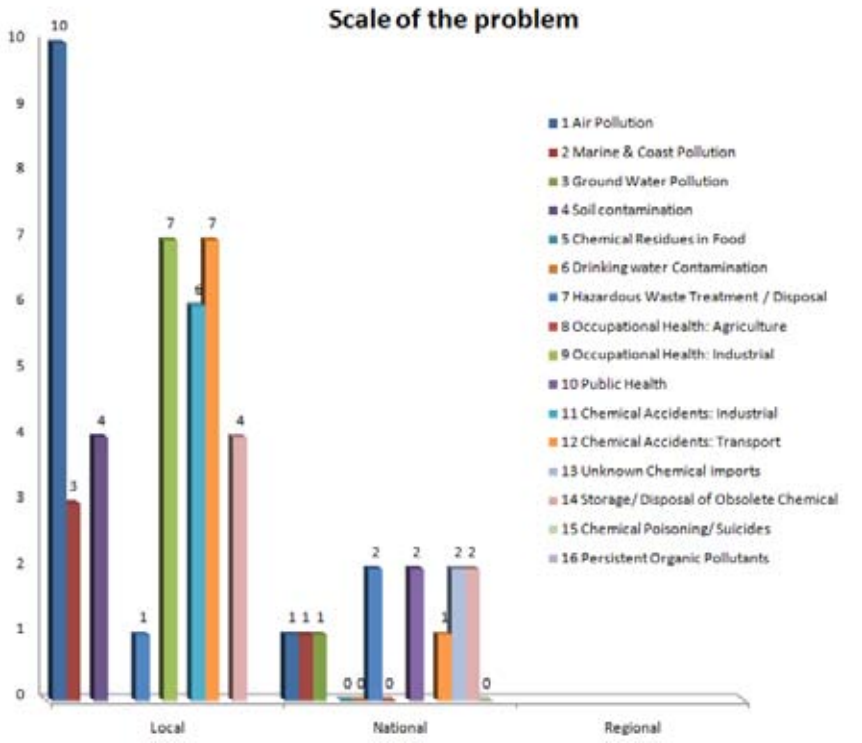


Figure 2.12: Scale of the Problem

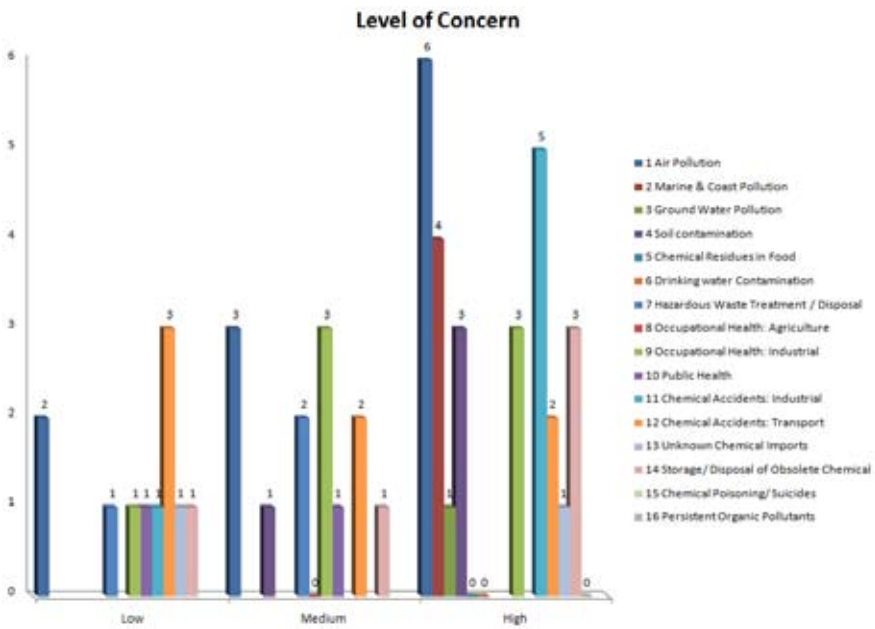


Figure 2.13: Level of Concern

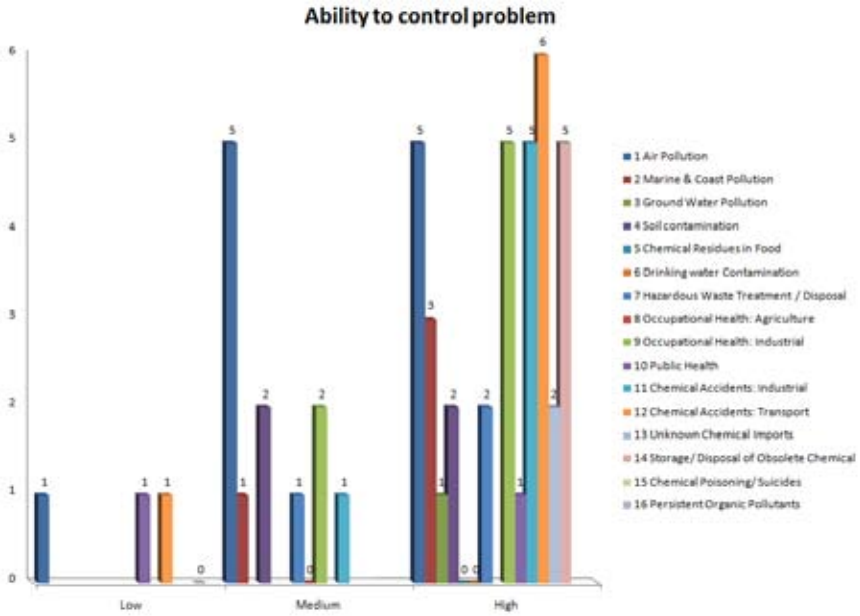


Figure 2.14: Ability of Control the problem

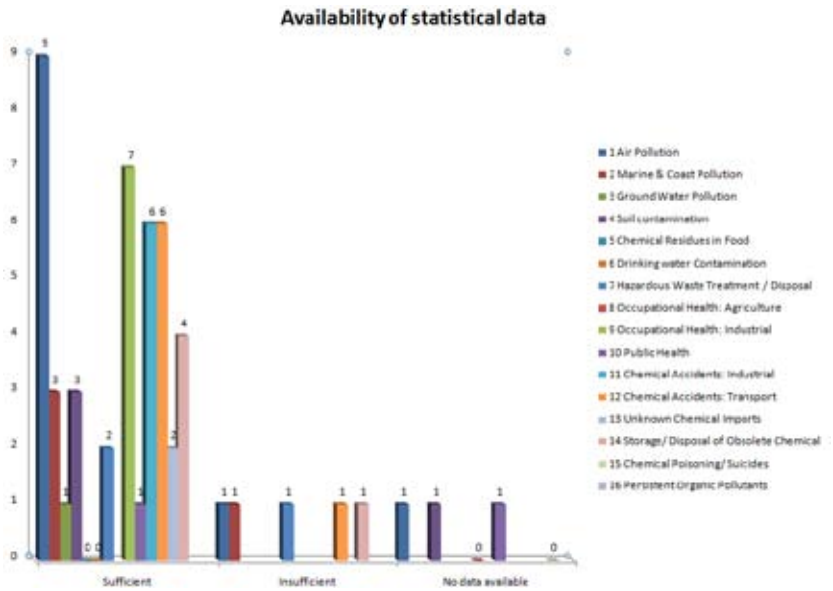


Figure 2.15: Availability of statistical data

CHAPTER 3

Legal Instruments and Non-Regulatory Mechanisms for the Sound Management of Chemicals

Purpose of the chapter

To provide an overview of existing legal instruments and non-regulatory mechanisms for managing chemicals, including their implementation and enforcement, and to identify relevant strengths, weaknesses, and gaps.

This Chapter outlines Bahrain's legal instrument and non-regulatory mechanisms for chemicals management by examining the regulatory processes which support chemicals assessment and the control of chemicals use in the industrial and agricultural, veterinary, and pharmaceutical spheres.

Background

Chemicals are divided by their use category into industrial chemicals, agricultural chemicals (chemical fertilizers, pesticides), medicines, veterinary medicines, food additives, and cosmetics. Chemicals management involves all stages of the chemical life cycle from import and export, production, transport, storage, marketing and use to disposal. There are a number of laws, regulations and standards for the management of chemicals, which are, need to be implemented and carefully and perfectly. It is, therefore, a top-priority task to build a complete and sound system of legislation for chemicals management.

Methodology

To obtain the information presented in this chapter, an official communication was sent to the concerned governmental organizations in order to identify the existing regulations/legislation related to the management of different types of chemicals. The responses were collected, scrutinized and summarized. The list of the existing regulation/legislation is tabulated in table (3.A).

3.1 Overview of the National Legal Instruments Which Address the Management of Chemicals

Table 3.1 provides a list of regulations, legislations or decrees relevant to the management of chemicals. The responsible ministry, scope and objective of each instrument are also provided.

Table 3.A : Existing Legal Instrument Relevant to the Management of Chemicals:

No.	Legal Instrument	Responsible Bodies	Chemical Type	Objective	Relevant Articles	Enforcement Ranking
1	Amiri Decree law No. 23 of year 1976 promulgating the Labour Law for the private Sector	Ministry of Labour & Social Affairs (occupational Safety Section)	Labour Hazardous	Occupational Safety	90 , 91 , 92 , 93	Enforcement
2	Amiri Decree law No. 6 of year 1984 with respect to organization of Industry	Ministry of Oil & Industry	Industrial	Industrial permits & protection National Industries	1 , 2 , 5	Effective
3	Amiri Decree law No. 5 of the year 1990 with respect to Civil Defense	Ministry of the Interior (Civil Defense Directorate)	Drug, Fire & Explosives	Protection of civilians & public Security	1 , 2	Enforcement
4	Amiri Decree law No. 9 of the year 1979 with respect to Traffic law	Ministry of the Interior	Public Safety & Security	Transportation means of chemicals & prevent road accidents	1 , 2 , 28 , 62 , 65	Enforcement
5	Amiri Decree law No. 3 of the year 1975 with respect to Public Health	Ministry of Health	Food , Water & Drug	Protection of public health & industries	27, 31 , 32 , 33	Enforcement
6	Amiri Decree No. 11 year 1989 with respect to Pesticides	Ministry of Works & Agriculture	Pesticides	Plant Protection	5 , 6	Effective
7	Legislation Decree law No. 21 year 1996 with respect to Environmental	SCE - Environmental Control Directorate	All	Protect community & occupational health & the environment	4 , 10 , 14 & 15	Effective

No.	Legal Instrument	Responsible Bodies	Chemical Type	Objective	Relevant Articles	Enforcement Ranking
8	Ministerial Order (1) 1999 with respect to control of Ozone Layer Depletion Substance (ODS)	SCE - Environmental Control Directorate	All refrigerant process and equipments, insulations materials , other	To protect ozone layer	All (article 2 about type of chemical substances)	Effective
9	Ministerial Order (10) 1998 with respect to the fees of Permit and Services	SCE - Environmental Control Directorate		• Listing the fees of all permissions and services that provided by environmental body in Bahrain • Submit a periodical reports about the establishment activities	1	Effective
10	Ministerial Order (7) 2002 with respect to the Control of Importer and Usage of Banned and Restricted Chemicals	SCE - Environmental Control Directorate	All	Listing the regulations pertaining to the importer and usage of banned and restricted chemicals	All	Effective
11	Ministerial Order No. 3 of 2006 with respect to Hazardous Waste Management,	SCE - Environmental Control Directorate	Chemical Waste	Procedure of handling and dispose chemical waste	1.1, 2 , 29	Effective

No.	Legal Instrument	Responsible Bodies	Chemical Type	Objective	Relevant Articles	Enforcement Ranking
12	Ministerial Order No. 4 of 2006 with respect to Hazardous Chemicals Management,	SCE - Environmental Control Directorate	All	Management of hazardous chemical including handling of hazardous chemicals, including industrial and production operations, export, import, transit, storage, transportation and use.	All	Effective
13	Commerce Law	MOC	Commercial	Commercial Licenses		
14	Municipality Law	Municipality	Clean Cities	Municipal Waste		
15	Sewerage Law	MOAW	Sewage	Protect the sewer Lines		
16	Ministerial Order no. 31 of 1977 with respect to provision for the protection of workers from the hazards of highly flammable liquids and liquefied petroleum gases	Ministry of Labor	• flammable liquids • liquefied petroleum gas • highly flammable liquids	protection of workers from the hazards of highly flammable liquids and liquefied petroleum gases	5, 7 and 8	Effective
17	Decree-Law No. (18) for the year 1997, regulating the profession of pharmacy and pharmaceutical centers	Ministry of Health-Pharmacy & Drug Control Directorate	Medicine, Health food, and health products	Control import, export and sale of medicine and medical products	All	Effective
18	Law No. (15) for the year 2007 on narcotics and psychotropic substances	Ministry of Health-Pharmacy & Drug Control Directorate	Narcotic Drugs, Psychotropic substances, Precursors and chemicals	Control production, manufacture, import, export, sale, transfer, possession, abuse of Narcotic Drugs, Psychotropic substances, Precursors and chemicals	All	Effective

Table 3.B: Descriptive evaluation of the environmental legislation relevant to chemicals management

Environmental legislation relevant to chemicals management / Legislative items and policy mechanisms	National legislations						Gulf Council
	Legislation Decree no.21 of 1996 concerning the environment	Ministerial Order no.1 of 1999 concerning ozone depleting substances	Ministerial Order No.7 of 2002 concerning the control of importation and use of hazardous chemicals	Ministerial Order no.4 of 2006 concerning the management of hazardous chemicals	Ministerial Order no.3 of 2006 concerning the management of hazardous wastes	Ministerial Order no.4 of 2005 concerning the control of used oil	Unified system of 2001 concerning the hazardous chemical management
Clarity of definitions	✓	✓	✓	✓	✓	✓	✓
Control, ban and restrictions based on the quantities	×	✓	×	×	×	✓	×
Control, ban and restrictions based on the hazard of chemical on the human and environment	✓	✓	✓	✓	✓	×	✓
Taxes on the quantities	×	×	×	×	×	×	×
Fines or taxes on the violation of old chemical activities which have negative impacts on the environmental	×	×	×	×	×	×	×
Support or incentives to encourage the companies to use best chemicals alternatives	×	×	×	×	×	×	×
Dissuasive sanctions	±	±	±	±	±	±	±
Emphasis on the adoption of the Globally Harmonized System (GHS) and its implementations	×	×	×	±	×	×	±
Emphasis on the adoption of the Custom Harmonized System (CHS) and its implementations	×	×	×	×	×	×	×
Monitor the production process of chemical	✓	✓	✓	✓	✓	✓	✓
Monitor the use of chemical	✓	✓	✓	✓	✓	✓	✓
Monitor the transportation of chemical	✓	✓	✓	✓	✓	✓	✓
Legislation follows the process of production, use and import of chemicals with large quantities (HPVCs)	×	×	×	×	×	×	×

Environmental legislation relevant to chemicals management / Legislative items and policy mechanisms	National legislations						Gulf Council
	Legislation Decree no.21 of 1996 concerning the environment	Ministerial Order no.1 of 1999 concerning ozone depleting substances	Ministerial Order No.7 of 2002 concerning the control of importation and use of hazardous chemicals	Ministerial Order no.4 of 2006 concerning the management of hazardous chemicals	Ministerial Order no.3 of 2006 concerning the management of hazardous wastes	Ministerial Order no.4 of 2005 concerning the control of used oil	Unified system of 2001 concerning the hazardous chemical management
Monitor the disposal of chemical	✓ (Protocol Montreal)	✓	×	×	✓	✓	×
Monitor the re-export of chemical	×	±	×	×	✓	✓	×
Follows the legislative life cycle of the product	×	✓	✓	✓	×	×	✓
The clarity of responsibilities of the implementing agencies in the legislation	✓	✓	✓	✓	✓	✓	✓
Identify a clear mechanism for coordination among the agencies which involved in the process of implementation	×	×	×	×	×	×	×
Specific time for the reports	×	✓ (quarterly)	✓ (yearly)	×	✓ (half yearly)	✓ (quarterly)	×
Emphasis on the establishment of databases	×	×	×	×	×	×	×
Induction on the search for alternatives after the grace period or the best technology (clear mechanism)	✓ (technology)	✓	✓	×	×	×	×
Compel the government to fund projects or activities concerned with sound and sustainable management of chemicals	×	×	×	×	×	×	×
Compel or induce the government to fund studies and research concerned with sound and sustainable management of chemicals	×	×	×	×	×	×	×
Integration of the social dimension as well as the environmental dimension of access to sound and sustainable management of	×	×	×	×	×	×	×

Environmental legislation relevant to chemicals management / Legislative items and policy mechanisms	National legislations						Gulf Council
	Legislation Decree no.21 of 1996 concerning the environment	Ministerial Order no.1 of 1999 concerning ozone depleting substances	Ministerial Order No.7 of 2002 concerning the control of importation and use of hazardous chemicals	Ministerial Order no.4 of 2006 concerning the management of hazardous chemicals	Ministerial Order no.3 of 2006 concerning the management of hazardous wastes	Ministerial Order no.4 of 2005 concerning the control of used oil	Unified system of 2001 concerning the hazardous chemical management
chemicals to promote the implementation process							
Integration of the economic dimension as well as the environmental dimension of access to sound and sustainable management of chemicals to promote the implementation process	×	×	×	×	×	×	×
Determine training mechanism for the legislation implementers on how to implement	×	×	×	×	×	×	×
A change in the institutional structure of those in charge of the implementation of legislation	×	✓	×	×	×	×	×

Key:
(✓) Legislation includes or is related to the item in question
(×) Legislation excludes the item in question
(±) Legislation includes the item in question, but not efficiently or to the required degree

Table 3.C: The assessment of product life cycle and chemicals

The concerned governmental agencies	Classification of products and chemicals (*)	Legislation/ What is it?	Product life cycle								coordinating committee
			Importation	Production	Labeling	Storage	Transportation	Marketing and distribution	Use and handling	Disposal	
The Supreme Council for Environment	Industrial Commercial and Service	National/Gulf	✓	✓	✓	✓	✓	✓	✓	✓	X
Ministry of Municipalities and Urban Planning (Agriculture)	Pesticides and fertilizers	National/Gulf	✓	✓	✓	✓	✓	✓	✓	x	Ministerial
Ministry of Health	Medicines and drugs	National	✓	✓	✓	✓	✓	✓	✓	✓	x
Ministry of Labour	All chemicals	National	✓	✓	✓	✓	✓	✓	✓	✓	Ministerial / Internal
Ministry of Interior (Customs)	All chemicals	Law (GCC)	✓	x	x	✓	x	x	x	x	x
Ministry of Industry and Commerce (Commerce)		National/ Gulf	✓	x	x	x	x	✓	✓	x	x
Ministry of Interior		National/ Gulf	✓	✓	✓	✓	✓	✓	✓	x	x

Key:
(*) The products and chemicals were ranked in the matrix of the product life cycle based on the use
(✓) Legislation includes or is related to the item in question
(x) Legislation excludes the item in question

Note: Tables 3.B and 3.C are parts of MSc. study prepared by Hussain Makki (team member), and translated to English.

3.2 Summary description of key legal instruments related to chemicals

1. Legislative decree no. 11 of 1989 governing pesticides

This comprehensive law relates to all pesticides including public health vector control pesticides, household pesticides, and professional pest control pesticides. It also regulates the use and licensing of agricultural pesticides. It covers all synthetic or natural chemical compounds used as pesticides to control any type of pest. All specifications in respect to pesticides in this decree are in line with World Health Organization (WHO), Food and Agriculture Organization (FAO), the International Plant Protection Convention (IPPC) and World Trade Organization (WTO) standards and other international recommendations.

- Chemicals covered: pesticides.
- Means for making legislation publicly known: newspapers (article 16 of the decree).
- Mechanisms included for monitoring implementation: audit procedures (article 13 of the decree).
- Actions taken for non-compliance: fines and/or prison terms (article 14 of the decree).

2. Legislative decree no. 6 of 1984 governing the organization of industry

It regulates the business of the local industrial sector and is used as a reference and guide for starting industrial projects.

- Chemicals covered: not indicated.
- Means for making legislation publicly known: newspapers (article 33 of the decree).
- Mechanisms included for monitoring implementation: inspection by authorized officers who are designated by a resolution from the minister of development and industry (articles 28 and 32 of the decree).
- Actions taken for non-compliance: fines, closure of establishment, imprisonment (articles 29, 30 and 31 of the decree).

3. Legislative decree no. 9 of 1979 enacting road traffic law

- Chemicals covered: not indicated.
- Means for making legislation publicly known: official gazette (article 3 of the decree).
- Mechanisms included for monitoring implementation: judicial arrest by members of the public security and the directorate of traffic and licensing (article 85 of the decree).
- Actions taken for non-compliance: fines, imprisonment, withdrawal of the registration certificate, the driving license, metal number plates of the vehicle and the license of the driver (articles 79 to 86 of the decree).

4. Legislative decree no. 21 of 1996 concerning the environment

This legislation aims to protect the environment from the polluting sources and factors, and to halt its deterioration by drawing up the required plans and policies to preserve it from the harmful effects resulting from activities causing damage to human health, agricultural crops, marine life and wildlife, other natural resources and the climate. This legislation also relates to the implementation of such plans and policies, as well as the adoption of all appropriate procedures and arrangements to halt the deterioration of the environment, prevent or combat all types of environmental pollution, and limit such pollution for the benefit of the present and future generations through the implementation of the development objectives.

- Chemicals covered: not indicated.
- Means for making legislation publicly known: newspapers (article 33 of the decree).
- Mechanisms included for monitoring implementation: inspection by authorized officers (article 28 of the decree).
- Actions taken for non-compliance: imprisonment, fines, closure of establishment and/or canceling of licenses (article 29 of the decree).

5. Legislative Decree 37 of 2005 concerning the approval of Gulf Countries Council (GCC) unified pesticides order

This law aims to regulate the production, import and trading of pesticides

6. Legislative Decree 38 of 2005 concerning the approval of GCC unified order with respect to agricultural fertilizers and soil improvements

This law concerns the import and export of agricultural fertilizers and soil improvements, production, manufacture, handling, and dissemination. And provided that, registration and obtain a license from the competent authority and coordination with the relevant authorities.

7. Ministerial Order No. 1 of 2001 Concerning Management of Hazardous Medical waste.

This Ministerial Order lays down the rules of control and supervision of the production, storage, transport, treatment and disposal of waste for the purpose of controlling such waste and preventing its harmful effects on health and the environment until they are disposed of in a proper environmental manner.

This Order also encourages the development of a proper waste treatment process for the purpose of maintaining public health and avoiding pollution of the environment.

8. Ministerial Order No. 7 of 2002 Concerning the Control of Importation and Use of Hazardous Chemicals.

This Ministerial Order regulates the import and the use of banned substances and chemicals subject to limitations and the chemical mixtures, goods and products containing banned substances and chemicals subject to limitations. It also determines

the purposes and fields of their use to stop or lessen the spread of their harmful effects on the public health and the environment.

8. Ministerial Order No. 4 of 2005 Concerning the Control of Used Oil.

This Ministerial Order establishes an appropriate control system for the storage, transportation, treatment, and disposal of used oils. This allows monitoring of such oils, thus preventing their detrimental effects on public health and eliminating pollution of the environment.

10. Ministerial Order No. 3 of 2006 Concerning the Management of Hazardous Wastes.

This Ministerial Order puts in place an appropriate monitoring and monitoring and control system with a view to controlling the operations of generating, storing, transporting and treating hazardous waste. It is also seeks to introduce a suitable supervision and control scheme for the operations of generating, storage, transportation and treatment of hazardous waste and the disposal thereof or exporting them for treatment, to control such hazardous waste, with a view to exercising control over such waste and preventing the spread of their effects that pollute the environment and damage public health.

11. Ministerial Order No. 4 of 2006 Concerning the Management of Hazardous Chemicals.

This Ministerial Order puts in place an appropriate monitoring and management system for the management of hazardous chemical materials listed in Ministerial Order No. 7 of 2002 with respect to the Control Over the Import and Use of Banned and Strictly Restricted Chemicals and any other chemicals specified by the General Directorate for the Protection of the Environment and Wildlife under this Regulation, with a view to eliminating or limiting the spread of its effects that are harmful to human health and the environment (including work environment and external environment).

12. Ministerial Order No. 110 of 2006 Concerning the formation of a national committee to register pesticides.

This order established the Pesticides Registration Committee for registration of agricultural and public health pesticides.

13. Ministerial Order No. 5 of 2011 Concerning forming a national committee for prohibition of the development, production, stockpiling and use of chemical weapons and on their destruction

This order established the National Registration Committee for the implementation of the Chemical Weapons Convention.

14. Ministerial order no. 31 of 1977 with respect to “provision for the protection of workers from the hazards of highly flammable liquids and liquefied petroleum gases”

This order organizes all processes related to the use, storage and transport of specifically highly flammable substances in indoor and outdoor workplaces. It is also states the duties of employers and employees

3.3 Existing legislation by use category addressing various stages of chemicals from production/import through to disposal

Table 3.D: overview of legal instruments to manage chemicals by use category

Category of chemical	Import	Production	Storage	Transport	Distribution/Marketing	Use/ Handling	Disposal
Pesticides (agricultural, public health and consumer use)	X	X	X		X	X	X
Fertilizers	X	X	X	X	X	X	X
Industrial Chemicals (used in manufacturing/ Processing facilities)	X	X	X	X	X	X	X
Petroleum Chemicals	X	X	X	X	X	X	X
Consumer Chemicals	X	X	X	X	X	X	X
Chemical Wastes	X	X	X	X		X	X

3.4 Summary description of key approaches and procedures for control of chemicals

1. Labeling of pesticides: point 2 of article 6 (Legislative decree no. 11 of 1989 governing pesticides).

2. Registration of pesticides: article 8 (Legislative decree no. 11 of 1989 governing pesticides).

3. Licenses for pesticides: articles 9 to 12 (Legislative decree no. 11 of 1989 governing pesticides).

4. Inspections regarding pesticides: article 13 (Legislative decree no. 11 of 1989 governing pesticides).

5. Licenses for setting up or managing an industrial establishment: articles 1 to 15 (Legislative decree no. 6 of 1984 governing the organization of industry).

6. Registration of industrial establishments: articles 16 to 27 (Legislative decree no. 6 of 1984 governing the organization of industry).

7. Inspection of industrial establishments: article 28 (Legislative decree no. 6 of 1984 governing the organization of industry).

8. Load of vehicles and trucks: articles 66 to 77 and articles 131 to 133 (Ministerial order no. 28 of 1979 – the implementation regulation of road traffic law enacted by decree law no. 9 of 1979).

9. Use of pesticides: article 10 (Legislation decree no. 21 of 1996 concerning the environment).

10. Permits for discharge and storage of wastes: articles 13 and 18 (Legislation decree no. 21 of 1996 concerning the environment).

11. Production, handling and disposal of dangerous materials: articles 14 and 15 (Legislation decree no. 21 of 1996 concerning the environment).

12. Processing of wastes: article 19 (Legislation decree no. 21 of 1996 concerning the environment).

3.5 Regulated mechanisms for managing chemicals

Existing regulatory schemes and processes for assessing new chemicals

Registration of banned and restricted chemicals substances are regulated by the resolution number (7) of the year 2002 relating to the control of the import and the use of banned chemicals and substances subject to limitations.

Banned chemicals and restricted chemicals can be any gas, liquid or solid substance on the list attached to the resolution. These chemicals according have been proven to be highly dangerous to humans, animals, and plants by regional and international organizations or research, and studies. They may also negatively affect the environment due to their toxicity, explosiveness, inflammability or corrosiveness. They may, alone or with other substances, have hazardous effects on public health or the environment.

Banned chemicals are substances whose import, use and production are not allowed within the territory of the kingdom.

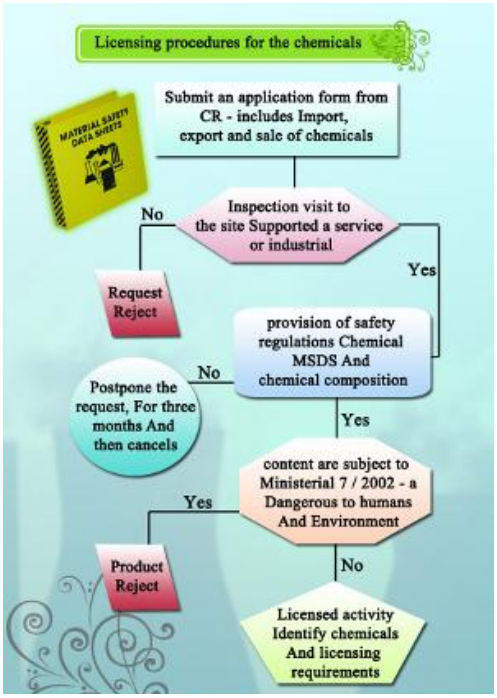


Figure 3.1 Licensing Procedures for chemicals

Restricted chemicals are substances that can be used for a specific activity only. Their use is not allowed for any other purpose than for the specific use stipulated in the regulations issued by the environment office with the consent of the officials bodies.

The procedure for licensing chemicals in shown in Figure 3.1. Three types of permissions are granted by the Chemical Safety Group (CSG). These are as follows: import, export or sale chemicals and chemical products; asbestos removal; and import, export and sale of ozone depleting substances and their alternatives. Only registered importers of chemicals are allowed to import, use and sell chemicals to local users. Agricultural chemicals, pesticides, detergents and cosmetics are excluded from this procedure. The CSG permits users and importers of chemicals based on the Ministerial order 5 of 2005. The conditions are a) the chemical activity should be permitted in the services or industrial areas; b) the location or activity should be at least 60 meters away in all directions from residential areas.

Through the ministerial order 7 of 2002 Material Safety Data Sheets (MSDS) of chemicals and chemical products need to be submitted to the CSG.

Pesticides Registration Committee

The mandate of the Pesticides Registration Committee is to register pesticides for agriculture and public health use. Its members are:

- Ministry of Municipalities Affairs and Urban Planning, Agriculture Planning and Development Authority
- Public Commission for the Protection of Marine Resources, Environment Wildlife, for Environment Control Directorate
- Ministry of Interior, The General Directorate of Civil Defense -Protection and Safety Directorate
- Ministry of Industry and Commerce, Standards and Metrology Directorate
- Ministry of Interior, Customs Affairs
- Ministry of Health, Pubic Health Directorate, Environment Health Section
- Ministry of Interior, General Directorate of Investigation and Criminal Evidence

The Committee is chaired by the Ministry of Municipalities and Urban Planning Affairs, Directorate for Agriculture.

The Committee is competent to register agricultural and public health pesticides as follows:

- Study and review of submitted applications to the competent authority for registration.
- Verify that the data provided in the registration application is in accordance with the conditions of registration as set out in Article (6) of the Regulations for the Law of pesticides, the committee may seek the assistance of experts in this field.
- adopt registration forms of pesticides.
- identify pesticides that may be brought within the recording database.

- commission some specialists to evaluate the performance, effectiveness and impact of pesticides registered for human and animal health and the environment.
- receive results of the evaluation of pesticides.
- study and review applications for registration or re-registration received and recommend to the competent authority to register or re-register pesticides that have met all the registration requirements set forth in the Regulations for the Law of pesticides. The Committee may recommend to refuse registration of any pesticide or refuse re-registration, in which case the applicants are informed of the reason

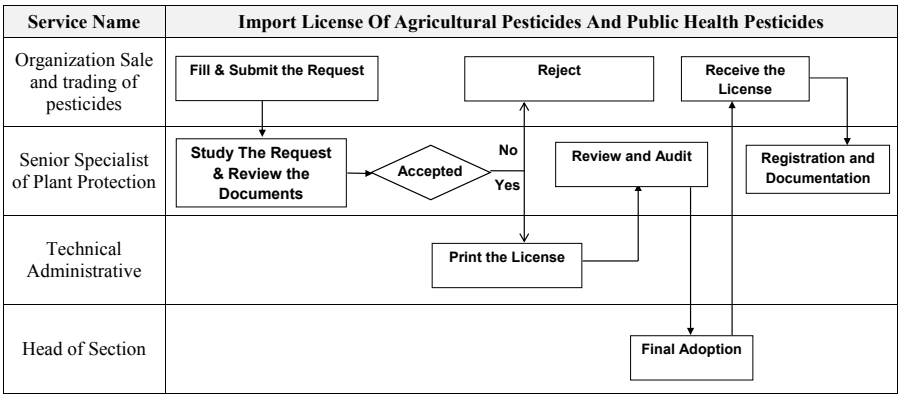


Figure 3.2: Importing License of Agricultural pesticides and public health pesticides

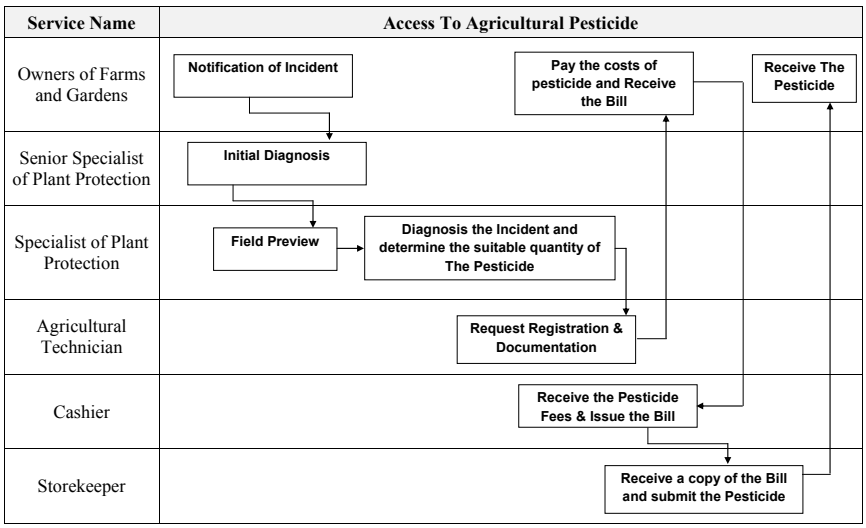


Figure 3.3: Access to Agricultural pesticides

Consumer products

Several cosmetics and other related consumer products have been receiving much attention in Bahraini markets. Bahraini consumers have shown a growing affinity to this sector of the market for the past decade, they have been inclined, just like other consumers all around the world, to purchase such items to apply to their bodies for cleansing, beautifying and altering their overall appearances.

This phenomenon is pleasing in presenting the increasing awareness of Bahraini consumers to international standard, yet it is fearful because cosmetic products may have adverse effects if not properly produced, managed, stored or distributed. Consumers should be able to benefit from products without negative effects on bodily structures.

After placing the situation into perspective, it is realized that the Kingdom is in need of a consumer safety authority as part of the Ministry of Health organizations, to identify and highlight the associated risks with such products, increasing consumer awareness towards them, while taking action against the issue, to reach an overall objective that promotes consumer safety.

Therefore "Consumer Products Safety Group" has been established in 2005, The main goal of this group is to ensure the safe use & avoid all adverse effects associated with cosmetics & other related consumer products in the Kingdom of Bahrain.

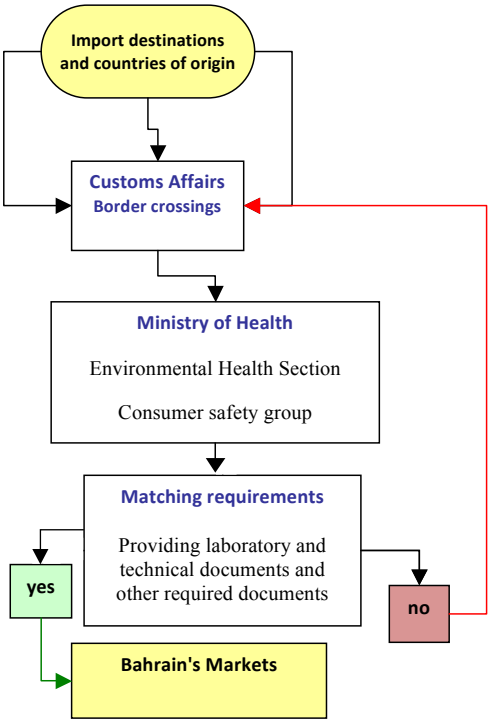
The purpose

1. To define the manner in which this Group controls, examine and supervise the safety and quality of consumer products as well as the importing, exporting, manufacturing and storage conditions.
2. Establish a relevant classification of the products into "every day" and "medical" use.
3. Promote consumer awareness about the products constituents and the healthy use.

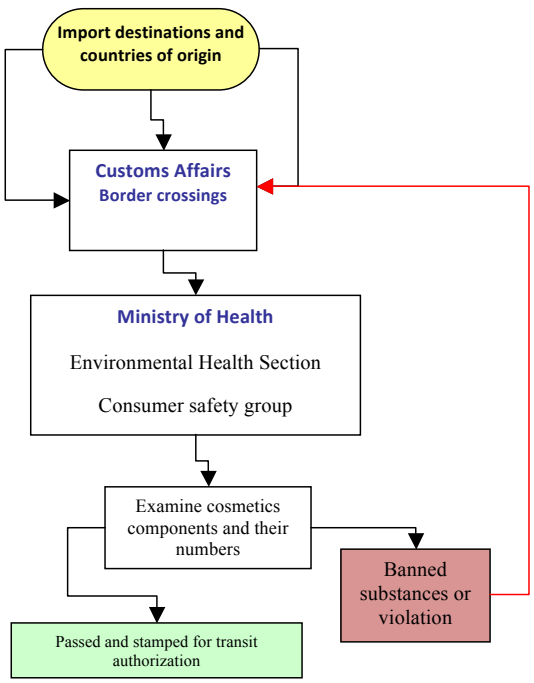
Objectives

1. To secure the safety and high quality of cosmetic products.
2. Eliminating all un-necessary adverse effects.
3. Developing guidelines for such products.
4. To maintain and enhance the protection of public health.

The mechanism used to take prior permission for the importation of cosmetics



The mechanism used to make way for cosmetics brought in by the Customs



3.6 Assessment

The existing legal tools are sufficient for the control and management of chemicals, but they are scattered in various laws and suffer from a lack of coordination and weak cooperation among the concerned stakeholders. Therefore, there is a need to create effective and clear legal mechanisms to implement and enforce these laws, and to avoid duplication and overlapping in the management of chemicals.

Therefore, we recommend the establishment of a national committee for chemical management in the country to enhance the control and monitoring of the chemicals life cycle. This committee should operate in close coordination and cooperation with the National Committee for Pesticides Management.

The legal tools shall also be updated. For instance, Legislation Decree no. 21 of 1996 concerning the Environment was developed in 1996. This fundamental environmental law needs to be updated to reflect the changes of the past 14 years in environmental governance.

Also, there is a need to raise awareness as among the legal and legislative circles in the target groups with regard to chemicals-related legislative and legal tools. For example, the private pest control sector is represented by very few professional companies that have experienced staff. Other enterprises, mainly in the cleaning and maintenance sector, use these chemicals for pest control (sometimes free of charge) while doing the household cleaning. This sector should receive more attention, and should be better regulated by legislations and thus must be observed by a professional body.

CHAPTER 4

Ministries, Agencies and other Governmental Institutions Managing Chemicals

Background

In addition to government ministries, various NGOs outside of the Government play an increasingly important role in strengthening chemical management at the national and local levels. Industry for example has a major responsibility to reduce chemical risk throughout chemical cycle, likewise the public interest groups.

Purpose

To describe and analyze the mandates and programs of different ministries, agencies and other governmental institutions responsible for, and concerned with, various aspects of chemicals management.

This Chapter outlines the responsibilities and mandates of each governmental ministry and their role in the management of chemicals.

Methodology

To obtain the information requested in this chapter, a questionnaire was distributed among the governmental organizations, and personal interviews with representatives of companies and ministries were conducted. Responses have been collected, analyzed, and summarized. A list and a summary of the results were tabulated.

4.1 Responsibilities of Different Government Ministries, Agencies and Other Institutions

Table 4.1: Responsibilities of Government Ministries, Agencies and Other Institutions

1. Food or water additives

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	-	-	-	-	-	-	X
Finance	Ministry of Interior Customs Affairs	X	-	X	X	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	X	X	-	-	-
Agriculture	Clinic Division	-	-	-	-	-	-	-
	Division of Plant Protection	-	-	-	-	-	-	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	-	-	-	-	-	-	-
	Food Hygiene Section	-	-	X	X	X	X	X
Labor	Occupation Safety Section	-	-	-	-	-	-	-

2. Pesticides

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	-	-	-	-	-	-	X
Finance	Ministry of Interior Customs Affairs	X	-	X	X	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	X	X	-	-	-
Agriculture	Clinic Division	-	-	-	-	-	-	-
	Division of Plant Protection	X	-	X	-	X	X	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	X	-	X	X	X	X	X
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	-	-	-	-	-

3. Fertilizers

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	-	-	-	-	-	-	X
Finance	Ministry of Interior Customs Affairs	-	-	X	X	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	-	-	-	-	-	-	-
Agriculture	Clinic Division	-	-	-	-	-	-	-
	Division of Plant Protection	X	-	X	-	X	X	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	-	-	-	-	-	-	-
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	-	-	-	-	-

4. Laboratory chemicals

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	X	X	X	X	X	X	X
Finance	Ministry of Interior Customs Affairs	-	-	X	X	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	X	X	-	-	-
Agriculture	Clinic Division	X	-	X	-	X	X	-
	Division of Plant Protection	X	-	X	-	X	X	-
	Agricultural Laboratories	X	-	X	-	-	X	-
Health	Environmental Health Section	-	-	-	-	-	-	-
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	-	-	-	-	-

5. Drugs (medicines)

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	-	-	-	-	-	-	X
Finance	Ministry of Interior Customs Affairs	X	-	X	-	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	-	-	-	-	-
Agriculture	Clinic Division	-	-	X	-	-	X	-
	Division of Plant Protection	X	-	X	X	X	X	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	-	-	-	-	-	-	-
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	-	-	-	-	-

6. Paints, dyes and thinners

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	X	X	X	X	X	X	X
Finance	Ministry of Interior Customs Affairs	X	-	X	-	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	-	-	-	-	-
Agriculture	Clinic Division	-	-	-	-	-	-	-
	Division of Plant Protection	-	-	-	-	-	-	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	-	-	-	-	-	-	-
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	-	-	-	-	-

7. Explosives and flammables

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	X	X	X	X	X	X	X
Finance	Ministry of Interior Customs Affairs	X	-	X	X	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	X	X	X	X	X
Agriculture	Clinic Division	-	-	-	-	-	-	-
	Division of Plant Protection	-	-	-	-	-	-	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	-	-	-	-	-	-	-
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	X	X	-	X	-

8. Consumer chemicals

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	-	X	X	X	-	-	X
Finance	Ministry of Interior Customs Affairs	X	-	X	X	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	X	X	-	-	-
Agriculture	Clinic Division	-	-	-	-	-	-	-
	Division of Plant Protection	-	-	-	-	-	-	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	-	-	-	-	-	-	X
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	X	X	-	X	-

9. Petrochemicals

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	X	X	X	X	X	X	X
Finance	Ministry of Interior Customs Affairs	X	-	X	-	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	X	X	X	-	-
Agriculture	Clinic Division	-	-	-	-	-	-	-
	Division of Plant Protection	-	-	-	-	-	-	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	-	-	-	-	-	-	-
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	X	X	-	X	-

10. Ozone Depleting Substances (ODS)

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	X	X	X	X	X	X	X
Finance	Ministry of Interior Customs Affairs	X	-	X	-	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	X	-	-	-	-
Agriculture	Clinic Division	-	-	-	-	-	-	-
	Division of Plant Protection	-	-	-	-	-	-	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	-	-	-	-	-	-	-
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	-	-	-	-	-

11. Special chemicals for combating insects and parasites

Stage of Life Cycle/Ministry Concerned		Importation	Production	Storage	Transport	Distribution/ Marketing	Use/Handling	Disposal
Environment	Environmental Control Directorate	-	X	X	X	X	X	X
Finance	Ministry of Interior Customs Affairs	X	-	X	-	-	-	-
Commerce	Standardization & Metrication Directorate	-	-	-	-	-	-	-
	Commercial Registration Directorate	X	X	X	X	X	X	X
Interior	Civil Defense	X	-	X	X	-	-	-
Agriculture	Clinic Division	X	-	X	-	- X	X	-
	Division of Plant Protection	-	-	-	-	-	-	-
	Agricultural Laboratories	-	-	-	-	-	-	-
Health	Environmental Health Section	-	-	-	-	-	-	-
	Food Hygiene Section	-	-	-	-	-	-	-
Labor	Occupation Safety Section	-	-	-	-	-	-	-

4.2 Description of Ministerial Authorities and Mandates

There are many ministries and other governmental bodies involved in the management of chemicals in Bahrain. Each ministry has a mandate and role to manage chemicals.

1. The Supreme Council for Environment

The Council has the overall mandate for environmental protection in the Kingdom of Bahrain. It has a special unit responsible for the management of chemicals through the control of import, export, storage, handling and disposal of chemicals, to ensure occupational and environmental safety in the Kingdom of Bahrain. Its Environmental Control Directorate (ECD) hosts the focal points for SAICM, Basel and Stockholm Conventions, and ECD is the Focal Point for Intergovernmental Forum on Chemical Safety (IFCS) and Stockholm Conventions. It hosts also the Focal Point of the Basel Convention and is responsible for the issues concerning the Prior Informed Consent Procedure.

Environmental Control Directorate

The mission of the ECD is to draw up plans, policies and mechanisms for the management and protection of the environment and to ensure industry compliance with the environmental standards and regulations for maintaining a safe and healthy environment in order to achieve sustainable development for the present and future generations. Its objectives are:

i) To plan and formulate rules, regulations, policies, standards and legislation for the control of pollution caused by industries, waste management, and conservation of environmental resources;
ii) To prepare, implement, monitor and ensure compliance with environmental legislation by the users and industries to safeguard the human health and the fragile eco-system of the country;
iii) To react and attend to any environmental emergency occurring within the territory of Bahrain;
iv) To control storage, handling, movement, treatment, disposal, import, and export of potential and hazardous substances, wastes and chemicals;
v) To fulfill the country's local, regional and international commitments related to the management, monitoring and control of pollution and environmental resources.

The main mandates of ECD in relation to POPs management and chemical safety in general are to:

- Prepare and implement rules and regulations for the protection of the environment, safety of people, and waste management;
- Prepare, participate, and ratify regional and international conventions and protocols on environmental plans pollution control;
- Develop and implement plans and procedures for emergency preparedness against pollution disaster and occupational risks;
- Study applications for opening of new service areas and industrial establishments and ensure compliance with environmental criteria;

- Conduct studies and field surveys to determine the quantity and quality of waste production and suggest the techniques and methodologies required for its treatment, and to minimize their risks;
- Develop management and monitoring plans for environmental control of POPs sources in the working environment;
- Establish criteria and procedures for management and monitoring of hazardous waste;
- Control importation, storage, handling, transportation, transfer, and disposal of hazardous and toxic materials and dangerous equipment whether chemical, biological or physical. And control illegal transboundary trade of dangerous goods in Bahrain's territory and coastal waters;
- Prepare plans and procedures for reduction, minimization, and recycling of waste;
- Set up mechanisms to follow up/reduce of environmental violations and follow up compensations;
- Recommend environmental health criteria and procedures to protect workers against occupational hazards and pollution and to safeguard the public health of citizens and coordinate with the Ministry of Health in this regard;
- Study and measure the existing environmental problems and suggest the optimum and feasible solutions;
- Conduct laboratory measurements regarding the contamination of soil, water, air, coastal, and marine environment;
- Establish and develop a functional referral laboratory to undertake testing and analysis of pollutants and environmental parameters to national, regional, and global requirements;
- Participate in national, international, and regional programs concerned with the evaluation of laboratory performance;
- Prepare programs required for development and training of technical and professional staff.

2. Ministry of Interior

2.1 Customs Affairs

Customs supervises the import and export of cargo (including chemicals), and is also responsible for taxation of these cargoes, including chemicals.

The mission and vision statements of Customs encapsulate the essence of Bahrain Customs. Customs' aim is to help promote the growth of Bahrain as a global centre of economic activity, attracting foreign investment and enterprises, whilst at the same time ensuring that they safeguard the society and local economy from illegitimate goods.

Customs supervises the import and export of cargos (including chemicals), which is also responsible for taxation on these cargoes.

2.2 Civil Defense

The General Directorate of Civil Defense approves and supervises the location of business for certain commercial activities that may require specific fire and safety

regulations. The Directorate inspects the business location, if applicable, and ensures that sufficient safety measures are in place.

Civil defense means taking the necessary measures for protection of civilians, ensuring the safety of transportation means, protection of public buildings, facilities, organizations and projects, private properties, preservation of archaeological sites and works of art from the hazards of air raids and other war and arson acts. In addition to minimizing the effects of war and arson acts, civil defense also includes extending assistance to the persons aggrieved from such acts in general, ensuring the continuation of the smooth work and operation of public utilities in the event of war or peace, emergencies, natural disasters or martial law, whilst ensuring public order, stability, and national security.

3. Ministry of Industry and Commerce

3.1 Commerce - Standardization & Metrication Directorate (SMD)

The Vision of SMD is to standardize services for industrial, economic, and administrative development of the country, and to promote the concept and practice of quality, productivity improvement, and active participation in international standardizations.

The mission of SMD is as follows:

- To harmonize the national standards and technical regulations with the international standards and best practices with a view to facilitate and boost trade exchanges and promote international trade;
- To improve productivity, quality, and market access for businesses and industries, protect consumer interests and enhance safety, health, and environmental conditions for Bahrain through the use of the appropriate technical regulations and standards;
- To develop and enforce technical regulations fully consistent with WTO principles and agreements for imports and locally produced products pertaining to health, safety, and environment conservation;
- To enhance the competitiveness of the Bahraini economy by providing a uniform and accurate national system of traceability of measurement for industry and trade, thereby protecting the interests of consumers, traders, and other users, and raising the level of measurement technology in Bahrain.

SMD aims at fulfilling the following objectives:

- Prepare technical regulations, standards, and conformity assessment procedures for Bahrain through a national program based on regional and international standards and best practices;
- Increase quality performance and productivity in Bahrain;
- Establish the basis on which conformity certificates and quality and conformity marks are issued in order to enhance the conformity and/or quality of national products;
- Control and monitor the conformity of products, both imported and locally manufactured, through a mechanism for compliance with technical regulations to assure safety, protect health, and safeguard the environment from ecologically hazardous goods;

- Establish and maintain a national laboratory for measurements as a reference for national measurement in line with regional and international standards;
- Establish and maintain laboratories to enhance testing facilities to meet the requirements of standardization and related activities;
- Monitor the calibration of measurement equipment, and organize legal and industrial metrology inspections;
- Establish and develop a Standards Information Centre which will act as the technical enquiry and WTO/ The Agreement on Technical Barriers to Trade (TBT) Enquiry point;
- Spread awareness on the importance of standardization and application of technical regulations and promote the services of the directorate in this respect;
- Provide training services in all standardization-related activities;
- Promote metrology at the regional and international levels;
- Coordinate with other regional, Arab, and international standards organizations in development and implementation of standards, in particular with the Gulf Standardization Organization (GSO) for GCC countries and the Arab Organization for Industrial Development and Mining (the Arab Centre for Standards & Metrology). and International Organization for Standardization.

3.2 Commerce - Commercial Registration Directorate (CRD)

The mission of CRD is to administer and control the Commercial Register for all trading businesses in the Kingdom of Bahrain, to ensure that the commercial sector is active, competitive, and operates in a manner that is complementary to the culture of the country and its people, beneficial to the economy, the needs of the consumer, and the trading environment as a whole. It suggests continued improvement related to the commercial registration law and internal procedures for business improvement, encourages investors to employ national labor to manage and operate projects in the private sector, and promotes economic activities which will contribute significantly to the development of the national economy as a whole.

Main duties & responsibilities include:

- Issuing commercial licenses and collection of commercial regulation fees in accordance with the rules and regulations;
- Processing of new commercial license applications and requests for amendments and cancellations;
- Coordinating with other Government bodies concerned regarding commercial licenses and following up to ensure the completion of procedures for the issuance of the final registration document;
- Following up the collection of the commercial registrations renewal fees;
- Maintaining a comprehensive database of all relevant information related to commercial registration including details of the registration holders, business locations, and the business activities approved to be carried on under the license;
- Providing individuals, organizations, and government bodies with true copies and other required documentation concerning commercial licensing as included in the database;

- Issuing periodical reports on commercial licenses, fees collected, and other relevant new information using the database;
- Preparing economic studies on the general situation of the commercial sector in the country and submitting recommendations for policy changes required for the future development of the commercial sector;
- Conducting periodical inspections on all commercial establishments in the country to ensure their compliance with laws and regulations in force;
- Supervising the implementation of the new Commercial Registration Computer System in co-ordination with Central Informatics Organization (CIO);
- Coordinating with relevant Government bodies concerning the exchange of information through the computer network;
- Developing new procedures and regulations for future improvement of commercial registration services and products in line with the needs of the economic development of the country.

4. Ministry of Municipalities and Urban Planning

Agriculture - Clinic Division

- Giving licenses to import drugs (medicines) and special chemicals for combating insects and parasites.
- Employees are postgraduates.

Agriculture - Division of Plant Protection

- Issuing pesticides regulations and giving licenses to import agricultural pesticides.
- The total number of employees is 24.
- There are two leading figures, one having PhD, and the other having Master's degree.

Agricultural Laboratories

- There are four technicians working in the lab together with a laboratory official.
- The official of the agricultural laboratories is postgraduate.

5. Ministry of Health

Environmental Health Section

The section it is charged with the responsibility of control of all diseases that relates to vectors, the main one being Malaria, which is endemic in the northern region of the country. Though the unit is within the Public Health Department, no provision specific to regulation of DDT is provided for in the Public Health Act; probably because Bahrain has not been using this insecticide for a while. This may be the case with other Acts that regulate the use of insecticide.

- Role: use of pesticides and storage until reuse.
- There are 200 employees working in this section.
- Three employees holding Master's degrees.

Food Hygiene Section

Analysis of water and food produced in or imported into the country is performed to ensure that they do not contain banned additives, or that the level of additives is not higher than the accepted level. Administrative procedures are taken against any industrial establishment if it is considered to be a source of chemical pollution that reaches places where food is prepared or produced.

- Some employees hold PhD and Master's degrees.

Public Analyst's Laboratory

The statutory role of the Public Analyst's Laboratory is to test food and water for compliance with the relevant legislation and guidelines. It plays a key role in public health and consumer protection by analyzing the chemical contaminants of food and water in order to ensure that it is safe for human consumption. The laboratory has a vital role in food safety by providing objective scientific evidence for the safety and quality of the food and water that we eat or drink. It provides data for proper risk assessment and risk analysis of food.

The laboratory works closely with the Food and Environmental Hygiene Departments in Public Health Directorate, Fisheries, and universities in Bahrain in the implementation and enforcement of the various pertinent regulations under the Public Health Services Ordinance.

6. Ministry of Labor

Occupational Safety Section

This Section is responsible for occupational safety, including the safe handling of chemicals. Its mandate is to enforce the Labor Act for the Civil Sector (23) of 1976, whose main aim is to regulate the conditions of employment in factories and other places of work with regard to safety, health, and welfare of persons employed. The Act covers all hazards that are found in workplaces, including a wide range of places of employment where chemicals are formulated, used, and packaged for the purpose of trade. The Section enforces the regulations of Bahrain labor law – section 12, 1976 as well as 27 ministerial orders related to occupational health and safety.

Main Functions

- Periodically inspecting the private sector establishments and taking legal actions against those which violate the safety and health law;
- Inspecting workers' residences and assuring they fulfill the safety and health requirements;
- Inspecting workers' complaints regarding occupational safety and health issues;
- Investigating occupational accidents and injuries and preparing technical reports about them;
- Organizing seminars, conferences and lectures in the safety and health field;
- Carrying out research on occupational safety and health in the Kingdom of Bahrain;
- Providing advice and approval to the institutes that organize safety and health training programs;

- Designing and releasing different types of booklets, posters, and brochures regarding occupational safety and health in several languages.

In addition to the above list of functions, the Ministry of Labor also carries out the following role in the **National Supreme Health and Safety Committee:**

The National Supreme Health and Safety Committee was appointed by H.E Minster of Labor by the ministerial order no. (4) of 1998, in order to advise the Ministry on the future direction of health and safety in the Kingdom of Bahrain. This Committee is made up of all of the major health and safety stakeholders in the country; it consists of 14 members with interest in both occupational safety and health. This Committee, in cooperation with the Occupational Safety Section in Ministry of Labor, carries out research and studies in the field of occupational health, organizes conferences, seminars, and workshops on health and safety, and supports occupational safety and health. The Committee is also responsible for the ratification of the international conventions on health and safety. For instance, the Committee is currently preparing to study the International Labour Organization's Chemicals Convention No. 170 of 1990.

7. General Organization of Sea Ports

Key responsibilities of the ports are:

- store cargos (including chemicals) for limited periods;
- Develop and enforce maritime and logistics zones regulations and standards that reflect international best practice and adhere to all necessary conventions;
- Optimize linkages between all of Bahrain's ports and logistics zones to facilitate seamless movement of goods;
- Contribute to preserving and protecting Bahrain's marine environment.

4.3 Assessment

There is a need to establish a clear mechanism among the authorities involved in chemicals management and, in particular, to improve the coordination between Customs and the DEC. This mechanism will facilitate and solve the problems of interference between the parties in this area, such as the formation of a specialization committee on chemicals to control licensing and approval.

CHAPTER 5

Relevant Activities of Industry, Public Interest Groups, Professional Bodies and the Research Sectors

Background

In addition to Government Ministries, various non-governmental bodies outside of the Government play an increasingly important role in strengthening chemical management at the national and local levels. Industry and public interest groups, for example, have a major responsibility to reduce chemical risk throughout the chemical life cycle.

Purpose of the chapter

The purpose of this chapter is to describe and review activities of non-governmental bodies and entities which can support national efforts to manage chemicals.

Methodology

To obtain the information requested in this chapter, a list of the major non-governmental bodies was prepared. The company names and addresses in the major industries were supplied by the Ministry of Oil and Industry. Other NGOs such as laboratories, universities, and societies where identified from the national telephone directory. A list of the identified NGOs was tabulated in Table (5.1), which shows the name, activity, and address of each entity. The list of NGOs mentioned in Table (5.1) was classified into four classes of chemicals (studies, industrial chemicals, consumer chemicals, and chemical waste) according to the activity of each NGO.

Questionnaires were sent to thirty one NGOs in order to gain an overview of the nature of expertise in NGOs which might be available to support national programs and policies related the chemicals management. 50% responded and results were analyzed and tabulated in Table (5.2).

Table 5.1: Description of Organizations / Programs

#	Organization	Activity/ies	Address
1	Al-Mashal Chemical Industries	Manufacture of Industrial & Domestic detergents	P.O. Box 2533 Phone: 17 830500 Fax: 17830322
2	Aluminum Bahrain "ALBA"	Aluminum Production	P.O. Box 570 Phone: 17 830000 Fax: 17 830083
3	Bahrain Aluminum Extrusion Company	Aluminum Bars, Angles, Sections and Shapes	P.O. Box 1053 Phone: 17730073 Fax: 17736924
4	Bahrain Fiberglass International Ltd.	Fiberglass Boats, water tanks & special designs	P.O. Box 26197 Phone: 17727063 Fax: 17 727615
5	Bahrain Medical & Industrial Gas	Production of Medical & Industrial Gases	P.O. Box 778 Phone: 17400473 Fax: 17 400391
6	Bahrain National Gas Company	Liquefied Petroleum Gas (from Natural Gas)	P.O. Box 29099 Phone: 17 756222 Phone: 17754145 Fax: 17756991
7	Bahrain Petroleum Company (BAPCO)	Oil and Allied Products	P.O. Box Phone: 17754444 Fax: 17 752924
8	Chem - Tech (Chemical Technology Co.) W.L.L	Industrial & Cleaning Chemicals	P.O. Box 10941 Phone: 17 736900 Fax: 17 736376
9	Berger Paints Bahrain	Manufacture of Paints, Putties and Thinners	P.O. Box 26688 Phone: 17 730700 Phone: 17 735483 Fax: 17730689
10	Gulf Acids Industries	Sulfuric Acid	P.O. Box 2770 Phone:17 730686 Phone : 17735194 Fax: 17731991
11	Gulf Aluminum Rolling Mill Co. B.S.C.	Aluminum Plates, Strips & Foil	P.O. Box 20725 Phone: 17731000 Phone: 17736698 Fax: 17730542+17735889
12	Gulf Investment Industrial Company	Rolling Mill	P.O. Box 50177 Phone: 17673311 Phone: 17464222 Phone: 17677134 Fax: 17675258
13	Gulf Petrochemical Industries	Ammonia, Methanol & Urea	P.O. Box 26730 Phone: 17 7731777 Phone: 177322490 Fax: 17731047

#	Organization	Activity/ies	Address
14	Gulf Power Beat	Car Batteries	P.O. Box 10253 Phone: 17 830831 Fax: 17830832
15	Hempel Paints (Bahrain) W.L.L.	Manufacture of Paints, Varnishes	P.O. Box 997 Phone: 17728668 Phone: 17729801 Phone: 17727012 Fax: 17729951
16	Maskati Bros.	Plastic Bags, Household Products, Paper Products	P.O. Box 24 Phone: 17729911 Fax: 17725454
17	Middle East Tyre Retreading Plant	Tyre Retreating	P.O. Box 495 Phone: 17 727350 Phone: 17784640 Phone: 17785495 Fax: 17261456
18	Middle East Detergent Ind.	Detergents	P.O. Box 26648 Phone: 17727350 Phone: 17729022 Phone: 17729022 Fax: 17 727466 Fax: 1717729022
19	National Chemical Industries Corporation	Sodium Sulfite & Sodium Metabisulphite	P.O. Box 10249 Phone: 17 735757 Fax: 17731076 Fax: 17730435
20	Olayan Kimberly Clark	Tissue and Paper Products	P.O. Box 33124 Phone: 17 830699 Phone: 17830688 Phone: 17830449 Fax: 17 830449
21	Sika Gulf	Construction Chemicals	P.O. Box 15776 Phone: 17735560 Phone: 17735287 Fax: 17732476
22	Unitco Al Bahrain Est.	Manufacture of Paints, Varnishes	P.O. Box 1018 Phone: 17 403008 Fax: 17403002
23	Yateem Oxygen Factory	Production of Medical & Industrial Gases	P.O. Box 60 Phone: 17 400675 Fax: 17400446
24	Zeera United Factories	Plastic Bags, PP mats, PP woven Sacks, Paper Envelopes & Paper Products	P.O. Box 696 Phone: 17 730030 Phone: 17730352 Phone: 17730333 Fax: 17731608
25	Bahrain Training Institute (BTI)	Eng. and Office Works Training, Teaching Environmental & Health Courses	P.O. Box 33090 Phone: 17 681222 Fax: 17688499

#	Organization	Activity/ies	Address
26	Bahrain Society of Engineers	Lectures, Training & Public Awareness Programmes	P.O. Box 835 Phone: 17727100 Phone: 17729761 Fax: 17729819
27	Bahrain Chemist Society	Lectures, Training & Public Awareness Programmes	P.O. Box 26909 Phone:17293963 Fax:17293694
28	University of Bahrain	Teaching Chemistry, Conducting researches and lab testing	P.O. Box 32038 Phone: 17 449999 – 17 681234 Phone: 17438888 Phone: 17876666 Fax: 17683278
29	Arabian Gulf University	Teaching Chemistry, Conducting researches and lab testing	P.O. Box 26671 Phone: 17 239999 Fax: 17272555 Fax: 17230730
30	Collage of Health Sciences	Environmental & Health Sciences Teaching	P.O. Box 12 Phone: 17 255555 Phone:17288888 Phone:17252605 Fax: 17230730

5.2 Summary of Expertise Available outside of Government

The nature of expertise available in NGOs that might support chemicals management in Bahrain varies from one to another according to the activities they carry out. To gather information on the situation, a questionnaire on fields of expertise was sent to 31 organizations that deal with chemicals. Out of these, 15 responses were received, which is almost 48%. The responses were analyzed and shown in table 5.2. Availability of the expertise in the organization shown by the letter (Y) and the unavailability shown by the letter (N).

Table 5.2: Summary of Expertise Available Outside the Government

Field of Expertise	Research Institutes	Universities	Industry	Environmental Consumer Group	Labor Union	Professional Organizations	Laboratories
Data Collection	N	Y	Y	N	N	Y	N
Testing of Chemicals	Y	Y	Y	N	N	N	Y
Risk Assessment	Y	Y	Y	N	N	Y	N
Risk Reduction	Y	Y	Y	N	N	Y	N
Policy Analysis	Y	Y	Y	N	N	Y	N
Training & Education	Y	Y	Y	N	N	Y	N
Research on Alternatives	Y	Y	Y	N	N	N	N
Monitoring	N	N	Y	N	N	N	Y
Enforcement	N	N	Y	N	N	N	N
Information to Workers	N	Y	Y	N	N	Y	Y
Information to Public	Y	Y	Y	N	N	Y	N

The information provided in the table came as a result of analyzing responses from the related designations
(Y) Expertise is available
(N) Expertise is not available

5.3 Assessment

1. Environmental and consumer groups, as well as labor unions, currently exist. However, they are willing to support national programs and policies related to chemicals management.

2. Industry has sufficient knowledge about chemical safety and management, and can support national programs in this area. The expertise in each company is limited to its own materials and needs.

3. Research institutes, universities, and industry have expertise in the majority of chemicals-related fields.

4. There is no specific policy concerning opportunities for NGOs to obtain government information related to the management of chemicals. However, such information can always be supplied to any NGOs, either through official requests or on an informal basis.

5. The government policy providing an opportunities for NGOs to provide information to the government related to the management of chemicals or any environment issue is mandatory, According to Article "3-3" of Legislative Degree no 21 of 1996, any NGO has "the right to request details which it deems essential, from any authority undertaking an activity which may lead to pollution or environmental deterioration".

6- NGOs have an important role to play in government decision-making in the area of chemicals management. Before any legislation or regulation is issued, the first draft is sent to all concerned parties in and out of the government for review. Their comments are reviewed and incorporated into the final draft and re-reviewed before issuance.

7. There are some voluntary initiatives in industries, which are successful and supplement the chemical management activities of the Government, such as asbestos remediation, hazard communication, and process safety management, provided that most industries are looking to get ISO 14000 series related to safety management.

8. NGOs can play a vital role in the promotion of public awareness on safety, health, and occupational health (e.g. Safety Week). Societies organizing workshops and seminars about chemical risks, and distribute leaflets and stickers.

9. NGOs can give recommendations and comments on the draft legislation/regulations which are usually taken into consideration by the government and incorporated into the final draft of the legislation and regulation.

10. There are no specific studies conducted by NGOs relevant to strengthening government capacity for chemicals management.

11. There is good corporation in the issue of chemicals management; all stakeholders are involved, as demonstrated in the preparation of this National Profile.

CHAPTER 6

Inter-ministerial Commissions and Coordinating Mechanisms

Background

Chemicals management deals with actions, procedures, and methodology that aim or lead to the safe handling of chemicals, with respect to their storage, loading, utilizing, treating, reusing, disposing, etc.

Chemicals management can be achieved through the establishment of monitoring committees, pronouncement of rules or regulations, preparation and implementation of contingency plans, licensing and registration of chemicals, monitoring of industries dealing with chemicals, labeling of chemicals, etc.

Purpose of the chapter

To describe and analyze mechanisms for chemicals management in Bahrain which can facilitate coordination and cooperation among ministries, agencies and other relevant governmental and non-governmental bodies.

Methodology

In order to assess and analyze and evaluate the existing mechanisms for chemicals management in Bahrain, a survey was conducted via distribution of a questionnaire among 59 organizations (governmental and non-governmental). The presentation of the questionnaire contents and aims was done through personal meetings with the representatives from around 83 % of these organizations. Responses were received, after reminders, from 71% of the organizations.

The replies received were analyzed and tabulated. The situation of existing coordinating mechanisms and their effectiveness was evaluated.

6.1: Inter-ministerial Commissions and Coordinating Mechanisms

Table 6.1.1 presents the main parties involved in managing chemicals in Bahrain and the sector or type of chemical covered by each.

Table 6.1.1: Responsibilities and chemicals covered by the main parties in chemicals management mechanisms

Governmental Organization	Responsibilities	Chemicals Covered
Ministry of Health (Pharmacology & Medicine Control Directorate)	1-Approval of licenses for importation and exportation of the some chemicals. 2-Monitoring and control of the use/consumption of various addictive medicines.	-medicines -drugs -food
Ministry of Interior (Directorate of Civil Defense)	1- Monitoring and control of the importation of explosives, flammables and toxic materials for safety and security purposes. 2-Monitoring and auditing of the storage of various chemicals for security and safety purposes.	-Explosives -Flammables -Toxic Materials
Ministry of Interior (Customs Affairs)	Customs supervises the import and export of cargo (including chemicals), and is also responsible for taxation of these cargoes including chemicals.	All import and export of cargo
The Supreme Council for Environment (Environmental Control Directorate)	1-Study impact of chemicals on human health and the environment prior to the approval of a chemical importation or projects dealing with chemicals. 2-Implementation of the National Strategy for Ozone Protection	-All chemicals excluding medicines and explosives. -Ozone depleting substances. -All non-hazardous chemicals that are not

Governmental Organization	Responsibilities	Chemicals Covered
	according to the Montreal Protocol. 3-Disposal of inert or non-hazardous non-industrial chemicals by storing at a dedicated location within the landfill. Some industrial chemicals are temporarily stored in the landfill site until the hazardous industrial/ chemical waste landfill site is constructed and operational. 4-Monitoring and control of environmental pollution (emission to air and effluent to sea) by weekly reporting on sand wash effluents, and reporting on industrial effluents and emissions every 3 months. 5-Legal instruments and legislation concerned with hazardous materials: refer to Chapter 4 for details.	disposed by industries. -Air pollutants: Sulfur dioxide, Nitrogen oxides and suspended particles. Water and sea pollutants: Hydrocarbons, trace metals, phenols, oils and grease. -Isotopes and asbestos.

6.2: Description of Inter-ministerial Commissions and Coordinating Mechanisms

The following table presents the existing inter-ministerial coordinating mechanisms, which help to facilitate a well-coordinated division of responsibilities, and inter-ministerial cooperation related to the sound management of chemicals.

Aim of Mechanism	Organizations Responsible	Chemicals Covered	Mechanism Description	Effectiveness	Current Weaknesses
Monitoring and control of ozone depleting substances (ODSs)	-SCE -Environmental Control Directorate (ECD) - Customs	All ozone depleting substances.	-ECD studies type and quantity of ODS requested by the importer, accordingly the request is permitted or rejected. - Inspector from EA inspects shipments at the customs for monitoring the import of ODS.	Adequate	- Limitation of the trained manpower to identify and control ODS
Monitoring and control of industrial chemicals and industrial projects dealing with chemicals	-Ministry of Industry and Commerce (MOIC) -Authority of oil and Gas -SCE	-Pesticides -Laboratory chemicals -Paints, dyes, Solvents or thinners -Consumer chemicals; -Construction chemicals -Petro-chemicals	- Commercial projects handling chemicals (importation, marketing, and handling, disposals) are registered in MOIC after the approval from the ECD and MOIC. -All industrial projects should be approved by the ECD before they are registered in MOIC and MOI.	Adequate	- Lack of specialized manpower causes inconsistent implementation of these procedures. - Lack of trained inspectors and the deficiency in the harmonized System (Sub-coding of HS) also cause difficulties in the implementation of the monitoring and control procedures. - Need more coordination between the MOIC and ECD.

Aim of Mechanism	Organizations Responsible	Chemicals Covered	Mechanism Description	Effectiveness	Current Weaknesses
Monitoring and control of medicines, drugs and healthy foods	-Ministry of Health (MOH), Directorate of Pharmacology and Drug Control -Ministry of Interior, Customs Affairs -SCE	-Medicines -Drugs -Healthy food - Food additives -Consumer chemicals	-Customs Department relies on the approval of licenses for the importation and exportation of the "chemicals covered" issued by MOH. - Regular inspection and monitoring procedures are applied by MOH on organizations dealing with such chemicals. - Cooperation between MOH and the Ministry of Information to assess the means of public awareness in the area of sound management of medicines and drugs. This is done through lectures, posters, leaflets, etc. - Coordination between MOH and ECD is mainly concerned with waste disposal.	Excellent	-None
Monitoring and control of chemicals covered	-Ministry of Interior, Civil Defense Directorate -Customs	Type 1: Toxic materials, flammables, explosives and their derivatives and raw materials. Type 2: All other types of chemicals.	-The importation of Type 1 chemicals is under efficient control procedures for the sake of national safety and security. This is done through coordination between civil defense and the Customs Directorate. -Registration and regular inspection procedures are done by the Civil Defense Directorate on	Excellent Adequate	-Inspection procedures on Type 2 chemicals may be more efficient if they are carried out through coordination and cooperation with other concerned organizations like EA and Ministry of Oil and Industry. - Further attention should be given to the preparation of an

Aim of Mechanism	Organizations Responsible	Chemicals Covered	Mechanism Description	Effectiveness	Current Weaknesses
			the industrial and commercial organizations to insure safe handling (mainly storage) of Type 2 chemicals. - The Civil Defense Directorate has a vital rule in contingencies, emergencies, accidents, and disasters caused by chemicals; this is done by contingency plans and coordination with other relevant organizations such as Environmental Control Directorate on a case-by-case basis.	Adequate	infrastructure or databases to assess the contingency plans, which deal with all chemicals types. - The mechanisms should be followed by regular meetings and continuous information exchange ,which is not the existing situation.
Monitoring and control of asbestos	- MOIC - SCE - MOH - Ministry of Interior, Customs Affairs	- Asbestos and all products that may contain asbestos	Legal instruments to restrict/ control all handling aspects of asbestos are legislated by the responsible governmental bodies (MOIC, ECD, MOH). There is coordination between Customs, ECD and MOIC to assess the implementation.	Adequate	- Inspection procedures are limited to the main sea port in Bahrain, leaving the other entrance points without such procedures. - Insufficient trained manpower and analytical testing equipment and labs necessary to identify the contents and the type of asbestos. - Absence of public awareness about asbestos and its health impacts.

Aim of Mechanism	Organizations Responsible	Chemicals Covered	Mechanism Description	Effectiveness	Current Weaknesses
Monitoring and control of pesticides	-Ministry of Municipalities and Urban Planning (Agriculture) -ECD - Ministry of Health	All types of pesticides	-Special legal instruments are issued for the sound management of pesticides (importation, use, and spraying)	Adequate	-Implementation of the relevant legal instruments is limited due to insufficient coordination/cooperation between the responsible organizations. - Lack of experienced inspectors at entry points into Bahrain.

6.3: Description of Mechanisms for Obtaining Input from Non-Governmental Bodies

This section illustrates the names of the main relevant non-governmental organizations and industries in Bahrain, the type of input obtained from these organizations, and the mechanisms followed in obtaining such input are listed in Table 6.3.1

Table 6.3.1: Overview of Inter-ministerial Commissions and coordinating Mechanisms:

#	Name of (NGO)	Kind of input obtained	mechanism
1	University of Arabian Gulf	*: participation in chemical management programs (National Profile).	*: Meeting and filling a questionnaire.
2	Society of Health & Safety	*	*
3	Bahrain Training Institute	*	*
4	University of Bahrain College of Science, Chemistry Department	-Periodic reporting to the ECD regarding the strategy of chemicals usage and waste management -Anticipation in chemicals management program.(National Profile)	-Periodic Reporting -Meeting, filling a questionnaire.
5	Bahrain Society of Chemists	-Participation in the preparation of national chemical management program (The National profile)	-Joint committees -meetings
6	Hempel Paints	*	*
7	Gulf Plastic Industries	*	*
8	Gulf Acid Industries	*	*
9	Berger Paints Bahrain	*	*
10	Awal Plastics	*	*
11	National Chemical Industries	* - On a case by case basis, participation with ECD in decision making, in environmental standard (emission and effluent rates).	* -Official letters -Meetings
12	Bahrain Petroleum Company (BAPCO)	* On a case by case basis, participation with ECD in decision making, in environmental standard	* -Joint committee for contingency plans with concerned organizations: e.g.: Oil spills with

#	Name of (NGO)	Kind of input obtained	mechanism
		(emission and effluent rates). Information exchange: Recycling of used oil in Bahrain, -Reporting to EA regarding the chemicals wastes from the company.	ECD and Port Directorates. -Quarterly meeting. -Official letters. -Periodic reporting.
13	Arab Shipbuilding &Repair Yard(ASRI)	* -On a case by case basis, participation with ECD in decision making, in environmental standard (emission and effluent rates). -Contact with EA regarding the chemicals wastes from the company.	-Official letters. -Quarterly meetings -Joint committee for contingency plans with concerned organizations: e.g.: Oil spills with ECD and Port Directorates. - Periodic reporting.
14	Gulf Petrochemicals Industries Company (GPIC)	* On a case by case basis, participation with ECD in decision making, in environmental standard (emission and effluent rates). Information exchange: Recycling of used oil in Bahrain. -Reporting to EA regarding the chemicals wastes from the company.	* -Joint committee for contingency plans with concerned organizations: e.g.: Oil spills with ECD and Port Directorates. -Quarterly meeting. -Official letters. -Periodic reporting.
15	Gulf Industrial Investment Co. (GIIC)	* -On a case by case basis, participation with ECD in decision making, in environmental standards (emission and effluent rates)-Reporting to ECD : Rate of emission to air	*
16	Aluminum Bahrain (ALBA)	* -On a case by case basis, participation with ECD in decision making, in environmental standards (emission and effluent rates) - Reporting to ECD regarding the chemicals wastes	* -Joint committee for contingency plans with concerned organizations: e.g.: Oil spills with ECD and Port Directorates. -Quarterly meeting.

#	Name of (NGO)	Kind of input obtained	mechanism
		from the company.	-Official letters. -Periodic Reporting
17	Bahrain Rubber Factory	*	*
18	Red Mack Industrial Services (Bahrain)	*	*
19	United Arab Shipping Company(UASC)	*	*
20	Bahrain Aluminum extrusion Company (BALEXICO)	* - Reporting to ECD regarding the chemicals wastes from the company.	*
21	Midal Cables Ltd.	* - Reporting to ECD regarding the chemicals wastes from the company.	* -Meetings
22	Al-Zamil Coating on Aluminum &Steel.	*	*
23	Capital Trading& Industry	*	*
24	Yousif Mahmood Hussain	*	*

6.4 Assessment

From the previous sections in the chapter and from other means utilized during the preparation of the questionnaire, the following general comments about the effectiveness of the existing coordinating mechanisms related to the sound management of chemicals are summarized:

1) The extent or degree of effectiveness of the existing mechanism is found to be adequate. However, there is a considerable need to improve the existing inter-ministerial coordinating mechanisms. This can be achieved by issuing specific legislation for management of chemicals, involving decision makers in the management program, and establishing a systematic and clear coordination mechanism.

2) The existing inter-ministerial coordinating mechanisms for the management of chemicals in Bahrain require further contribution from all concerned governmental parties. Most of the existing mechanisms would work more effectively if the other relevant governmental bodies contributed more. Again, this can be achieved by encouraging systematic planning and coordination and by having clear leadership.

3) The existing mechanisms for the management of chemicals are not linked together but work separately.

4) There is a need to form a chemicals management committee consisting of representatives from all related governmental and non-governmental bodies in order to have direct and better cooperation and coordination among various ministries and between governmental and non-governmental bodies.

5) The organizations dealing with the chemicals in Bahrain are The Supreme Council for Environment, Pharmacology and Medicine Control Directorate of the Ministry of Health, and Civil Defense Directorate of the Ministry of Interior.

6) Chemical management has still not gained the attention it should receive. The Government of Bahrain is endeavoring to streamline the process and procedure of safe chemicals handling and to establish effective coordinating mechanisms for various ministries and organizations dealing with chemicals.

7) The most significant existing governmental procedure for the management of chemicals is licensing and registration of chemicals and industries dealing with chemicals through the governmental channels (Environmental Control Directorate, Ministry of Interior).

CHAPTER 7

Information Management, Access, and Use

Background

Bahrain uses many chemicals in the industrial and non-industrial sectors. Information about safe handling and health and environmental hazards are needed in order to avoid their harmful impacts. There should be a regulation or legislation that obliges the sectors to make available all relevant information to the end users. This information needs to be collected and made available to the private and public and easy to access.

Purpose of the chapter

This chapter aims to give an overview of the availability of data for chemicals management and the related infrastructure, and to analyze how information is used for national and local chemical risk reduction.

Methodology

The availability information has been studied for each class of chemicals. All governmental and non-governmental bodies that might have the information included in Tables 7A to 7D were contacted in order to investigate the availability and location of data. Also, the sources and format of the available data were investigated. The information received was analyzed and tabulated in Tables 7A to 7D.

Table 7.A: Quality & Quantity of Available Information

Data Needed for/to	Pesticides(Agricultural, Public Heath and consumer use)	Industrial Chemicals	Consumer Chemicals	Chemical Wastes
Priority Setting	N	X	X	X
Assess Chemical Impact Under Local Conditions	X	X	X	X
Risk Assessment (Environment/Health)	X	X	X	X
Classification/Labeling)	N	N	N	N
Registration	X	Y	Y	Y
Licensing	X	X	X	X
Permitting	X	Y	Y	Y
Risk Reduction Decisions	X	X	X	X
Accident Preparedness/Response	N	N	N	N
Poisoning Control	N	N	N	N
Emission Inventories	N	X	Y	Y
Inspection & Audits (Environment/Health)	N	X	Y	Y
Information to Workers	X	N	N	N
Information to Public	X	X	Y	Y
Others				

(Y) If sufficient information is available for the tasks listed in the left hand column.

(X) If insufficient information is available for the tasks listed in the left hand column.

(N) If no information is available for the tasks listed in the left hand column.

Table 7.B: Location of National Data

Type of Data	Location/s	Data Source	Who has access	How to gain access[1]	Format
Production Statistics	NOGA	Company Registration	No restrictions	Official Letters.	Computerized Data Base. Publications.
Import Statistics	Central Information Organization	Customs Registration Form.	No restrictions.	Official Letters. CIO web page	Data Base, Publications
Export Statistics	Central Information Organization	Customs Registration	No restrictions.	Official Letters. CIO web page	Data Base, Publications.
Chemical Use Statistics	Partial Data are Available with the SCE+ CIO	Application Company Registration (Not up to date)	Restricted	Confidentially	Computer Data Base.
Industrial Accident Reports	GOSI Pension Fund	Company + Ministries MOL/GOSI	No restrictions	Official Letters	Data Base, Publications.
Transport Accident Reports	Traffic Directorate Civil Defense	Traffic Accident Reports Insurance Companies	Government / Limited	Official Letters	Computer Data Base
Occupational Health Data(agricultural)	Social, Hospital, GOSI MOH/MOL	Scattered Reports, Ministries, Road Accidents	Published	Official Letters	Data Base
Poisoning Statistics	A/E, Hospitals	Individual Files	Restricted	Official Letters	Computer Data Base
Pollutant Release and Transfer Register	Civil Defense, SCE, Traffic Directorate	SCE	Government	Official Letters	Records in Hard Copies
Hazardous Waste Data	SCE & Municipalities	Application Form Reports SCE	Reports Published	Official requests	Records in Hard Copies
Register of Pesticides	Ministry of Agriculture, Public Health Directorate	Reports Agriculture	Official	Official Letters	Computer Data Base

Type of Data	Location/s	Data Source	Who has access	How to gain access[1]	Format
Register of Toxic Chemicals	SCE/CD	Reports	Restricted	Official Letters	Computer Data Base
Inventory of Existing Chemicals	SCE/CIO	Under preparation	Confidential	Official Letters	Computer Data Base
Register of Imports	Commerce Registration, Central Statistics Organization, Customs Affairs SCE	Reports	No restrictions.	Official Letters	Computer Data Base, Publications.
Register of Producers	Commerce Registration, Central Statistics Organization, Customs Affairs SCE	Reports	No restrictions.	Official Letters	Computer Data Base, Publications.
PIC Decisions	SCE/ Agriculture	Periodical Reports Received	No restrictions.	Official Letters	Hard Copies

1 This should include any restrictions on access

Regional database:

The Kingdom of Bahrain, represented by the Standards Development Section - Standard and Metrology Department at Ministry of Industry and Commerce (governmental organization), is an active member of the Gulf Standardization Organization (GSO).

The GSO consists of a number of Gulf Committees covering several sectors such as food and agricultural products, oil and gas industry, electrical and electronic products, and construction. There are also other committees, including a technical committee for the specifications of the chemical industry and textiles. Local committees have been formed by the Ministry of Industry and Commerce to mirror the Gulf Committees.

Each year, all the GCC countries suggest a work plan to adopt new international standards (based on ISO, ASTM, CEN, and other organizations with which the GSO has memoranda of understanding), modify old GSO standards, and prepare new regional standards related to chemical products. Each country has to communicate and distribute its standards in the GSO forum (GSO website), which is considered to be a common database to be reviewed and studied by the other GCC countries.

The SMD Standard Specialist has the authority to access the GSO forum and download the standards received from the countries and distribute them among the local committee members for review and comment.

Each committee holds two meetings per year. In the first meeting, members discuss and approve the work plan suggested by GSO members, and in the second meeting, they discuss the progress made in implementing the work plan. Countries receive notifications from the GSO forum whenever a topic is posted by the other members, ensuring continuous communication and informed decision-making.

Comparative data is used in Bahrain to analyze the country's performance overtime, to help the country understand at what rate it is improving. It does not measure our performance compares with other standardization organizations that are attempting to achieve similar goals such ISO, ASTM, EN, CODEX. …, etc. Comparative data is used to evaluate Bahrain's progress toward targets or goals, and to communicate with other countries and organizations using benchmarking to identify other organizations that have achieved a desired level of performance in order to study or evaluate those organizations. The specifications of the chemical industry and textile are mentioned in Annex 4).

Table 7.C: Availability of international literature

Literature	Location(s)	Who has Access?	How to gain Access[1]
SAICM Information Clearinghouse	http://www.saicm.org/ich SCE	SCE	internet
Environmental Health Criteria Document (WHO)	http://www.who.int/ipcs/publications/ehc/en/index.html SCE, Ministry of Health	No Restrictions - Everybody can access	Verbal, Official Letters internet

Literature	Location(s)	Who has Access?	How to gain Access[1]
Health & Safety Guides (WHO)	http://www.who.int/ipcs/publications/cicad/en/index.html SCE, Ministry of Labour, Ministry of Health	No Restrictions - Everybody can access	Verbal, Official Letters internet
International Chemical Safety Data Cards (IPCS/DEC)	http://www.inchem.org/pages/icsc.html Partial Data are available with the SCE	No Restrictions - Everybody can access	Verbal, Official Letters internet
Decision Guidance Documents for PIC Chemicals (FAO/UNEP)	http://www.pic.int/en/Table7.htm SCE, Ministry of Labour, Ministry of Health	No Restrictions - Everybody can access	Verbal, Official Letters internet
FAO/WHO Pesticides Safety Data Sheet	http://www.who.int/ipcs/publications/pds/en/index.html Agriculture, Ministry of Health	No Restrictions - Everybody can access	Verbal, Official Letters internet
Documents from the FAO/WHO Joint Meeting on Pesticides Residues	http://www.who.int/ipcs/publications/jmpr/en/ Agriculture, Ministry of Health	No Restrictions - Everybody can access	Verbal, Official Letters internet
Documents from the FAO/WHO Joint Expert Committee on Food Additives	http://www.who.int/ipcs/publications/jecfa/en/index.html Ministry of Health	No Restrictions - Everybody can access	Verbal, Official Letters internet
Globally Harmonized System of Classification and Labelling of Chemicals (GHS)	http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html SCE, Customs, Commerce	No Restrictions - Everybody can access	Verbal, Official Letters internet
Material Safety Data Sheet	http://www.msds.com/index.asp http://www.permabond.com/ http://www.3ecompany.com/Industries_Application/chemical_distributors.htm Industry, Supplier	No Restrictions - Everybody can access	No Restrictions - Everybody can access
OECD Guidelines for the testing of Chemicals	http://www.oecd.org/document/40/0,3343,en_2649_34377_37051368_1_1_1_1,00.html	No Restrictions - Everybody can access	internet
Good laboratory Practice Principles	http://www.oecd.org/document/63/0,3343,en_2649_34381_2346175_1_1_1_1,00.html With Laboratories Themselves	No Restrictions - Everybody can access	Verbal, Official Letters
Good Manufacturing Practice Principals	http://www.who.int/medicines/areas/quality_safety/quality_assurance/production/en/index.html Individuals, Industries	Limited restrictions	Verbal, Official Letters
WHO/UNEP Global Env. Library Network	Internet	No Restrictions - Everybody can access	Internet
Others : (API) (HSE) (OSHA) (NIOSH) (IARC) & (CCOHS)	Internet	No Restrictions - Everybody can access	Internet

[1] **This should include a description of any restrictions on access**

Table 7.D: Availability of International Databases

Database	Location(s)	Who has Access?	How to gain Access[1]
ILO CIS	http://www.ilocis.org/ Ministry of Labour	No Restrictions - Everybody can access	Internet
WHO/IPCS INCHEM	http://www.inchem.org/ SCE, Customs, Commerce, Labour	No Restrictions - Everybody can access	Internet
WHO/IPCS INTOX	http://www.intox.org/ SCE, Customs, Commerce, Labour	No Restrictions - Everybody can access	Internet
WHO/IPCS Human Health Risk Assessment Toolkit: Chemical Hazards	http://www.who.int/ipcs/methods/harmonization/areas/ra_toolkit/en/index.html SCE, Health, Labour	No Restrictions - Everybody can access	Internet
IRPTC	http://www.chem.unep.ch/irptc/irptc/databank.html SCE, Labour	No Restrictions - Everybody can access	Internet
Chemicals Abstract Services Database	http://www.cas.org/ SCE	No Restrictions - Everybody can access	Internet

Assessment

A) Procedures for collecting and disseminating national /local data

1- The type of data required by law related to chemicals management to be provided to Government authorities are chemical names, trade names, chemical compositions, quantities, by-products, material safety data sheets (MSDS), and handling procedures. This information should be provided by the companies upon application to import the substance or request of any related activities.

2- Data on health and environmental effects of chemicals are not maintained properly. Some data on effects of chemicals on the environmental is maintained, but none on the effects on health.

3- There is little information maintained within the Government about certain types of chemicals. Sometimes it is no easy to find detailed information about certain chemicals, due to unavailability. Only some big NGOs maintain this type of information.

4- Data about chemicals is available to everybody, but with some restrictions. Confidential business information (CBI) is not accessible to everybody, such as the percentage of ingredients of chemical product.

B) National information exchange systems

1- There are insufficient accessible databases in the country. Databases are either not available or not centralized in one location.

2- For the time being, there is no specific systematic way or special policies

with respect to information flow from international organizations to concerned parties in the country. However, information exchange is practiced by both sides (international organizations and concerned parties) upon request with no limitations.

3- There are no limitations or specific policies that exist to prevent exchange of information among various ministries and other institutions, or even among other concerned parties. An official or unofficial request, depending on type of information needed, allows everybody access to all information except confidential business information (CBI).

C) Availability of literature and information

1- There are some significant gaps in the literature/information databases and their current distribution. Gaps of information/data exist between the ministries themselves, ministries and companies, companies and suppliers, and between international organizations and the Government.

2- There are overlapping gaps and conflicting sources of information related to chemical assessment and management, including information related to the environmental and health databases. Each database is established with a specific purpose and the data is not interchangeable.

3- The databases in the country are in the developing stage and need time to be developed. Concerned parties are trying to fully automate their databases. Some existing information is maintained within certain specific locations and groups.

4- There are some current efforts to improve the quality of the existing databases by automating and updating them.

5- The existing data/information mechanisms could be strengthened by making all systems compatible with each other, and by developing a centralized system that can allow everybody to access the data and avoid any conflicting data sources.

6- There are sufficient international databases and documentation available through the internet. However, some of the information that is available on the Internet is not sufficient or is difficult to access because the details are limited to certain organizations.

7- Not all concerned parties have appropriate access to all information. The location of specific information is not easily identified (not centralized).

8- All parties handling chemicals should maintain a MSDS for each specific chemical and make it available and accessible to everybody. This can be done by issuing a law.

9- Information maintained within the Government is available to the public and open to everybody through an official request, except for CBI.

CHAPTER 8

Technical Infrastructure

Background

The technical infrastructure in the country is scattered to support programs and policies for the management of chemicals.

Purpose of the chapter

Aim I:
Provide an overview of the laboratory facilities available in the country to support programs and policies for the management of chemicals.

Aim II:
Provide an overview of computer capabilities available within the government which can be used for chemical information systems, to access international databases, and for the implementation of governmental policies and programs related to chemicals management.

Aim III:
Provide an overview of technical training and education programs.

Method

A questionnaire divided to two parts:

- **Part I** about laboratory infrastructure for regulatory chemical analysis.
- **Part II** about computer capabilities.

About 28 concerned governmental and non-government organizations were selected to answer the questionnaire, with the purpose as mentioned above. Only 92% of these organizations gave replies, and not all questionnaires were fully completed.

Table 8.A: Overview of laboratory infrastructure for regulatory chemical analysis

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
Bahrain Training Institute	This chemical lab conducts practical work in chemical process tech. and applied chemistry module. This involves testing & preparation of different chemical compounds.	Small chemical reactor, conductometer, viscometer, high temp. Furnaces, flame propagation unit, flash point tester. Heat transfer equipment: Heat conduction, heat convection, and heat radiation apparatus. Heat exchangers. Fluid flow equipment: Renold Apparatus, Bernoulli's Apparatus, Fluid Friction Apparatus, centrifugal pump, centrifugal fan, axial fan, and centrifugal compressor units, hydraulic benches	-Production and analysis of different chemicals (acids, soaps & detergents, metals & alloys). -Testing of physical and chemical properties of chemical compounds; building materials, food items, crude oil and its products, water treatment analysis and fertilizer analysis.	Yes, by Business and Technical Education Council (BTEC)	Yes	Training
Bahrain medical & industrial gas plants	Lab. equipped with modern analytical equipment to conduct gas analysis.	Gas chromatography, portable gas analyzer, infrared CO2 analyzer, moisture meter, THC analyzer, conductivity meter. Ion chromatography, total hydrocarbons meter, oxygen meter, infrared co2 analyzer, sulfur analyzer	All types of gas analysis inclusive of gas mixture.	Yes, by BSI ISO9002 ISO 9001	Yes	Gas analysis Quality of final gas products

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
SMC Path. Dept.	Diagnostic lab & analysis blood	Diminsion, Hitashi 911, Ax Sm, Elecsys, ACA, HPLC, PCR, Automotive Apscopters, ES700, 1mx, TDX, Gamma Counter, Waterbath, Microscope, Ionize calcium, centrifuge, etc.	See attached lists	Yes, by WHO	Yes	Drug analysis
Al Hoty Analytical Services	Independent testing materials, and geotechnical consultants.	Spectrophotometer, Atomic Absorption, Ammonia Gas Sensing Combination Electrode Apparatus, DO/BOD Meter, Turbidity Meter, PH Meter, EC Meter, Furnace, 1200° C.	Fe, SiO2, PO4, B, Cu, NO2, NO3, SO4, Cl2, COD, P, H2S, Organic Matter. Na, K, Al, Pb, Cd, Fe, Ni, Mn, Zn, Cu, Ca, Mg, other Heavy Metals. Ammonia, Nitrogen, DO,BOD Turbidity, PH value, EC, TDS, Salinity, Loss on Ignition, SiO2, SO3, SO4	-	Yes	*Food/drug/water analysis *Environmental consultancy *Metallurgical analysis. *Waste analysis.
Bahrain Danish Dairy	Dairy lab	Milko Scan, Rafractometer, pH meter, water baths, Magnetic stirier, Scale, etc. Moisture analyzer, food	Fat pest, TS determination, Acidity, pH, Conductivity pest, F.F.A.%	ISO 2200	Yes	Dairy products Quality of dairy and juices

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
		coloring meter, autoclave and centrifuge	determination, Phosphate pest, Antibiotic pest, etc.			
Gulf Aluminum Rolling Mill Co. (GARMCO)	It contains several labs. It is composed of oil analysis, metallurgical, mechanical testing, anodizing, and etching sections. The utility water treatment section is separate.	PH meter, conductivity meter, F.T.I.R machine, PH meter, conductivity meter	Chemical testing, infrared and petrochemical analysis, and mechanical testing.	Yes	Yes	Oil analysis, water treatment, and mechanical and alloy composition testing. Analysis of the quality of rolling oil, purity of aluminum, and quality of water (non-drinking water)
Gulf Industrial Investment Co. (GIIC)	The lab. is equipped with all equipment and instruments required to carry out physical, chemical, and metallurgical analysis of iron ore and iron oxide pellets.	Reduction furnaces, cold compressive strength machine, tumble drums, sample mill, muffle furnaces, and atomic absorption spectrophotometer. PH meter, conductivity meter, X-ray diffraction instrument	Wet analysis (titration), instrumental analysis (flame spectrometer), and gravimetric analysis.	No	Yes ISO 2000	Metallurgical, physical, and chemical analysis of iron ores and pellets. Determination of heavy metals such as iron
International Lab. Services	Geotechnical engineering analysis, material testing	Spectrophotometer, conductivity meter, pH meter, and testing of	Electrical conductivity, pH,	Yes, by Committee of	Yes	Water testing, geotechnical

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
	services, and NDT services.	chemicals such as acids and alkalis, etc. Flame photometer,	chlorides, sulfate, nitrate, potassium, magnesium, boron, organic matter, copper, zinc, manganese, carbonate, bicarbonate, silica, etc.	Organizing Engineering professional Practice, Bahrain	ISO 17025 ISO 9001	engineering analysis, material testing services, and NDT services. Analysis of waste water and soil
Yateem Oxygen	In-house gas analysis lab.	Various instruments for measurement of gas purity. Show low moisture meter, oxygen analyzer, ph meter, total hydrocarbons analyzer	Direct readout of gas purity on instruments.	No	Yes	Quality control of own manufactured and retailed gases.
Gulf Petrochemical Industries (GPIC)	A lab. designed for the analysis and testing of raw materials, intermediates, and final products associated with the manufacture of liquid ammonia, methanol, and granular urea.	Balances, spectrophotometers, ovens, pH meter, conductivity meters, Karl Fischer titrators, centrifuge, furnace, infrared analyzer, oxygen analyzer, dew point meters, flame photometer, atomic absorption spectrophotometer, turbidimeter, gas chromatographs, density meter, mercury vapor analyzer, sieves, sample dividers, hardness apparatus, particle analyzer, general lab. equipment	Gravimetric analysis, Titrimetric analysis, Volumetry, Coulometry, Potentiometry, Conductimetry, Spectrophotometry, Atomic absorption spectroscopy, Turbidimetric analysis, Flame photometry, gas chromatography.	Yes, ISO9001 and ISO14000 certified. Ohfaf 18001 certificate	Yes	Petrochemical analysis. Analyssis of quality of gases and liquid products.

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
		High performance liquid chromatography (HPLC), coulometer, ion chromatography				
Magnum Industrial Lab.	Material testing, consultancy & chemical analysis.	See attached lists Micrometer, PH, conductivity	See attached lists	Yes, Professional Engineering Committee	Yes	Consultancy, waste, building material testing and analysis. Quality of water and measure the thickness of tissue
Bahrain National Gas Co. (Banagas)	Quality analysis of end products (propane, butane, naphtha) and other analysis for monitoring purposes	See attached lists karl fischer apparatus aquacounter, alpha meter ,model : sadp mini ex, thermometers astm, hydrometers astm , digital burette ,model : digitrate 50 ml, saybolt color ,model : sc-s, saybolt universal color ,model : 15311-2, dissolved specific gravity meter ,model : dma-35oxygen meter ,model : do-100, dr-2000 spectrophotometer, flash point testers, gas chromatography (gc), total sulfur ,model : houston, auto flash point ,model : pm a2, auto reid vapour pressure, seta v tds / conductivity meter: tds meter ,model : hach 44600-00is auto viscosity	See attached lists	Yes, ISO9002 ISO 9001	No	Quality analysis of products to ensure compliance with specifications prior to shipment.

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
		apparatus, water hot bath, ph meter ,model xentaur meter, xentaur meter, total sulfur meter, ph meter (follow to Bahrain National Gas Co. (Banagas)				
Aluminium Bahrain (ALBA)	Qualitative lab. (inorganic) designed to analyze raw material.	XRD, XRF, Distillation setup, HPLC, Surface area analysis, etc. NMR machine, Leko for oxygen measurement, RDC machine to measure carbons.	Qualitative and quantitative elemental analysis	No	Yes RDC certificate	Environmental and, metallurgical, and quality control.
Bahrain Petroleum Company (BAPCO)	Composed of lab. equipment and utilities room.	Testing equipment for petroleum products. XRF, gas chromatographs (GC), atomic absorption (flame and flame less), density meter, cloudly pour meter, Nerzoo for flash point measurement, lovibond meter, visco meter, Colorimeter, micro separo meter. HFRR meter, Hydrogen contain analyzer, Bomb coloi meter, freeze point meter, salt analyzer, Induction period analyzer , Leco analyzer, spectrophotometer ,Oil water analyzer, Ion Chromatography, ANTEK analyzer For S, N and total hydrocarbons , Automatic Titrater, CT Vap to measure the color of vapor	Physical and chemical properties of petroleum products and gases.	Yes	Yes ISO 9002	Analysis of petroleum products and gases
Directorate of	Carries out analysis of samples	Atomic absorption, ion selective	Chemical (BOD,	Yes	Yes	Analyze quality

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
Sewerage & Drainage	from all stages of the waste water treatment plant, including monitoring water and odor control treatment.	electrode, spectrophotometer, centrifuges, sterilizer, pH, conductivity meters, ovens, furnaces, incubator, balances, heating mantels, nitrogen analyzer, total dissolved oxygen meter, autoclave	COD, TSS, pH,…) & biological (coliform, parasite, eggs for parasite)		ISO 17025	of waste water after all the stages of treatment.
Directorate of Precious Metal/Assay Section	Precious metals analysis	Analytical balances, cupellation furnace, memo titrator, X-ray, fluorescence spectrometer	Chemicals analysis	No	Yes	Metallurgical analysis
Public Health Lab. Please check down the table	Multi-functional government lab.	Atomic absorption spectrometer, HPLC, GC, UV-VIS spectrometers, flame photometer.	Microbiology on clinical, food, and water samples, as well as analytical chemistry of food and water samples.	No	Yes	Food/drug analysis/water, Medical/health, academic/training, Insect/pest.
R. A. Jarjur	This lab. is a part of the Chemical Engineering Dept. It analyzes water samples from various locations of the plant and reports to the operation to monitor the parameters at every stage of production.	Atomic absorption spectrometer, spectrophotometer, pH meter, EC bridge, DO meter, turbidity meter, etc.	General water analysis for inorganic constituents, bulk chemicals purity checking (lime, SBS, FeCl3, citric acid, etc.	Yes	Yes	Water desalination plant and bulk chemicals used in R.O. plant
Materials Testing & Research Dept. (Ministry of Works & Agriculture)	For testing building materials such as sand, aggregates, cement, etc.	Hotplates, furnaces, autotitrator, vacuum filtration system, paint testing equipment, auto pipettes, digital burettes, digital thermometer, water bath, and	A) Tests carried out on sand, coarse aggregates, soil and water: chloride, sulfate, TDS, pH.	No	YesES	See analytical capabilities.

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
		spectrophotometer, flame photometer.	B)Tests carried out on cement: total silica, loss on ignition, calcium and magnesium, total alkali, insoluble residue, iron content, titanium and manganese. C) Addition tests: paint ceramic tiles, glass fiber pipes other building materials.			
Forensic Science Lab. (Ministry of Interior)	Forensic science lab for the scientific investigation of crimes.	GC, GC/MS, A.A.S., I.R. spectrophotometer, UV/VIS spectrophotometer, HPLC, GC/ATD, TDx/ADx analyzer, comparison microscope, projectina, photophone, co-oximeter, electrophoresis apparatus, thermal cycler (DNA), densitometer, microtome, vacuum plotter, freeze drying apparatus, etc.	Analysis of drug, narcotics, alcohol, pesticides, other poisons, fire arms, explosive, tool marks, foot print, DNA, hair, fiber, plants, seeds, soil analysis, fire debris, etc.	Yes	Yes	Food/drug analysis, water analysis, other forensic tests.
University of Bahrain Chem. Dept.	Teaching and research lab.	Atomic absorption spectrometer, HPLC, ICP, gel chromatography, IR, UV-VIS, plus other equipment.	Tests and experiments mainly related to academic work.	No	Yes	Academic teaching and training.
The Supreme Council for	Environmental	AAS-Polarography, GC spectrometer, UV-VIS,	Water and sediment analysis.	No	Yes	Environmental analysis

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
Environment Env. Lab.		spectroflorophotometer.				
Ministry of Health	Public Health Laboratory, Chemical Analysis Group (CAG)	Gas chromatography-mass spectrometry (GC-MS), gas chromatography (GC), atomic absorption spectroscopy (flame le Gama-X-HPGe photon detector, accelerated solvents extraction, protein analyzer, spectrophotometer, flame photometer, rancimate, fat extraction system, Karl fiscsher titrator, LC- high performance liquid chromatography (HPLC) MS, Refractometer, microwave digestion system, muffle furnace	Determination of food quality, adulterations, and organic and non organic contaminants in food and water	No	No	Determination of quality of water and food for human consumption.
Ministry of Health	Drug control laboratory	Gas chromatography, spectrophotometer, atomic absorption spectroscopy(AA), high performance liquid chromatography (HPLC), muffle furnace	Quality analysis of drugs	No	No	Determination of the quality of drugs for human and animal consumption
BALEXCO	Quality analysis of aluminum	PH meter, conductivity meter, Karl Fiscsher titrator, vacuum oven, X-ray diffraction machine	Quality analysis of aluminum	Yes	Qualic 080 ISO 9001 qualanod	Quality analysis of aluminum
Fishery	Carries out proximate analysis of seafood and sea water.	conductivity meters, ovens, mffle furnaces, incubator, balances, spectrophotometer , pH meter, conductivity meter, distillation	Determination of approximate analysis as protein, fat%, etc, in seafood and also	No	Yes	Quality analysis of seafood and fish, and analysis of sea

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
		system crude protein, including digestion system, distillation system and titration system instrument	analysis of sea water, including conductivity, nitrate, phosphate, and biological test such as coliform in water			water.
Ministry of Works – Materials Engineering Directorate – Chemical Analysis Lab. group	The main objective of the Chemical Analysis Laboratory (CAL) group is to ensure that chemical specifications for building, road, geotechnical, and other construction materials meet the Ministry of Works standard requirements. The CAL group continues to provide QA/QC testing, which is carried out under the following designations: • **Routine tests**: majority of the samples tested under this category are from ready-mixed concrete companies and block factories. In addition, samples from construction sites, Road Materials Laboratory, Consultancy & Research Section and Geotechnical Engineering groups are also		Materials testing	No	No	Materials testing

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
	tested as per these sections' requirements. The list of materials includes sand, coarse aggregates, mixing and curing water, ground water, soil for foundations, and concrete. • **Advanced tests:** This category of tests involves performing sophisticated chemical analyses pertaining to the various components of cement, ceramic tiles, RTR pipes, galvanized steel beads, geological specimens, paints and allied substances, and other construction materials of the like.					
R. A. Jarjur	Lab. Is a part of chemical engineering, dept. analysis water samples from various locations of the plant and reporting to the operation to monitor the parameters at every stage of production.	Atomic Absorption spectrometer, spectro photometer, pH meter, EC bridge, DO meter, Turbidity meter, …etc. Dry Oven, Muffle Furnaces,, autoclave, Conductivity meter. , hydro meter, balances, Automatic titration system (Metrohm)	General water analysis for inorganic constituents, bulk chemicals purity checking (lime, SBS, FeCl3, citric acid, …etc.	YES	YES	Water desalination plant and bulk chemicals used in R.O. plant). Quality of water and purity of chemicals used in the treatment of water.
Authority of	This lab. is a part of the Chemical Engineering Dept.. It	PH meter, turbidity meter dry oven, muffle furnaces, autoclave,	Analysis of quality of drinking water	No	Yes	Quality analysis of drinking

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
Electricity and Water (Dur plant)	carries out analysis of water samples from various locations of the plant and reporting to the operation to monitor the parameters at every stage of production.	spectrophotometer(UV.VIS), conductivity meter, balances, Automatic titration system (Metrohm), TOC meter, HACH spectrophotometer				water
Authority of Electricity and Water (Salmabad)	Carrying out the analysis of drinking water	Atomic absorption (AA), inductively coupled plasma–mass spectrometry (ICP), conductivity meters, ovens, muffle furnaces, incubator, balances, autoclave, TOC meter, spectrophotometer, turbidity meter, ion chromatography, gas chromatography (GC), automatic titrater, pH meter, sterilizer	Chemical analysis such as sodium, iron, total dissolve salt, etc and biological analysis such as coliform, yeast and mould	No	Yes	Ensuring that the quality of drinking water is fit for human consumption.
Directorate of Sewerage and Drainage (Tubli)	Carrying out the analysis of samples from all stages of the waste water treatment plant, monitoring trade water and odor control treatment.	Atomic absorption, Ion selective electrode, spectrophotometer, Centrifuges, sterilyser, pH, conductivity meters, ovens, Furnaces, Incubator, Balances, Heating mantels .Nitrogen analyzer, Total dissolve oxygen meter, Autoclave,	Chemical (BOD, COD, TSS, pH,…) & biological (coliform, parasite, eggs for parasite)	YES	YES ISO 17025	Quality of wastewater after all the stages of treatment.
Directorate of Precious Metals and Gemstone Testing / Assay	The official Laboratory for Precious Metals Analysis & Hallmarks in the Kingdom of Bahrain. The main purpose of	Analytical balances, cupellation furnace, memo titrator, X-ray, fluorescence spectrometer, ICP spectrometer, laser marking	- Cupellation method (fire assay) – determination of gold in jewelry	No	Yes	Metallurgical analysis

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
Section	this lab is to control the precious metals trade and industry through the application of a series of laws and regulation in this regard.	machines.	alloys. - Potentiometric method- determination of silver in jewelry alloys. - ICP analysis- determination of precious metal elements (platinum & platinum group elements) in jewelry alloys.			
Directorate of Precious Metals & Gemstone Testing/Gemstone and Pearl Lab	The official Laboratory for Pearls & Gemstones testing in the Kingdom of Bahrain. The main purpose of the lab is to maintain the natural pearl and prevent the invasion of the culture pearl on our market, and to control precious gemstones through application of a series of laws & regulations in this regard	- Nonius & Faxitron X-ray system - Raman microscope - Fourier transform Infrared Spectrometer. - Energy Dispersive X-ray Fluorescence - Ultraviolet-Visible-Near Infrared Spectrometer - Diamond Colorimeter - Diamond Sure. - Diamond View.	-Using direct X-ray radiography for pearl testing, in addition to X-ray diffraction and fluorescence techniques to determine whether the pearl are natural, cultured, non-nucleated or imitation in origin. -Using visual	No	Yes	Testing pearls & gemstones.

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
			observations techniques combined with some instrumentation, to determine the gem identification.			
Electricity and Water Authority, Sitra Power and Water Station Laboratory	1) Analysis of sea water and distillate (from beginning through final stages of the process) and different types of water samples; reporting the results to the operation to control the parameters in every stage of production. 2) Transformer and lubricating oil analyses. 3) Bulk chemical analyses. 4) Scale analysis from boilers, distillers and auxiliary plants.	1) Spectrophotometers, pH meters, EC meters, DO meters, turbidity meters, ion selective meters, gas detectors, flame photometers, refractometers, colorimeters, ultrasonic baths, hotplates, water baths, balances, air oven, muffle furnaces, etc. 2) Oil testing instruments like Dean and Stark, Soxhlet, Distillation, Karl Fischer, Viscometers, Dielectric strength testers, Flash point apparatus, TOG/TPH analyzers.	1) General water analysis for physical and chemical properties. 2)Bulk chemicalanalyses (sodium sulphite, caustic, ion exchange resins, etc.). 3) Transformer and lubricating oil analyses	---	Yes	To ensure process quality control by carrying out all necessary and essential analyses.
International Laboratory Services	Independent testing laboratory, Materials and Geotechnical consultants.	- Conductivity meter (readable to 0.01µS/cm), - Analytical balance (readable to 0.0001g), - Oven(25-2000C),		ISO 17025:2005, by IAS	Yes	-Water analysis. -Environmental. -Consultancy. -Soil analysis.

Name	Description of Lab.	Equipment	Analytical Capabilities Available	Accreditation (if yes, by whom)	Certified GLP* (yes/no)	Purpose
		- Muffle Furnace(25-9990C), - BOD Incubator, - COD Digestor DRB 200, - Spectrophotometer 4000U, - pH meter (readable to 0.001 units), - Simple SDI Kit, - Magnetic stirrer cum hot plate, - Hot plate, - Flame Photometer, - Temperature recorder, - General Chemical Laboratory Glasswares, - Computers with Internet Connection.				-Wastewater & sludge analysis. -Building Materials Testing.
Ministry of Municipality (Water Resources Dept.)	To monitor and analyze bore well water quality	Electrical conductivity, pH, meters, ovens, furnace, and titrators, flame photometer etc….	major anions and cations etc and physical parameters	No	No	Analysis of quality of water for human consumption

* **GLP** = **G**ood **L**aboratory **P**ractice.

Table 8.B: Computer Capabilities of Laboratories

Name	Computer system/Database	Location	Equipment available	Current Uses
Bahrain Training Institute	-	-	-	Internet
SMC, Path. Dept.	Bliue, MDIS, McDonnell information, TAS2000	All labs and offices	PCs and printers	Data processing, Internet, data storage.
Awal Dairy Company	Oracle based ERP software	-	COMPAQ proliant 3000 server	Data processing, Internet, data storage.
Gulf Aluminum Rolling Mill	Windows95, MS Office97, Windows NT	In all lab. Sections connected to the company network.	Data processors, PCs with network printers.	Data processing, Internet, data storage.
International Lab. Services	-	In the lab.	PCs	Data processing, Internet, data storage.
Gulf Petrochemical Industries Co.	Windows	In the lab.	PCs	Data processing, data storage, reporting.
Magnum Industrial Labs.	Windows, Microsoft Word & Excel	In the lab.	PCs	-
Bahrain National Gas Co.	MS Office mainly Excel	In the lab.	PCs	Data processing.
Aluminum Bahrain	Company system office, Vbasic, GWBasic, Oracle.	-	PCs	process control
Bahrain Petroleum Co.	Windows and MS Office. Windows NT	-	PCs	Data processing, Internet, data storage.
Directorate of Sewerage & Drainage	MS Office Word97 and Excel97	In lab and offices	PCs	Data processing, data storage.
Directorate of Precious Metal/Assay Section	Special programme	Separate room	PCs	Data processing, data storage.
Public Health Lab.	Windows2000	-	PCs	Data processing, data storage, reporting of results.
R. A. Jarjur	Windows 95 & MS office	AAS has its own integrated built-in	PCs	Data processing.

Name	Computer system/Database	Location	Equipment available	Current Uses
		computer in which the standard operating conditions and graphs are programmed		
Materials testing & research dept. (Ministry of Works & Agriculture)	Q & R and U.T.P.	-	PCs	Data processing, Internet, data storage.
Forensic Science Lab. (Ministry of Interior)	Case management, Library/Journals, Inventory control, Cost analysis…etc.	Forensic Science Lab.	PCs and printers	Data processing, Internet, data storage and attached to analytical instruments.

Conclusions drawn from Table 8.B:

- 47% of the computer systems in laboratories have ability to access E-mail and the Internet;
- Most of the computer software is Windows and MS Office;
- The main uses of the computers are data processing, data storage, reporting of results, and Internet;
- Only one of the computers is attached to analytical instruments.

Table 8.C Number of monthly samples received in the laboratories in table 8.A

#	Laboratory Name	No. of samples received per month
1	Bahrain Medical & Industrial gas plants	Gases: 1000
2	SMC Path. Dept.	N/A
3	Al Hoty Analytical Services	Concrete: 50, water: 20, soil: 10, concrete with cement: 50
4	Bahrain Danish Dairy	Dairy products: 2500, juice: 240
5	Gulf Aluminium Rolling Mill Co. (GARMCO)	Rolling oil: 90, emulations:9
6	Gulf Industrial Investment Co. (GIIC)	Gases: 1000
7	International Lab. Services	N/A
8	Yateem Oxygen	Gases: 936
9	Gulf Petrochemical Industries (GPIC)	N/A
10	Bahrain National Gas Co. (Banagas)	Gases: 2080, water: 250, general liquid: 200
11	Aluminium Bahrain (ALBA)	N/A
12	Bahrain Petroleum company (BAPCO)	N/A
13	Directorate of Precious Metal/Assay Section	N/A
14	Public Health Lab.	Food: 800, Blood: 20 Water: 100
15	R. A. Jarjur	Water: 1000
16	Materials testing & research dept. (Ministry of Works & Agriculture)	Sand: 182, Soil:130, water: 100, concrete: 75 Cement: 60, paint: 55, tiles: 75, aggregate:125
18	Forensic Science Lab. (Ministry of Interior)	N/A
19	Env. Affairs Lab.	N/A
20	Ministry of Health , Drug control laboratory	Drug (medicine): 69
21	BALEXCO	196
22	Fishery	Fish:30
23	Ministry of Works – Materials Engineering Directorate – Chemical Analysis Lab. group	Sand: 182, Soil:130, water: 100, concrete: 75 Cement: 60, paint: 55, tiles: 75, aggregate:125
25	(Ministry of Ect. & water Salmabade	Drinking water:90
26	Directorate of Sewerage & Drainage (Tubli)	Waste water:910
27	Directorate of Precious Metals &	N/A

#	Laboratory Name	No. of samples received per month
	Gemstone Testing / Assay Section	
28	Directorate of Precious Metals & Gemstone Testing/Gemstone & Pearl Lab	N/A
30	International Laboratory Services	N/A
	Ministry of Ect. & water (Dur plant)	Water: 1200
30	Ministry of Municipality (Water Resources Dept.)	Water 2600

Food and water

The statutory role of the Public Analyst's Laboratory (PAL) is to test food and water for compliance with the relevant legislation and guidelines. It plays a key role in public health and consumer protection by analyzing the chemical contaminants of food and water in order to ensure that they are safe and fit for human consumption. The laboratory has a vital role in food safety by providing objective scientific evidence for the safety and quality of the food and water that we eat or drink. It provides data for the proper risk assessment and risk analysis of food.

PAL is working closely with the Food and Environmental Hygiene Departments in the Public Health Directorate, Fisheries, and universities in Bahrain in the implementation and enforcement of the various pertinent regulations under the Public Health Services Ordinance.

Table 8.D: Public Health Laboratory analysis of food and drinking water

#	Test Name	Food type
1	Purity of food	Oil, fat, honey, tea, sugars, salt ….etc
2	Adulteration	Pork fat, milk….etc
3	Residue contaminants such as pesticides (organo chlorine, organo phosphorous, carbamate), Melamine, acrylamide, histamine, PAHs, hormones antibiotic …..etc	All types of meat, fruits, vegetables, drinking water, etc
4	Radioactive materials	All types of water and food
5	Mycotoxins as Aflatoxins (B1, B2, G1, G2),M1,M2, etc	All types of nuts, Milk
6	Heavy metals such as AS, CD, Tn, Hg, etc	All types of water and food
7	Additives as artificial color and preservative as sodium benzoate, potassium sorbate, vitamins, antioxidants, etc	All types of water and food
8	Quality of water, all relevant tests to check that the water quality is fit for human consumption, such as Ca, Na, K, PH, TDS, etc	Drinking water

The chemicals used to purify seawater are not harmful. These chemicals include anti-foaming reagent, anti-scale reagent, sodium sulphite, nitrate, and chlorine. All chemical reagents are used at low-level concentrations and most chemicals are commonly used in food as preservatives, such as sodium sulphite. Moreover, chlorine is used to destroy any bacteria, fungus, etc.

Naturally occurring compounds :

Polycyclic aromatic hydrocarbons (PAHs) constitute a large class of organic compounds containing two or more fused aromatic rings. They are well-known environmental pollutants at low concentration and are included in the European Union and US Environmental Protection Agency (EPA) priority pollutant lists due to their mutagenic and carcinogenic properties. PAHs are generated by incomplete combustion of organic materials arising in part from natural combustion such as forest fires and volcanoes. Industrial production, factories, transportation, and waste incineration also generate significant levels of PAHs.

The USA fixed sixteen parent PAHs as priority pollutants and potential human carcinogens especially in the marine sample. The sixteen poly aromatic carbons are, naphthalene, acenaphthylene, acenaphthene, flourene, Phenanthrene, Anthracene, Flouranthene, Pyrene, Benzo[a]anthracene, chrysene, benzo[b]flouranthene, benzo[k]- flouranthene, benzo[a]pyrene, benzo[ghi]perylene, dibenz[a,h]anthracene and indeno[1,2,3- cd]pyrene.

The health hazards of these compounds have been studied by several authors

High prenatal exposure to PAH is associated with lower IQ and childhood asthma. The Center for Children's Environmental Health reports studies that demonstrate that exposure to PAH pollution during pregnancy is related to adverse birth outcomes including low birth weight, premature delivery, and heart malformations. Cord blood of exposed babies shows DNA damage that has been linked to cancer. Follow-up studies show a higher level of developmental delays at age three, lower scores on IQ tests, and increased behavioral problems at ages six and eight.

Assessment

- There is a need for coordination and exchange of experiences among laboratories.
- The necessity of integration between existing laboratories for example interlink the databases, establish cooperation mechanism.
- Raising the capacity building: Enhancing laboratory capacity is essential for generating reliable and accurate data, supplying new equipment, staff training, and quality control.
- Training of technical personnel working in laboratories.
- Encourage the laboratories to obtain an international accreditation certificate.
- Establishing database among laboratories for exchange information, knowledge and technologies.

CHAPTER 9

Chemical Emergency Preparedness, Response, and Follow-up

Purpose of the chapter

To provide an overview of the capacity in the country related to preparedness for, response to, and follow-up of, emergencies involving chemicals.

Background

The General Directorate for the Supreme Council for Environment (SCE), through its Pollution Control Section and in cooperation with the Communications and Information Technology Section of the Directorate of Services, established an Oil Spill Command Center dedicated to the management of the response to oil spills at the Fishermen Port in Sitra. The Directorate has chosen a suitable location for the centre, facilitating the management and response, and ensuring easy contact and communication between the response teams at the sites and the various units operating in the Center. The Center is appropriately located at the Sitra coast near many industrial plants and oil recycling and handling facilities, which have more likelihood than spill incidents.

The Oil Spill Command Center role is to manage the oil spill response and ensure rapid response. Representatives from all concerned parties meet together to control and manage oil spill response. The Center is provided with all the necessary facilities, services, and means for operational management of meeting with any emergency.

The Center has all the necessary means of communication for oil spill response control, including telephone lines, fax machines, Internet, and display screens. The Center shows live telecasts from the site of the event, thus facilitating appropriate decision-making by the stakeholders. It is also equipped with other important equipment and other facilities. It has rooms for meetings and a dedicated Media Center to organize meetings and press conferences as required. The Center was inaugurated in November 2010 and has been operational since then. For example, it conducted an oil spill exercise based on the National Plan to Combat Oil Spills.

The General Directorate is seeking assistance for the development of this Center in order to enable it to appropriately attend and manage all types of environmental emergencies, rather than being limited oil spills.

The Kingdom of Bahrain supports the Hyogo Framework for Action (HFA). Strategic Goal Two states, "*the development and strengthening of institutions, mechanisms and capacities at all levels, in particular at the community level, that can systematically contribute to building resilience to hazards*". Bahrain is working towards this goal by ensuring that the Kingdom's Senior Management's directions are followed and that a "culture" of risk awareness, disaster reduction, and disaster management is developed through a multi-agency national approach. This involves:

- Reactivating the "Civil Defense Council", a Ministerial Council chaired by the Minister of the Interior to give strategic direction and support;
- Establishing a "Focal Point" for such activities - the "National Committee for Disaster Management" (already in existence), which reports to the "Civil Defense Council";
- Ensuring legislation and supporting regulations are in place to prevent or mitigate potential risks and also to empower the Government in the event of contingencies;

- Establishing a multi-stakeholder national platform of all involved government agencies and representatives of the private sector, NGOs, and local communities to ensure assessment and prioritization of risks and development of action plans to address and reduce the risks.

9.1 Chemical Emergency Planning

9.1.1 Legal tools

Ministerial Order No. 28 of the year 2006 with respect to the Establishment and Set-up of the National Committee for Disaster Management outlines the Committee's tasks as follows:

1- Assess the general situation of public safety and recommend plans, programs, and measures;
2- Recommend plans and detailed programs to manage disasters and reduce their effects efficiently and effectively;
3- Recommend and coordinate tasks of ministries and other agencies involved in disaster management;
4- Recommend conditions and regulations to achieve public safety according to existing laws in the Kingdom and to international standards;
5- Conduct continuous assessment of general emergency plans and specialized plans of ministries and other relevant agencies, and recommend required amendments, developments, and updates;
6- Set up volunteer groups and follow up on their training programs;
7- Work in cooperation and coordination with committees, institutes, and organizations specialized in the field of disaster and crisis management;
8- Carry out any actions or tasks to manage disasters as directed by the Minister of Interior or the Civil Defense Council;
9- Set up a plan for joint exercises on disaster management and follow up on their execution periodically.

The Bahrain National Risk Register (HAZARDS) was prepared in cooperation with the UK Government's Emergency Planning College. Toxic chemical release is classified in the high risk category in the matrix.

9.1.2 The National Oil Spill Contingency Plan (NOSCP)

The National Oil Spill Contingency Plan (NOSCP) (full title: National Oil and Hazardous and Noxious Substances Spill Contingency Plan) was prepared and approved in 1993 after the Second Gulf War. The plan was recently updated in 2010 in cooperation with the Marine Emergency Mutual Aid Center (MEMAC) and the relevant parties in Bahrain. In November 2010, the Supreme Council for Environment conducted a drill exercise with the assistance of MEMAC's experts. The companies that have activities adjacent to the sea are requested to prepare a local oil spill contingency plans for their local use to protect their boundaries; these plans should be integrated with the NCP. Bahrain is in the process of privatizing the operational part of the NCP.

The Chemical and Hazardous and Noxious Substances (HNS) Spill Plan has been merged with the National Oil Spill Contingency Plan. The last drill exercise dealt with the oil spill incidents only.

Hazardous and Noxious Substances (HNS) Response in Bahrain

HNS Incident – vessel in port

Phase 1 Emergency Response
The initial response to an HNS incident on a vessel in port will be provided by the Emergency Response Team of the facility at which the incident occurs, but is likely to be restricted to the establishment of a safe zone around the incident. The facility will immediately report all HNS spills to Port Control, Civil Defense, and Environmental Control Directorate.

Civil Defense, with advice from the vessel crew, will be responsible for actions to evacuate casualties, to ensure that further pollution has been stopped, to take samples if necessary to identify the pollutant if this is unknown, and to take the necessary actions to stabilize the situation.

The General Directorate for the Protection of Marine Resources will advise on the measures necessary to minimize the effects of the pollution on marine life and institute any fishing bans that may be necessary.

Phase 2 Restoration and Clean-up
Restoration and clean-up will be carried out either by the facility's HNS contractor or the national Tier 2 contractor.

HNS Incident at Sea

Phase 1 Emergency Response
The initial response will be carried out by the vessel crew, who, if they are able, will attempt to stop any outflow of pollutants, rescue any casualties, and prepare them for evacuation.

Further emergency response will be carried out by a team from Civil Defense or Bahrain Coast Guard, specially trained in marine response and having marine HNS expertise, advised as necessary by a specialist marine HNS or salvage contractor.

The General Directorate for the Protection of Marine Resources will advise on the measures necessary to minimize the effects of the pollution on marine life and institute any fishing bans that may be necessary.

Phase 2 Restoration and Clean-up
Should the vessel require cargo offloading, tank cleaning, and gas freeing prior to being sent to dry dock for repair, this will require the use of a specialist marine HNS or salvage contractor.

Marine Pollution
If the pollutant reaches the sea, once again, there are several possibilities. The chemicals will be in three main categories: those which float, those which sink, and those which dissolve into seawater.

1. **Floaters**

It may be possible to recover chemicals which float from the sea surface using booms and skimmers. However, this can pose many problems, as the chemical may degrade or destroy the booms and skimmer pumps. Therefore, selection of the correct

equipment is extremely important and will depend upon knowing the characteristics of the pollutant. Specialist chemical-resistant pumping equipment may be required.

It is likely that bird hazing (scaring away birds) and fishing bans will be required, as well as extensive water and fish sampling.

Floaters may also be toxic and/or flammable and can cause mortality to humans and wildlife.

2. Sinkers

Chemicals that sink to the seabed will be extremely difficult, or indeed impossible, to recover. Such chemicals will pose a threat to seabed fish and animals. Moreover, even if recovered, they may still be toxic or flammable. It is likely that fishing bans will be required, as well as extensive water and fish sampling.

3. Dissolvers

There is no way that dissolved chemical can be recovered. However, they may cause significant risk to desalination plants, industrial water inlets, fishing grounds, and marine life in general. It is likely that fishing bans will be required, as well as extensive water and fish sampling.

4. The General Directorate for the Protection of Marine Resources

In all cases, the General Directorate for the Protection of Marine Resources will advise on the measures necessary to minimize the effects of the pollution on marine life and institute any fishing bans that may be necessary.

9.2 Chemical Incident Response

Table 9.A: Examples of Chemical Incidents

Date of incident	Location	Type of incident	Chemical(s) involved	D: no. of deaths I: no. of injuries E: no. of evacuated	Environmental contamination of damage
16/1/2010	Labor accommodation	fire	kerosene	D:1	Air pollution
26/1/2010	Workplace	fire	Painting dyes	D:1 I:1	Air pollution
9/3/2010	Labor accommodation	fire	kerosene	E:10	Air pollution
13/3/2010	Workplace	fire	Oil used	I:1	Air pollution Soil contamination
19/7/2010	Workplace	explosion	Oil used	I:2	Air pollution
5/12/2010	On the road	explosion	gasoline	I:1	Air pollution
9/12/2010	Workplace	explosion	Oil used	D:2	Air pollution Soil contamination

The Occupational Safety Section of the Ministry of Labor has been taken several steps in order to achieve a safe workplace with regard to handling of chemical in workplaces and labor accommodation, such as:

- Periodically inspecting private sector establishments and taking legal action against those which violate the safety and health law;
- Periodically inspecting labor accommodations and assuring they fulfill the safety and health requirements;
- Investigating workers' complains regarding occupational safety and health issues; and
- Investigating occupational accidents and injuries, and preparing technical reports about them.

  One of the most important steps of preparedness in OSS is investigating occupational accidents, in order to find out the root causes and formulate plans to prevent recurrence in the future. Moreover, investigation allows the responsible parties to be charged through legal action.

CHAPTER 10

Awareness/understanding of Workers and the Public; and Training and Education of Target Groups and Professionals

Background

To prevent the occurrence of chemical accidents and poisoning, it is important to stress the need for educational programs for workers and the public on the nature and the hazards of materials that they handle.

Purpose of the chapter

To provide an overview of the mechanisms available to inform workers and the public about the potential risks associated with chemical production, import, export, handling, use, and disposal.

Method

Relevant activities of government ministries and non-governmental organizations were determined. Some information was obtained from the internet (most of NGOs and companies have websites which contain plenty of information and data) and via telephone conversation to fill the gaps. Questions were prepared to obtain information on programs, policies, and other activities designed for the three aims indicated below:

Aim 1:

Provide information to workers to protect their health and promote their safety from the risks posed by chemicals.

Aim 2:

Provide information to the public concerning the risks to the environment, health, and safety posed by chemicals, and actions which they should take in order to protect themselves from chronic or acute exposure to hazardous chemicals.

Aim 3:

To raise awareness and educate the public for effective participation in national environment management initiatives.

Aim1:

The replies showed that concerned organizations are giving information to the workers on chemical safety by:

1. Making material safety data sheets available to the workers' supervisors;
2. Distributing informative handbooks on hazardous chemicals, including information on proper handling of chemicals (some industries);
3. Keeping records on occupational accidents and work mistakes, and informing workers on ways to avoid them;
4. Giving specific safety instructions and advice directly to the workers, including through posting information on boards (posters, stickers, and brochures). This covers the use of personal protective clothing and equipment, and proper handling of chemicals; and
5. Undertaking periodic programs for checking the work places and processes, including storage facilities, and inform workers about the results (all industries).

Worker awareness of handling, storage and transportation of chemicals can be achieved by:

- Designing and publication of different types of booklets, posters, and brochures regarding occupational safety and health in several languages; and
- organizing conferences, seminars, and workshops regarding health and safety, for all stakeholders involved in safe chemicals handling.

Aim 2:

This aim is achieved as follows:

1. Information on the harmful effects of chemicals, such as theuse of asbestos and ODSs (Ozone Week) are sometimes disseminated to the public through articles published in newspapers and other types of mass media;
2. Household chemicals are labeled with information on their use; and
3. The academic curriculum includes some information on precautions and instructions about the handling of chemicals.

Aim 3:

The study showed that mass media such as Bahrain Television and Radio, daily newspapers, lectures, and seminars are rarely used to educate the public on the hazards of chemicals and methods to be followed for protection from these hazards. However, the following achievements can be noted:

1. Some industries distribute booklets, brochures, and stickers about chemical safety;
2. Workshops, short courses, and lectures (including on-site practical lectures) to the workers on ways of protecting themselves and disposing of hazardous waste and substances are arranged;
3. Some of the above activities are coordinated with the General Committee for Bahrain Workers and the Occupational Health and Safety Society. Bahrain Chemical Society also participates in arranging practical courses for industrial and laboratory workers about clean production and hazardous chemicals. The Cancer Control Society participates in educating the public regarding carcinogenic materials;
4. Whenever new workers are recruited in large main industries they undertake training sessions; and

5. Teachers and laboratory staff are trained practically on chemical safety.

Table 10.A: Relevant NGOs in the field of environment and chemicals management

Name of NGO	Contact details	Relevant activities	Expertise	Comment
Bahrain Society of Chemists	Tel: +973 39414776 Fax: 17730989 Email: bfchemists@gmail.com	Counsel the society on the possible solutions that can be achieved through chemistry	Chemicals-related information dissemination, environmental campaigns, waste management, public awareness, research, advocacy	Has capacity to organize training workshops on chemicals-related issues, and do research.
Bahrain Cooperative Agriculture Society	Tel: 17600720	Advises the government on policies affecting co-operatives, co-ordinates the implementation of such policies, and encourages use of the co-operative model for social and economic development.	Public environmental education through campaigns concerning pesticides.	Capacity to provide awareness on pesticides use, integrated pest management.
Youth & Environment Society	Tel: +973 39434899 Fax: +973 17723585	Capacity-building for children and students concerning environmental protection.	Environmental campaigns and education.	Capacity to raise awareness on environmental issues.
Bahrain Agriculture Engineers Society	Tel: +973 39644978 Fax: +973 17781649 Email: fouad577@hotmail.com	Development and improvement of farming in the Kingdom of Bahrain.	Mobilization of farmers for technical matters addressing agriculture and farming	Training of farmers, organizing workshops, consultation for legal measures.
Environment Friend Society	Tel:+973 39433228 Fax:+973 17421413 Email: info@naturalbahrain.com	Environment-related information and awareness-raising in Bahrain.	Journalism expertise	Have the capacity to cover any topic and disseminate it electronically and otherwise, across the country. Media coverage, broadcasting, publications, and educational campaigns.
Bahrain Society of Health and Safety	Tel:+973 17727374 Fax:+973 17725242 Email: info@bhssonline.com	Providing human health-related awareness and information to the public	Publications concerning the adverse effects of chemicals. Awareness campaigns concerning the safe use of chemicals	Organizing workshops, developing information and awareness-raising tools for the public. Undertaking information and awareness-raising programs.

Name of NGO	Contact details	Relevant activities	Expertise	Comment
Chamber of Commerce and Industries	Phone +973 17380000 , Fax+973 17380123 P.O. Box 248 Manama	They are the representatives and supporters of the private sector to enable it to be the engine of economic growth	Industry-representation, supporting information collection from industries, promoting public awareness of industries	Involvement in development of UP-POPs-related legislations and increasing public awareness of industries.
Bahrain Society for Engineers	P.O. Box 835 Manama Tel: + 973 17 727100 Fax: : + 973 17 729819	It represents the engineering professionals from all disciplines and takes the lead in the advancement of the profession. The Society aims for the protection of the health, safety, and welfare of the public and the environment in the practice of the profession. Promotes participation in the national economic development of the Kingdom. Promotes quality and cost-effective engineering practices	Organizing conferences, providing training on engineering matters, developing and distributing publications	All engineers in Bahrain are members to this Society. They can play an important role in outreach to engineers that work with POPs such as PCB, or to those that work at facilities releasing POPs.
National Supreme Health and Safety Committee, Ministry of Labor	Tel: 17873649, 17873648 Fax: 17689567 e-mail: osd@mol.gov.bh	Development, improvement, and provision of advice to the private and governmental sectors on the suitable framework for using chemicals in kingdom of Bahrain.	• Organize workshops, conferences, training to the public and private sector in cooperation with occupational safety section. • Providing different types of posters and booklets in several languages for workers and employers.	Capacity to organize workshops, training programmes, conferences that related to chemicals issues.

Assessment

Participate in some of the specialized national committees, for example, the Committee for Occupational Safety and Health Ministry of Labor, the part of its responsibilities:

- Proposing a general policy of occupational safety in the private sector;
- Proposing a media policy that can be disseminated to raise awareness among employers and workers, and proposing operational plans for this policy;

- Coordinating between the programs of the Ministry of Labor and large companies in Bahrain, the Association of Health and Safety, and other stakeholders in the field of occupational health and safety;
- Providing input to legislation, regulations, and decisions relating to occupational safety.

CHAPTER 11

International Linkages

Background

In order to protect human health and the environment, Bahrain (governmental and non-governmental organizations) supports the work of relevant GCC and UN agencies. It has signed and participated in many activities and organizations such as : the World Health Organization, the United Nations Environment Programme (UNEP), International Register of Potentially Toxic Chemicals (IRPTC), IE/PAC - Cleaner Production Center, UNIDO, ILO, Food and Agriculture Organization (FAO), Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer, International Programme on Chemical Safety (IPCS), Basel Convention, etc. Bahrain is member of GCC and has actively participated in their activities with respect to control of chemicals and waste.

Purpose of this chapter

The objective of this chapter is to describe Bahrain's participation and involvement in international organizations and agreements concerned with the management of chemicals, and to identify opportunities and integrated approaches at the national level.

Methodology

Information provided in this chapter was obtained from governmental and non-governmental organizations through personal interviews with the concerned person/s in the designated organization or by phone contacts. Table 11.C is modified to present more specific and related information requested in section 11.2.

Table 11.A: Membership in International Organizations, Programs, and Bodies

International Organization/ Body/Activity	National Focal Point (Ministry/Agency & Primary Contact Point)	Other Ministries/Agencies Involved	Related National Activities
Intergovernmental Forum on Chemical Safety (IFCS)	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain Tel: (+973) 386612 Fax: (+973) 920213	Concerned Ministries	Environmental control: - Chemical control - Pollution control - Oil Spill control - Chemical licensing
UNEP-ROWA	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain Tel: (+973) 386612 Fax: (+973) 920213	Concerned Ministries	Multilateral conventions
IRPTC - National Correspondent	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain Tel: (+973) 386612 Fax: (+973) 920213	Concerned Ministries	- ODS control - Chemical control - Chemical research - Chemical licensing
IPCS	Ministry of Health P.O. Box 12 Manama - Bahrain Tel: (+973) 244017 Fax: (+973) 252569	The Supreme Council for Environment	- Public awareness-raising
WHO	Ministry of Health P.O. Box 12 Manama - Bahrain Tel: (+973) 244017 Fax: (+973) 252569	Ministry of Health	- Heath care - Medicine control - Heath database - Heath training & education programs
FAO	Ministry of Municipalities & Urban Planning (Agriculture) P.O. Box 53 Manama - Bahrain Tel: (+973) 501565	Ministry of Municipalities & Urban Planning (Agriculture)	- Insecticide handling & control - Food quality control
UNIDO	Dr. Hashem Sulaiman Hussain Head Regional Offices UNIDO. P.O. Box 10523 Manama - Bahrain Tel: (+973) 17536881 Fax: (+973) 17536883	*Ministries of:* Finance and National Economics, Oil and Gas Authority, Industry and Commerce, Bahrain Investment Bank, Bahrain Charmer of Commerce and Industry Multilateral Investment Granule Agency	- All industrial investment in the GCC. - Project Implementing Agency for a Montreal Protocol project to phase out ODS
ILO	Occupational Safety Section	• Ministry of Health. • Ministry of Interior.	- Occupational safety

International Organization/ Body/Activity	National Focal Point (Ministry/Agency & Primary Contact Point)	Other Ministries/Agencies Involved	Related National Activities
	Ministry of Labour P.O. Box 32333, Manama - Bahrain Tel: (+973) 17687800 Fax: (+973) 17686945	• Civil Defense. • Ministry of Works. • Ministry of Municipality and Urban Planning	- Chemical safety - Labor education - Protection of life and health of workers - Inspection of housing & facilities of workers
World Bank	N/A	UNIDO Regional Office P. O. Box 10523 Manama - Bahrain Tel: (+973) 17536881 Fax: (+973) 17536883	- Implementation of World Bank projects in GCC related industrial projects.
OECD	N/A	Ministry of Finance & National Economy P.O. Box 333 Manama - Bahrain Tel: (+973) 17530800 Fax: (+973) 17532853	- Facilitation and protection of investments
Regional Economic Commissions - GCC		GCC Regional Office Riyadh - KSA	- Facilitation and protection of investments - Economic, trade & technical convention between GCC countries

Table 11.B: Participation in International Agreements/Procedures Related to Chemicals Management

International Agreements	Primary Responsible Agency	Relevant National Implementation Activities
Agenda 21 - Commission for Sustainable Development	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain	- Control of Hazardous Chemicals -Protection of the atmosphere -Marine protection -Hazardous waste management -Radioactive materials & waste control -Environmental awareness- raising
UNEP London Guidelines (voluntary procedure)	Ministry of Health P. O. Box 12 Manama Bahrain	Public health awareness-raising
FAO Code of Conduct (voluntary procedure)	Ministry of Municipalities & Urban Planning (Agriculture)	Farmer awareness-raising
Protocol Montreal	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain	- National Ministerial Order No (1) of 1999 to phase out ODS Conduct - National Workshop on R/R of refrigerants - National Workshop on Training the Trainer for R/R of refrigerates - Regular GCC meeting to phase out ODS
ILO Convention 170	Ministry of Labor P. O. Box 32333 Manama - Bahrain	- Industrial inspection - Periodic reports for ILO Convention 170 - Investigation of chemical accidents in work places - Cooperate in the preparation of a National Profile for Chemical Safety
UN Recommendation for the Transport of Dangerous Goods	- Traffic Directorate - Civil Defense	Vehicle labeling for dangerous goods
Basel Convention	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain	- Control of import / export of dangerous waste - Coordinate in the protocol of transboundary movement of toxic waste and disposal - Implementation of bilateral conventions related to hazardous waste
Stockholm Convention	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall – Bahrain	- POPs management and phase-out
Rotterdam Convention (PIC)	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall – Bahrain	-Bahrain in the process to signing and ratify the Convention -Bahrain is implementing the Convention voluntarily
Strategic Approach to International Chemicals Management (SAICM)	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain	-voluntary initiative on chemicals management –the QSPTF project

International Agreements	Primary Responsible Agency	Relevant National Implementation Activities
GATT/WTO agreements (related to chemicals trade)	Ministry of Industry and Commerce P.O. Box 5479 Bahrain Mall - Bahrain	Implementation of international trade
Chemicals Weapon Convention	Ministry of Defense Ministry of Foreign Affairs	Establishment of a National Committee with representatives from relevant governmental bodies - 2011

Table 11.C: Participation as Recipient in Relevant Technical Assistance Project

#	Name of Project	International/Bilateral Donor Agency Involved	National Contact Point	Objective & Scope	Duration	Participating National Organization	Relevant Activities
1	Ozone Project	UNEP / UNDP	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain	To phase out ODS	Continues	Public Commission for the Protection of Marine, Environment and Wildlife	Ministerial Order No. (1) for 1999 to Phase out ODS
2	Climate Change	UNEP	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain	Inventory of green house gases & mitigation option to reduce its effects.	Finished by December 2001	Public Commission for the Protection of Marine, Environment and Wildlife	Ministerial Orders No. (10) for 1999 for air emission & effluent
3	Health & Environment	UNDP / CCF Lever pool School for Tropical Medication U.K.	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain	To introduce health aspects in the EIA procedure under consideration (HEIA)	30 Months	Ministry of Health	--
4	Mercury	UNEP NET	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain	Connect EA Institute all over UNEP area by Internet	Continues	Ministry of Health	Research information from UNEP mainly through UNEP NET Project Application Center

#	Name of Project	International/Bilateral Donor Agency Involved	National Contact Point	Objective & Scope	Duration	Participating National Organization	Relevant Activities
5	SAICM Quick Start Programme Trust Fund	UNEP and UNITAR	The Supreme Council for Environment P.O. Box 18233 Bahrain Mall - Bahrain	1.Strengthening inter-agency coordination and information availability and exchange regarding chemicals management; 2.Developing a sound institutional and legislative programmatic national framework; 3.Undertaking enabling activities for the implementation of the Globally Harmonized System of Classification and Labeling of chemicals (GHS); 4.Strengthening education and awareness raising, including training and information dissemination among all relevant government authorities, industry, workers, non-governmental organizations and the public for sound national chemicals management.	2 years	Concerns public and private organizations related to chemicals and waste management	1.Updating the National Chemicals Management Profile; 2.Preparing a National SAICM Capacity Assessment; 3.Undertaking national SAICM priority setting; 4.Developing and strengthening national legislation and policies for the sound management of chemicals; 5.Undertaking enabling activities for the implementation of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS); 6.Establishing and promoting education and training programs for scientific and technical training of personnel.

Table11.D List of international documents acceded/ratified by Bahrain

Convention & Protocols	Ratification
Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution	1978
Vienna Convention for the Protection of Ozone Layer London, Montreal and Copenhagen Protocols	April 1990
Basel Convention On the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal	July 1992
United Nation Framework Convention on Climate Change and Kyoto Protocol	Dec. 1994
International Convention on Civil Liability for Oil Pollution Damage (CLC), 1969	August 1995
International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage	August 1995
United Nations Convention to combat desertification in countries experiencing serious drought and/or desertification, particularly in Africa	July 1997
Chemical Weapons Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction	1997
Adoption of the GCC unified regulation for the management of hazardous wastes of 1999	March 2006
Adoption of the GCC unified regulation for the management of hazardous chemicals of 2002	March 2006
Stockholm Convention on Persistent Organic Pollutants	May 2002
Adoption of the GCC unified regulation for the pesticides	Dec 2005
Adoption of the GCC unified regulation for the agricultural fertilizers and soil improvements additives	Dec 2005
International Convention for the Prevention of Pollution from Ships(MARPOL)	Dec. 2006
Rotterdam Convention (PIC)	In process
International Marine Organization (IMO)	In process

11.3 Assessment

The Government of Bahrain has issued and is updating some decrees and legislations in order to support the signed and ratified agreements and conventions. In order to strengthen the national implementation of the Montreal Protocol, Bahrain issued in 1999 Ministerial Order No. (1) of 1999 to phase out Ozone Depleting Substances, and in 1998 Ministerial Order No. (10) of 1998 for standards of air emission and effluent. In 2006, ministerial orders with respect to the control of banned and restricted chemicals and the management of chemicals were issued and, in 2001, a ministerial order relating to medical care waste management was issued. Overall, there is good co-operation among concerned authorities and parties participating in preparing national policies to avoid duplication of authority in chemicals control and management.

CHAPTER 12

Resources Available and Needed for Chemicals Management

Background

There is no national database that provides information on the availability of professional personnel, particular skills, or financial resources to estimate the needs of government ministries and other organizations in order to fulfill their responsibilities for chemicals management.

Purpose of the chapter

To provide an overview of resources available within the Government related to various aspects of chemicals management (including human and financial resources) and to analyze resource needs.

Method

A questionnaire contains main questions needed to fill Table 12.A and Table 12.B. Only 46.15% of these organizations gave replies and not all questionnaires were fully completed.

Table 12.A: Resources Available in Government Ministries / Institutions

Ministry/ Agency Concerned	Number of Professional Staff Involved	Type of Expertise Available	Financial Resource Available (Per year)
The Supreme Council for Environment (Environmental Control Directorate) - Environmental Assessment and Planning Directorate	Specialists11 Inspectors 20 Specialists 3	Chemists & Chemical Engineers	-
Ministry of Health PHL SMC LAB	13	Chemist / Microbiologists	-
Agriculture & Work Sewerage PWD Services Agriculture Stations Plant Agriculture	2	BSc.	-
	5	Chemists/Chemical Engineers	-
	-	-	-
	5	Q.C Chem. Manag.	-
	PhD. 1 M.S 2 B.S 3	Experience in the field of plant protection and pesticides	-
Ministry of Industry and Commerce	2	Chemical & Mechanical Engineers	- -
Ministry of Interior CID Civil Defense Customs	-	-	-
	- 5	- Customs officers with specialization in CFC and green customs	-
University of Bahrain	14 18	MSc. / PhD MSc./PhD	-
Ministry of Labor	2 2 2	Electrical Engineers Mechanical Engineers Chemical Engineers	

Table 12.B: Resources Needed by Government Institutions to Fulfill Responsibilities Related to Chemicals Management

Ministry/ Agency Concerned	Number /Type of Professional Staff Needed	Training Requirements
The Supreme Council for Environment (Environmental Control Directorate)	-	-
Agriculture	- Specialists in pesticides - Specialists in plant pathology	- Assessment of pesticide residues - Pesticide analysis
Customs	4 chemists	Workshops, training courses about hazardous chemicals, How to deal with chemical materials
Ministry of Labor	4 Chemical Engineers 4 Mechanical Engineers	- Risk management -Risk evaluation and control

Unfortunately, little information were collected about resources available and needed for chemicals management, and the information collected was not enough to describe the training requirements and to build an overview needed for chemicals management.

CHAPTER 13

Conclusions and Recommendations

Conclusions

Bahrain is experiencing significant development with rapid industrialization and population growth, which has led to the import and use of large amounts of chemicals and the generation of a broad spectrum of waste in terms of type and quantity. As chemicals management receives stronger international attention, Bahrain also has an increasing responsibility to develop sustainable national programs for an effective implementation of environmental, chemicals-related conventions and SAICM across all sectors at the national level. Chemicals and waste management has thus become a major national concern and now draws intense attention as one of the priority management areas due to its environmental consequences and public health implications.

The extent or degree of effectiveness for the existing chemicals management mechanisms is found to be adequate. However, there is a considerable need to improve the existing inter-ministerial coordinating mechanisms, which can be achieved by issuing specific legislation for management of chemicals, involving decision-makers in the management program, and by specifying a systematic and clear coordination mechanism.

The existing inter-ministerial coordinating mechanisms for the management of chemicals in Bahrain require further contribution from all concerned governmental parties. Most of the existing mechanisms would work with more effectiveness if the other relevant governmental bodies contributed with their efforts. The existing mechanisms for the management of chemicals are not linked together but work separately.

This could be addressed through the establishment of a chemicals management committee consisting of all relevant governmental and non-governmental bodies in order to have direct and better cooperation and coordination among various ministries and between governmental and non-governmental bodies.

Chemicals management has still not gained the desire attention it should receive at the national level. The Government of Bahrain is working hard and putting all their efforts together to streamline the process and procedure of safe chemical handling, and to establish effective coordinating mechanisms for various ministries and organizations dealing with chemicals.

Main problems

The main problems which concern chemicals management in the country can be summarized as follow:

- Lack of information on the chemical composition for most of the imported chemicals, raw materials, and products;
- Lack of unified classification and proper labeling for the imported chemicals;
- Shortage of trained manpower and equipment needed to control and monitor chemical hazards and pollution;
- Lack of databases on the chemicals being imported and used in the country, which makes it unfeasible to determine the location of handling and storage of certain hazardous chemicals;

- There is no Poison Control Center in the country or in the region, and there is no referral system that can help in correlating the health and environmental effects to the exposure to chemical hazards or pollution;
- There is no policy or strategy that specifically addresses public awareness concerning chemicals, especially POPs. The ratification of the Stockholm Convention should therefore give Bahrain an opportunity to prioritize POPs and make them a component of the country's plans and development goals;
- The current setback in Bahrain's policies and legislation is that they do not clearly address issues of awareness on a number of important issues such as POPs and other environment-related issues. In areas where such issues are mentioned, it is just in passing. The main issue, especially with legislation, is that most of them do not have specific regulations relating to key issues such as POPs; and
- Household pesticides are available for sale in almost every cold store and in all super stores. Importers are licensed for each individual brand for two years, renewable for a further two years if no changes or modifications are applied to the licensed product. No quality control is being practiced concerning pesticides formulations in the Kingdom because of the lack of professional labs and trained technicians.

Recommendations

The following is a set of recommendations for achieving sound chemicals management in the country:

- Establishment of a permanent inter-ministerial committee on national chemicals and wastes to serve as a platform for information exchange on chemicals and chemicals-related conventions. It is important as, for example, the POPs Focal Point should receive information from other stakeholder ministries to fulfill its reporting obligations under the Stockholm Convention. Public and private sectors and NGO should be represented in the committee. This could improve inter-ministerial cooperation, which is also highly recommended as chemicals management are cross-cutting within the Government;
- Establish a coordinating body for the exchange of information within inter-ministerial committees and establish a central database, because effective chemicals management requires information on certain chemicals that exist in the country that cause serious impacts on human health and the environment. Therefore, research on certain chemicals that cause impacts to human health and the environment should be conducted;
- Establish clear a chemicals management mechanism among the concerned parties to prevent any illegal trade, violation of national legislation, and/or any negative impacts to human health and the environment;
- Human resource development is needed to increase performance; this includes education of staff, including specialized trainings in the area of pest control. Moreover, inspectors should be encouraged to get higher education and diplomas in this field;
- An electronic database needs to be developed to store registration-related information. This database shall be made available at all border posts;
- Certification process is proposed for the enterprises that are importing, producing or using chemicals commercially;

- Public awareness shall be increased concerning the use and management of chemicals in Bahrain. For awareness-raising to be successfully carried out among the public, information capturing and dissemination tools need to be in place, and they should also be accessible and affordable to the general public;
- Strengthening the control and monitoring of the industrial enterprises in the area of import, export, use, and production of chemicals;
- Follow-up and implementation of Bahrain's obligations to international conventions on chemicals management;
- Encourage the chemicals users to use alternatives to banned chemicals;
- Control/manage the rate/quantity of consumption of chemicals in all sectors to minimize chemical waste generation in the future;
- Cooperation and coordination at the national level, regional and international exchange of information on the use of hazardous chemicals, toxic and protective measures, and methods of disposal;
- Development of public-private partnerships as a tool for resource mobilization; and
- The quality and accuracy of the chemical composition of the marketed pesticides might vary as to what was provided by the producing company and what was submitted by the registrant.
    - Regulation on pesticides should be updated with a vision to protect society from the adverse effects of pesticides without denying access to the benefits of their use;
    - The registration process should involve local laboratory assessment of the pesticide product based on the technical data submitted by the applicant;
    - Members of the Pesticides Registration Committee have changed over time and thus the Committee is not fully functional. Activities have started to this end;
    - Relevant stakeholders involved in pesticides registration must be active members of the Pesticides Registration Committee;
    - Establishment of a pesticides analytical laboratory and a toxicological laboratory is needed to assess, evaluate, and monitor the use of pesticides in the Kingdom.
    - The pesticides registration fees should be increased and harmonized in the GCC countries; and
    - Electronic databases need to be developed for pesticides and chemicals registration to aid the duties of customs, health, agriculture, environment, and other relevant authorities.

Annex 1

Abbreviations and Glossary

Abbreviations

ALBA	Aluminum Bahrain
BD	Bahrain Dinar
BANAGAS	Bahrain National Gas Company
BAPCO	Bahrain Petroleum Company
bbl/d	Barrel/day
Bcf	billion cubic feet
CAS No.	Chemical Abstracts Service Registry
CIO	Central Informatics Organization
CSG	Chemical Safety Group
CD	Civil Defense
CRD	Commercial Registration Directorate
CBI	Confidential Business Information
ECD	Environmental Control Directorate
FAO	Food and Agriculture Organization
gal	Gallon
GOSI	General Organization for Social Insurance
GDP	Gross Domestic Product
GCC	Gulf Cooperation Council
GPIC	Gulf Petrochemicals Industries Company
GSO	Gulf Standardization Organization
HFA	Hyogo Framework for Action
HNS	Hazardous and Noxious Substances
Ha	Hectare
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMDC	Guide for International Marine Transportation of Dangerous Commodities
IPM	integrated pest management
IFCS	Intergovernmental Forum on Chemical Safety
IRPTC	International Register of Potentially Toxic Chemicals
KBSP	Khalifa bin Salman Port
Kg	Kilogram
Km	Kilometer
L	Liter
MEMAC	Marine Emergency Mutual Aid Center
MSDS	Material Safety Data Sheets
MT	metric ton

MOH	Ministry of Health
MOL	Ministry of Labour
NOGA	National Oil and Gas Authority
NOSCP	National Oil Spill Contingency Plan
NGOs	Non-governmental Organizations
NA	Not Available
OECD	Organization for Economic Cooperation and Development
ODS	Ozone Depleting Substances
POPs	Persistent Organic Pollutants
PPE	Personal Protection Equipments
PIC	Petroleum Investment Corporation
PAHs	Polycyclic aromatic hydrocarbons
PAL	Public Analyst's Laboratory
UN	United Nations
UNEP/ROWA	Regional Office for West Asia of the United Nations Environment Programme
UNITAR	United Nations Institute for Training and Research
PIC	Rotterdam Convention
SAICM	Strategic Approach to International Chemical Management
SWM	Solid Waste Management
SMD	Standardization & Metrication Directorate
SC	Stockholm Convention
SCE	The Supreme Council for Environment
TDS	total dissolve salt
Tcf	trillion cubic feet
TEUs	twenty-foot equivalent units
EPA	US Environmental Protection Agency
WHO	World Health Organization
WTO	World Trade Organization
Yr	Year

Glossary

Agricultural wastes	The various wastes resulting from crop raising and harvesting and which are returned to the soil as fertilizers, but do not include pesticide wastes or weeds.
Assessment of hazards	A comprehensive study of the health, occupational, and environmental effects of a hazardous chemical substance or a group of substances under certain environmental, economic, and social conditions in a certain area, and the results of which can be used as a guide in the results of similar studies in other areas under similar conditions.
Banned chemicals	Any substance on which the environment office- in agreement with the official government institutions- issues a ban on import and use in all fields for health or environmental reasons.

Carrier	Any natural or corporate person who transports hazardous chemical materials on road or by sea or air.
CAS No.	A number in the Chemical Abstracts Service Registry that provides all information related to it.
Chemical component	A chemical substance made up of two or more elements that react together with various proportions.
Chemical Material Safety Data Sheet (MSDS)	A sheet issued by the manufacturer in the country of origin containing information related to the safety measures in connection with the chemical material.
Chemical wastes	Solid, liquid or gaseous chemicals residual from industrial or laboratory activities or used for cleaning purposes that cause corrosion to other substances or have a pH-level less than 2 or more than 12.
Consignments of unpackaged (bulk) chemicals	This term refers to the following: - Class 2 chemical materials in containers with a capacity exceeding 500 liters or the total quantity of containers exceeding 1000 liters; - Chemical materials under a class other than Class 2, which are in liquid or paste form in a container exceeding 250 liters capacity or in smaller containers with a total capacity of 1000 liters; and - Solid chemical materials in a container, the quantity of which is not divisible and exceeds 400 kg or a divisible quantity exceeding 800 kg.
Danger label	A square card fixed at a forty five degree angle on the packs containing hazardous chemical materials, and contains information and drawings in internationally agreed colors to indicate the danger of the material.
Determination of hazards	The initial investigation of the hazard potentials from the chemical properties of elements and compounds and the results of the initial experimental studies and laboratory tests.
Disposal	The processes that do not lead to extraction of substance or recycling such as burial, biological, physical or chemical treatment or permanent storage or incineration.
Domestic wastes	Wastes generated by homes, including individual and mass residences, hotels, commercial complexes, and recreation centers, which do not contain hazardous wastes.

Drug waste	Waste resulting from the production or preparation of damaged or expired pharmaceutical products, drugs or medicines.
Environmental body	The authority empowered with environmental affairs at the national level. In Bahrain, this is the [name of body] in the Ministry of Housing, Municipalities and Environment.
Environmental deterioration	The effect on any of the natural environmental elements which undermine its historical, cultural or economic value, and leads to damage to living beings which live in or depend on the .
Environmental hazards	Direct and accumulated hazards in the water, air, or soil, which may affect humans, animals, plants, r the environment, or ecological systems, or limit the normal use of environmental resources individually or collectively.
Environmental pollution	The presence of any polluting materials or factors for a certain period of time, leading to deteriorating the environment, damaging public health, or affecting in any form the enjoyment of life or benefit from resources and properties.
Environmental protection	The preservation of the environment through prevention or alleviation of pollution, thus and ensuring its survival.
Handling cards	Information required alone or together with the hazardous chemical materials danger labels. This information is contained in a number of rectangular forms.
Hazardous chemicals	Any chemical that has reactive characteristics on its own or in a mixture or as a compound whether such chemical is in its natural form or in a processed form.
Hazardous chemicals management	The proper handling of hazardous chemicals, including industrial and production operations, export, import, transit, storage, transportation, and use.
Hazardous materials and waste	Any material or waste resulting from industrial operations, chemicals, or radiation, and acquires hazardous characteristics because of its contents of material, material concentrates, chemical reacting, distinguished as toxic, capability to burst and corrode, or any other characteristic resulting in danger to human, animal, or plant life, or the environment.
Hazardous wastes	Waste that belongs to any of the categories of Schedule III and characterized by any of the properties listed in Schedule IV, or a mixture of hazardous wastes and other substances, or waste that is specifically designated as hazardous by the Environment Authority.

Health care hazardous waste	Waste resulting from various health care activities in all nursing, treatment and diagnostic forms including laboratories, research centers, dental treatment, veterinary treatment activities, and products and drugs of pharmaceutical factories and warehouses, all without prejudice to the limitation indicated in the schedules to be issued by an Order of the Minister for Health in co-ordination with the Minister for Municipalities and Environmental Affairs.
Health hazards	Direct or indirect hazards, whether immediate or delayed, that result from the direct or indirect exposure of man to chemicals at production units or at population centers such as residences, or when using or dealing with such chemicals during transportation, storing, or the disposal of their waste.
IATA Regulations	Dangerous Goods Regulations of the International Air Transport Association.
ICAO Regulations	Technical instructions of the International Civil Aviation Organization.
IMDC Regulations	The document titled "Guide for International Marine Transportation of Dangerous Commodities" issued by the International Maritime Organization.
Import of banned/restricted substances	The act of bringing any banned substance or substance subject to limitations into the country, or allowing it to enter from any official check points either legally or illegally, except for transit.
Importer of banned/restricted substances	Any physical or moral person granted an official permit to import banned chemicals or chemicals subject to limitations either for him or for others.
Incineration of wastes	The process of controlled burning of solid, liquid, and gaseous wastes, producing gases and traces of non-combustible substances.
Industrial and commercial wastes	These wastes are similar to domestic or inert wastes but do not include wastes which contain solvents, degreasers, inks, putty sediments, acids, alkalies, or other wastes of the non-domestic types.
Inert wastes	Wastes that are chemically or biologically non-reactive in the natural environment. They usually include glass, reinforced cement building debris, plastic, wood, rubber, wires, metal sheets, and unpolluted soils with no plants.
License	A written license issued by the General Directorate for the Protection of Environment and Wildlife in connection with

	certain activities and practices provided that the licensed party shall comply with all specified conditions and the general protection regulations.
Licensed party	A party represented by its president or manager who holds the license for certain practices and activities, which shall incur all responsibilities, liabilities, and duties specified in the license conditions.
Environmental licensing authority	Any authority empowered to issue licenses for projects having a possible effect on the environment.
Peak hours	The period of time in which trucks and heavy plants are not allowed to operate on all or certain roads as determined by the General Directorate of Traffic and Licensing in this respect.
Polluting materials and agents	Any solid, liquid, gas, smoke, steam, fume, noise, rays, heat, or vibrations caused by man or polluting organisms i.e. rodents, insects, different microbes, or any natural phenomena which lead to direct or indirect environmental pollution or deterioration.
Waste generator	Any installation whose activity may generate wastes.
Project's environmental evaluation	The study or studies conducted before licensing a project to determine the possible environmental effects, the suitable procedures, and measures to prevent or minimize the negative effects (or increase the positive effects) of the project on the environment.
Proper shipping name	This term has the following meanings: a. The proper shipping name used for the shipped materials with CAS No. or UN No. in accordance with the recommendations of the United Nations or the Guide for International Marine Transportation of Dangerous Goods or International Civil Aviation Organization Regulations or International Air Transport Association Regulations in accordance with the regulations issued by the International Customs Organization; b. In relation to radioactive chemicals, the proper shipping name is the name designated by the General Directorate for the Protection of Environment and Wildlife, being the authority concerned with the management of radioactive materials; and c. In relation with chemicals within the explosive Class, the proper shipping name shall be the one specified by

the relevant authorities.

Recycling of used oils	Processes, such as refining, that allow recovery or reuse of substances such as fuels.
Shipper of hazardous chemicals	Any natural or corporate person who transports hazardous chemical materials in connection with the transportation thereof where he is the consignor of the first trip.
Waste storage	The temporary storage of waste in special places determined according to conditions to be defined by the Environment Authority for the purpose of collection before transportation or treatment.
Substances subject to limitations	Any substance used in a specific activity and that cannot be used in another one according to specific conditions and regulations issued by the environment office, with the consent of the relevant official bodies, for health or environmental reasons.
Environment	The vital surroundings which include living beings such as human beings, animals, plants, and the surrounding air, water, and earth, and its content of solid, liquid and gas materials, various forms of energy or any movable or immovable facilities built by man or in which man works.
Treatment unit	The facility in which the operations for altering the biological or chemical characteristics of the waste take place using suitable techniques for the purpose of limiting the hazards of such wastes and reducing the possibility of spreading diseases.
UN number.	A number assigned to some hazardous chemicals by the United Nations Committee of Experts on the Transport of Dangerous Goods, published as part of the United Nations Recommendations on the Transport of Dangerous Goods, the Guide for International Marine Transportation of Dangerous Goods, International Civil Aviation Organization Regulations and International Air Transport Association Regulations.
Use of banned/restricted substances	The consumption of banned substances or chemicals subject to limitations in production, sale, or other activities.
Used oils	Any liquid or semi-solid substance containing in part or in whole mineral oils or manufactured hydrocarbons such as the oils left over from the maintenance of vehicles, engines, and other machinery, or oils mixed with water resulting from industrial or non-industrial processes, or the oils used for lubricating engines and other machinery, or the oils whose original particulars have changed as a result of utilization.

User of banned/restricted substances	Any physical or moral person who uses the banned substances or chemicals subject to limitations.
Waste classification	The operation of classifying waste according to the nature of its contents and in accordance with their classification provided for in Article l (6) of the Order 1 of 2001.
Waste incineration	The controlled ignition process of solid, liquid, and gaseous waste to produce gases and limited quantities of non-flammable materials.
Waste management	All processes that wastes undergo from the time they are generated until they are disposed of, including gathering, storage, transportation, treatment, and subsequent handling at disposal or burial sites.

Annex 2

Storage and Warehousing Facilities of Industrial Chemicals (Used in manufacturing/processing facilities)

Industrial Chemicals (used in manufacturing/ processing facilities) Product Name/ Chemical Type	Size/ capacity (Volume in cubic meters or weight in tons)	Type of Facility	Location Area (Port, Industrial Complex, Urban, Rural)	Labeling; Health and Environment Protection Measures
1 - Hydrochloric Acid, HCL	5.0 Tons	In storage tank	Industrial Complex	Labeling Provided
2- Sulphuric Acid,H2S04	75.0 Tons	In storage tank	Industrial Complex	Labeling Provided
3- Caustic Soda,Liquid,NAOH	120.0 Tons	In storage tank	Industrial Complex	Labeling Provided
4- Caustic Soda(FLAKES),NAOH	11.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
5- Activated Hydrazine, N2H4	3.3 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
6- Calcium Chloride,CACL2	8.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
7- Calcium Hypochlorite	0.2 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
8- Sodium Sulphite,NA2SO3	17.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
9- Trisodium Phosphate,NA3PO4.12H2O	0.4 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
10- Potassium Carbonate,K2CO3	12.0 Tons	In storage tank	Industrial Complex	Labeling Provided

Industrial Chemicals (used in manufacturing/ processing facilities) Product Name/ Chemical Type	Size/ capacity (Volume in cubic meters or weight in tons)	Type of Facility	Location Area (Port, Industrial Complex, Urban, Rural)	Labeling; Health and Environment Protection Measures
11- Disodium Hydrogen Phosphate	0.05 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
12- Freon 404A	0.3 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
13- Sodium Bicarbonate,NAHCO3	8.5 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
14- Diethanol Amine(DEA)	9.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
15- Methyl Diethanol Amine(MDEA)	1.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
16- Potassium Metavanadate(KVO3)	1.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
17- Potassium Nitrite(KNO2)	6.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
18- Corrosion Inhibitor,Type:NALCO 8539	12.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
19- Industrial Biocide; NALCO 8514	3.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
20- Corrossion Inhibitor;NALCOL-2000	0.2 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
21- Industrial Biocide Type:NALCO 7330	1.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
22- Waste Treatment Antifoam;NALCO 71-D5	0.1 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
23- Organic Inhabitor;BELGARD EV	30.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
24- Microbiocide,UCARCIDE 224	10.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
25- Corrosion Inhibitor,Corrshield NT 4293	11.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
26- KS-1 Amine Based Solvent (70% wt)	160.0 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
27- Maxamine 70B Antifoam	0.06 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided

Industrial Chemicals (used in manufacturing/ processing facilities) Product Name/ Chemical Type	Size/ capacity (Volume in cubic meters or weight in tons)	Type of Facility	Location Area (Port, Industrial Complex, Urban, Rural)	Labeling; Health and Environment Protection Measures
28- Antifoam Agent,B51,Polyalkylene Glycol	0.4 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
29- Anti-Foam Agent,Type:FILLIX 110	0.07 Tons	completely enclosed warehouse	Industrial Complex	Labeling Provided
30- Chlorine(CL2),99.9%	240.0 Tons	In cylinder under sun shade	Industrial Complex	Labeling Provided
31- Urea Formaldehyde	6200.0 Tons	In storage tank	Industrial Complex	Labeling Provided

Annex 3

Distribution and Transportation of Industrial Chemicals (Used in manufacturing/processing facilities)

Industrial Chemicals (used in manufacturing/ processing facilities) Product Name/ Chemical Type	Type of Transportation Facility: Maritime, Inland waterway, Rail, Road, Air	Approximate Capacity (Volume in cubic meters or weigh in tons transported by year)	Labeling; Health and Environment Protection Measures
1- Hydrochloric Acid, HCL	Road	5.3 Tons	Labeling provided
2- Sulphuric Acid,H2S04	Road	90.0 Tons	Labeling provided
3- Caustic Soda,Liquid,NAOH	Road	300.0 Tons	Labeling provided
4- Caustic Soda(FLAKES),NAOH	Road	8.0 Tons	Labeling provided
5- Activated Hydrazine, N2H4	Road	3.5 Tons	Labeling provided
6- Calcium Chloride,CACL2	Road	8.0 Tons	Labeling provided
7- Calcium Hypochlorite	Road	0.25 Tons	Labeling provided
8- Sodium Sulphite,NA2SO3	Road	16.0 Tons	Labeling provided
9- Trisodium Phosphate,NA3PO4.12H2O	Road	0.6 Tons	Labeling provided
10- Potassium Carbonate,K2CO3	Road	15.0 Tons	Labeling provided
11- Disodium Hydrogen Phosphate	Road	0.1 Tons	Labeling provided

Industrial Chemicals (used in manufacturing/ processing facilities) Product Name/ Chemical Type	Type of Transportation Facility: Maritime, Inland waterway, Rail, Road, Air	Approximate Capacity (Volume in cubic meters or weigh in tons transported by year)	Labeling; Health and Environment Protection Measures
12- Freon 404	Road	0.3 Tons	Labeling provided
13- Sodium Bicarbonate,NAHCO3	Road	9.0 Tons	Labeling provided
14- Diethanol Amine(DEA)	Road	8.2 Tons	Labeling provided
15- Methyl Diethanol Amine(MDEA)	Road	1.6 Tons	Labeling provided
16- Potassium Metavanadate(KVO3)	Road	1.2 Tons	Labeling provided
17- Potassium Nitrite(KNO2)	Road	7.0 Tons	Labeling provided
18- Corrosion Inhibitor,Type:NALCO 8539	Road	15.0 Tons	Labeling provided
19- Industrial Biocide; NALCO 8514	Road	2.5 Tons	Labeling provided
20- Corrossion Inhibitor;NALCOL-2000	Road	0.2 Tons	Labeling provided
21- Industrial Biocide Type:NALCO 7330	Road	1.4 Tons	Labeling provided
22- Waste Treatment Antifoam;NALCO 71-D5	Road	0.12 Tons	Labeling provided
23- Organic Inhabitor;BELGARD EV	Road	30.0 Tons	Labeling provided
24- Microbiocide,UCARCIDE 224	Road	9.0 Tons	Labeling provided
25- Corrosion Inhibitor,Corrshield NT 4293	Road	10.0 Tons	Labeling provided
26- KS-1 Amine Based Solvent (70% wt)	Road	130.0 Tons	Labeling provided
27- Maxamine 70B Antifoam	Road	0.06 Tons	Labeling provided
28- Antifoam Agent,B51,Polyalkylene Glycol	Road	0.3 Tons	Labeling provided

Industrial Chemicals (used in manufacturing/ processing facilities) Product Name/ Chemical Type	Type of Transportation Facility: Maritime, Inland waterway, Rail, Road, Air	Approximate Capacity (Volume in cubic meters or weigh in tons transported by year)	Labeling; Health and Environment Protection Measures
29- Anti-Foam Agent,Type:FILLIX 110	Road	0.12 Tons	Labeling provided
30- Chlorine(CL2),99.9%	Road	250.0 Tons	Labeling provided
31- Urea Formaldehyde	Road	6200.0 Tons	Labeling provided

Annex 4

Areas corresponding to function of International's (ISO) committees

The Kingdom of Bahrain is a member in the GSO (Gulf standardization organization) and the gulf and local committees cover these functions

No.	No. of International committee (ISO)		
1	ISO/TC 6	Paper, carton, paper pulp	الورق والكرتون ولب الورق
2	ISO/TC 35	Paints and varnish	الأصباغ والورنيش
3	ISO/TC 38	Textiles	النسيج
4	ISO/TC 42	Photography	التصوير الفوتوغرافي
5	ISO/TC 45	Rubber and its products	المطاط ومنتجاته
6	ISO/TC 47	Chemistry	الكيمياء
7	ISO/TC 54	(Standardization of methods of analysis and specifications for essential oils)	الزيوت العطرية
8	ISO/TC 61	Plastic	البلاستيك
9	ISO/TC 81	Common agricultural pesticides and chemicals	الأسماء الشائعة للمبيدات والكيماويات الزراعية
10	ISO/TC 120	Leathers	الجلود
11	ISO/TC 134	Fertilizers and soil improvements	الأسمدة ومعدلات التربة
12	ISO/TC 138	Plastic pipes, fittings and valves to transfer liquids	أنابيب البلاستيك والوصلات والصمامات لنقل السوائل
13	ISO/TC 158	Gases analysis	تحاليل الغازات
14	ISO/TC181WG5&WG6	Safety in children's toys (chemical requirements) the recommendation of the Technical Committee added to the field	السلامة في لعب الأطفال (المتطلبات الكيميائية) توصية اللجنة الفنية بإضافتها للمجال
15	ISO/TC 201	Surface Chemical analysis	التحاليل الكيميائية السطحية
16	ISO/TC 217	Cosmetics	مستحضرات التجميل
17	ISO/TC 219	Floor covers	أغطية الأرضيات
18	ISO/TC 256	Pigments, dyestuffs and extenders	الصبغات ومواد الصبغ وامتداداتها

Corresponding to ASTM committees:

	B. Nonferrous metals		المعادن غير الحديدية
1	B08	Metallic and Inorganic Coatings	الطلاءات المعدنية و غير العضوية
	C. Cementitious, ceramic, concrete and masonry		المواد الأسمنتية و الخزفية و الخرسانية و البنائية
2	C14	Glass and Glass Products	الزجاج و المنتجات الزجاجية
3	C16	Thermal Insulation	العزل الحراري
4	C21	Ceramic White wares and Related Products	أطباق الطعام الخزفية و المنتجات ذات الصلة
5	C24	Building Seals and Sealants	موانع تسرب و عوازل البناء
6	C28	Advanced Ceramics	الخزفيات المتقدمة
	D. Miscellaneous materials		مواد متنوعة
7	D01	Paint and Related Coatings, Materials and Applications	الدهان و الطلاءات والمواد والتطبيقات ذات الصلة
8	D05	Coal and Coke	الفحم و الكوك
9	D06	Paper and Paper Products	الورق و منتجات الورق
10	D07	Wood	الخشب
11	D08	Roofing and Waterproofing	التسقيف و العزل المائي
12	D10	Packaging	التعبئة و التغليف
13	D11	Rubber	المطاط
14	D12	Soaps and Other Detergents	أنواع الصابون و المنظفات الأخرى
15	D13	Textiles	المنسوجات
16	D14	Adhesives	مواد اللصق
17	D15	Engine Coolants	مبردات المحرك
18	D16	Aromatic Hydrocarbons and Related Chemicals	الهيدروكربونات العطرية و المواد الكيميائية ذات الصلة
19	D19	Water	الماء
20	D20	Plastics	المواد البلاستيكية
21	D21	Polishes	مواد التلميع
22	D22	Air Quality	جودة الهواء
23	D24	Carbon Black	أسود الكربون
24	D26	Halogenated Organic Solvents and Fire Extinguishing Agents	المذيبات العضوية الهالوجينية و مواد إطفاء الحريق
25	D27	Electrical Insulating Liquids and Gases	السوائل و الغازات العازلة للكهرباء
26	D28	Activated Carbon	الكربون المُنَشط
27	D30	Composite Materials	المواد المركبة (الكومبوست)
28	D31	Leather	الجلد
29	D32	Catalysts	المواد الحافزة
30	D33	Protective Coating and Lining Work for Power Generation Facilities	أعمال الدهان و البطانة الواقية لمرافق توليد الطاقة
31	D34	Waste Management	إدارة النفايات
32	D35	Geosynthetics	رقائق البوليمر (الجيوسنثيتكس)
	E. Miscellaneous subjects		موضوعات متنوعة
33	E01	Analytical Chemistry for Metals, Ores and Related Materials	الكيمياء التحليلية للمعادن و المواد الخام و المواد ذات الصلة

34	E02	Terminology	المصطلحات
35	E12	Color and Appearance	اللون و المظهر
36	E15	Industrial and Specialty Chemicals	المواد الكيميائية الصناعية والتخصصية
37	E27	Hazard Potential of Chemicals	المخاطر المحتملة للمواد الكيميائية
38	E35	Pesticides and Alternative Control Agents	مبيدات الآفات و الحشرات و مواد المكافحة البديلة
39	E42	Surface Analysis	تحليل سطوح المواد
	F. Materials for specific applications		مواد لاستخدامات معينة
40	F02	Flexible Barrier Materials	مواد الحاجز المرن
41	F03	Gaskets	حشيات منع التسرب
42	F04	Medical and Surgical Materials and Devices	المواد و الأجهزة الطبية و الجراحية
43	F06	Resilient Floor Coverings	الأغطية المرنة للأرضيات
44	F13	Pedestrian/Walkway Safety and Footwear	سلامة المشاة/الممرات و الأحذية
45	F15	Consumer Products	المنتجات الاستهلاكية
46	F17	Plastic Piping Systems	نظم شبكة الأنابيب البلاستيكية
47	F20	Hazardous Substances and Oil Spill Response	التعامل مع تسرب المواد الخطرة و البترول
48	F23	Protective Clothing	ملابس و أجهزة الحماية الشخصية
49	F26	Food Service Equipment	تجهيزات تقديم الطعام
50	F32	Search and Rescue	البحث و الإنقاذ
51	F40	Declarable Substances in Materials	المكونات التي يلزم الإفصاح عنها بالمواد
	G. Corrosion, deterioration, and degradation of materials		تآكل و تدهور و انحطاط (تردي) المواد
52	1G0	Corrosion of Metals	تآكل المعادن
53	G03	Weathering and Durability	التجوية و المتانة

Corresponding to CEN:

No.	No. of European committee	**No.**	No. of European committee
1	CEN / TC 139	**2**	CEN / TC 52
3	CEN / TC 193	**4**	CEN / TC 248
5	CEN / TC 223	**6**	CEN / TC 252
7	CEN / TC 260	**8**	CEN / TC 289
9	CEN / TC 276	**10**	CEN / TC 309
11	CEN / TC 298	**12**	CEN / TC 386
13	CEN / TC 317	**14**	CEN / SS C02
15	CEN / TC 321	**16**	CEN / SS C10
17	CEN / TC 335	**__**	----------

Annex 5

Identifying Key Actors for the Work Areas Listed in Table A of the SAICM Global Plan of Action

#	Work Area	Activity	Lead Agency/Stakeholder	Other Participating Agencies/Stakeholders
1	Assessment of national chemicals management to identify gaps and prioritize actions	1, 165, 207	• PMEW - Environment	• Ministry of Health • Ministry of Labor • Ministry of Industry and Commerce – Commerce • Ministry of Interior- Customs Affairs • Ministry of Municipalities Affairs and Urban Planning – Agriculture
2	Human health protection	2-6	• Ministry of Health	• PMEW - Environment • Ministry of Labor
3	Children and chemical safety	7-10, 150-153, 245-246	• Ministry of Health	Ministry of Industry and Commerce - Commerce
4	Occupational health and safety	11-21, 138-149, 255	• Ministry of Labor	• PMEW - Environment
5	Implementation of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)	22, 99-101, 168, 248-250	• PMEW – Environment • Ministry of Industry and Commerce - Commerce	• Ministry of Interior- Customs Affairs
6	Highly toxic pesticides risk – management and reduction	23-30, 114-117	• Ministry of Municipalities Affairs and Urban Planning – Agriculture • Ministry of Health	• PMEW - Environment
7	Pesticide programmes	31	• Ministry of Municipalities and Urban Planning –	• Ministry of Municipalities and Urban Planning –

#	Work Area	Activity	Lead Agency/Stakeholder	Other Participating Agencies/Stakeholders
			Agriculture • Ministry of Health	Agriculture • Ministry of Health
8	Reduced health and environmental risks of pesticides	32-42	• Ministry of Municipalities and Urban Planning – Agriculture • Ministry of Health	• Ministry of Municipalities and Urban Planning – Agriculture • Ministry of Health
9	Cleaner production	43-46, 118, 238-242	• PMEW – Environmental Assessment	• Ministry of Industry and Commerce - industry
10	Remediation of contaminated sites	47-48, 243	• PMEW - Environment	• Ministry of Interior-Civil Defence
11	Lead in gasoline	49, 156, 244	• National Oil and Gas Authority	• PMEW - Environment
12	Sound agricultural practices	50-53, 158-160	• Ministry of Municipalities and Urban Planning – Agriculture	• Ministry of Health • PMEW - Environment
13	Persistent, bioaccumulative and toxic substances (PBTs); very persistent and very bioaccumulative substances; chemicals that are carcinogens or mutagens or that adversely affect, inter alia, the reproductive, endocrine, immune or nervous systems; persistent organic pollutants (POPs)	54-56	• PMEW - Environment	• Ministry of Health • Ministry of Labor • Ministry of Industry and Commerce • Ministry of Interior-Customs Affairs • Ministry of Municipalities Affairs and Urban Planning – Agriculture • Ministry of Interior-Civil Defence • NGO • Private Sector
14	Mercury and other chemicals of global concern; chemicals produced or used in high volumes; chemicals subject to wide dispersive uses; and other chemicals of concern at the national level	57-60, 157	• PMEW - Environment	• Ministry of Health • Ministry of Labor • Ministry of Industry and Commerce • Ministry of Interior-Customs Affairs • Ministry of Municipalities Affairs and Urban Planning – Agriculture • Ministry of Interior-Civil Defence • NGO • Private Sector

#	Work Area	Activity	Lead Agency/Stakeholder	Other Participating Agencies/Stakeholders
15	Risk assessment, management and communication	61-67, 127-137, 247	• Ministry of Interior-Civil Defence	• Ministry of Health • Ministry of Labor • Ministry of Industry and Commerce • Ministry of Interior-Customs Affairs • Ministry of Municipalities Affairs and Urban Planning – Agriculture • NGO • Private Sector
16	Waste management (and minimization)	68-73, 161-162, 258-262, 272-273	• PMEW - Environment	• Waste generators, and waste treatment and disposal facilities
17	Formulation of prevention and response measures to mitigate environmental and health impacts of emergencies involving chemicals	74-79, 237	Ministry of Interior-Civil Defence	• Ministry of Health • Ministry of Labor • Customs Affairs • Ministry of Municipalities Affairs and Urban Planning – Agriculture • NGO • Private Sector
18	Research, monitoring and data	80-87	• All concern parties which are deal with chemicals	• All concern parties which are deal with chemicals
19	Hazard data generation and availability	88-97	• All concern parties which are deal with chemicals	• All concern parties which are deal with chemicals
20	Promotion of industry participation and responsibility	98, 189-192	• Ministry of Industry and Commerce - industry	• PMEW – Environmental Assessment
21	Information management and dissemination	102-113, 256	• All concern parties which are deal with chemicals	• All concern parties which are deal with chemicals
22	Life cycle	119-123	• All concern parties which are deal with chemicals	• All concern parties which are deal with chemicals
23	Pollutant release and transfer register (PRTRs) – creation of national and international registers	124-126, 177-180	-	-
24	Education and training (public awareness)	154-155	• All concern parties which are deal with	• All mass media • NGO

#	Work Area	Activity	Lead Agency/Stakeholder	Other Participating Agencies/Stakeholders
			chemicals	• Private Sector
25	Stakeholder participation	163-164	• PMEW - Environment	• Ministry of Health • Ministry of Labor • Ministry of Industry and Commerce • Ministry of Interior-Customs Affairs • Ministry of Municipalities Affairs and Urban Planning – Agriculture • Ministry of Interior-Civil Defence • NGO • Private Sector
26	Implementation of integrated National programmes for the sound management of chemicals at the national level in a flexible manner	166-167	• PMEW - Environment	• Ministry of Health • Ministry of Labor • Ministry of Industry and Commerce • Customs Affairs • Ministry of Municipalities Affairs and Urban Planning – Agriculture • Civil Defence • NGO • Private Sector
27	International agreements	169-176	• Ministry of Foreign Affairs	• Ministry of Health • Ministry of Labor • Ministry of Industry and Commerce • Customs Affairs • Ministry of Municipalities Affairs and Urban Planning – Agriculture • Ministry of Interior-Civil Defence
28	Social and economic considerations	181-188, 257	• All concern parties which are deal with chemicals	• All concern parties which are deal with chemicals
29	Legal, policy and institutional aspects	193-198	• All concern parties which are deal with chemicals	• All concern parties which are deal with chemicals
30	Liability and compensation	199	• All concern parties which are deal with	• All concern parties which are deal with

#	Work Area	Activity	Lead Agency/Stakeholder	Other Participating Agencies/Stakeholders
			chemicals	chemicals
31	Stock-taking on progress	200-201	• PMEW - Environment	• All concern parties which are deal with chemicals
32	Protected areas	202-203, 253-254	• PMEW - Environment	• All concern parties which are deal with chemicals
33	Prevention of illegal traffic in toxic and dangerous goods	204, 263-271	• Ministry of Interior-Customs Affairs	• PMEW - Environment • Ministry of Health • Ministry of Industry and Commerce • Ministry of Municipalities Affairs and Urban Planning – Agriculture • Ministry of Interior-Civil Defence
34	Trade and environment	205, 251-252	• Ministry of Industry and Commerce - Commerce	• PMEW - Environment • Ministry of Health • Ministry of Municipalities Affairs and Urban Planning – Agriculture • Ministry of Interior-Civil Defence
35	Civil society and public interest nongovernmental organization (NGO) participation	206	• PMEW - Environment	• All concern parties which are deal with chemicals
36	Capacity-building to support national actions	208-236	• PMEW - Environment	• All concern parties which are deal with chemicals

Annex 6

Available National Reports and Papers Addressing Various Aspects of Chemicals Management

- The National Environmental Strategy - 2006
- State of Environment Report – 2009
- National Economic Strategy 2009 – 2014
- The Economic Vision 2030 for Bahrain
- Management of Public Health Pesticides in the Kingdom of Bahrain - Ministry of Health
- Bahrain Profile to Johannesburg Summit 2002
- Bahrain national assessment report on implementation of the Mauritius Strategy (MSI) of the Barbados programme of action (BPOA) – 2009
- Environmental Health Section Annual Report 2009
- Bahrain Millennium Development Goals (MDG) Report 2003
- On The Road to the Millennium Summit 2010 Review of the Progress of the Millennium Development Goals in the Kingdom of Bahrain (A National Perspective)
- Bahrain National Risk Register (HAZARDS).
- National progress report on the implementation of the Hyogo Framework for Action (2009-2011) - interim

Annex 7

Names and Addresses of Key Individuals and Organizations

Governmental Organizations:

#	Organization	Website	Tel.	Fax
1	The Supreme Council for Environment	www.pmew.gov.bh	17386999	17920206
2	Ministry of Industry and Commerce	www.moic.gov.bh	17574777 17568000	17530151
3	Ministry of Health	www.moh.gov.bh	17288888	17252569
4	Ministry of Municipalities Affairs and Urban Planning • Agriculture	www.mun.gov.bh	17501565	17211767
5	Ministry of Interior • Customs Affairs • Civil Defense • Central Informatics Organization	www.interior.gov.bh www.bahraincustoms.gov.bh www.civildefence.gov.bh www.cio.gov.bh	17359999 17534534 17377777	17359935 17534041 17728989
6	Electricity and Water Authority	www.mew.gov.bh	17576576	17223283
7	General Organization of Sea Ports	www.gop.bh	17359595	17359395
8	National Oil & Gas Authority	www.noga.gov.bh	17312644	17293007
9	Ministry of Labor	www.mol.gov.bh	17873777	17873754

Non-Governmental Organizations*

#	Organization	Website	Tel.	Fax
1	The General Federation of Bahrain Trade Unions	http://www.gfbtu.org/	17727333	17729599
2	Bahrain Health and Safety Society	http://bhssonline.com/default.asp	17727374	17725242
3	Bahrain Chemists Society	-	39414776	-
4	Bahrain Society of Engineers	www.mohandis.org	17727100	17729819
5	Bahrain Environmental Society	-		17630056

* Other NGOs are invited in some activities according to their specialization.

Private Sector*

#	Organization	Website	Tel.	Fax
1	Gulf Petrochemicals Industries Co. (GPIC)	www.gpic.com	17731777	17731047
2	Aluminium Bahrain (ALBA)	www.aluminiumbahrain.com/en/default.asp	17830000	17830083
3	Bahrain Petroleum Company (Bapco)	http://www.bapco.net/	17704040	17704070

* all companies which are deals with chemicals.

Academic and Research

#	Organization	Website	Tel.	Fax
1	University of Bahrain	www.uob.edu.bh	17449999	17683278
2	Arabian Gulf University	www.agu.edu.bh	17239999	17272555
3	College of Health Sciences	www.chs.edu.bh	17252605	17230730
4	Bahrain Training Institute	www.bti.com.bh	17681222	17688499