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BAHRAIN



COUNTRY PROFILE



UNITED NATIONS

INTRODUCTION - 2002 COUNTRY PROFILES SERIES

Agenda 21, adopted at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, underscored the important role that States play in the implementation of the Agenda at the national level. It recommended that States consider preparing national reports and communicating the information therein to the Commission on Sustainable Development (CSD) including, activities they undertake to implement Agenda 21, the obstacles and challenges they confront, and other environment and development issues they find relevant.

As a result, in 1993 governments began preparing national reports for submission to the CSD. After two years of following this practice, the CSD decided that a summarized version of national reports submitted thus far would be useful. Subsequently, the CSD Secretariat published the first Country Profiles series in 1997 on the occasion of the five-year review of the Earth Summit (Rio + 5). The series summarized, on a country-by-country basis, all the national reports submitted between 1994 and 1996. Each Profile covered the status of all Agenda 21 chapters.

The purpose of Country Profiles is to:

- Help countries monitor their own progress;
- Share experiences and information with others; and,
- Serve as institutional memory to track and record national actions undertaken to implement Agenda 21.

A second series of Country Profiles is being published on the occasion of the World Summit on Sustainable Development being held in Johannesburg from August 26 to September 4, 2002. Each profile covers all 40 chapters of Agenda 21, as well as those issues that have been separately addressed by the CSD since 1997, including trade, energy, transport, sustainable tourism and industry.

The 2002 Country Profiles series provides the most comprehensive overview to date of the status of implementation of Agenda 21 at the national level. Each Country Profile is based on information updated from that contained in the national reports submitted annually by governments.

Preparing national reports is often a challenging exercise. It can also be a productive and rewarding one in terms of taking stock of what has been achieved and by increasing communication, coordination and cooperation among a range of national agencies, institutions and groups. Hopefully, the information contained in this series of Country Profiles will serve as a useful tool for learning from the experience and knowledge gained by each country in its pursuit of sustainable development.

NOTE TO READERS

The 2002 Country Profiles Series provides information on the implementation of Agenda 21 on a country-by-country and chapter-by-chapter basis (with the exception of chapters 1 and 23, which are preambles). Since Rio 1992, the Commission on Sustainable Development has specifically addressed other topics not included as separate chapters in Agenda 21. These issues of trade, industry, energy, transport and sustainable tourism are, therefore, treated as distinct sections in the Country Profiles. In instances where several Agenda 21 chapters are closely related, for example, chapters 20 to 22 which cover environmentally sound management of hazardous, solid and radioactive wastes, and chapters 24 to 32 which refer to strengthening of major groups, the information appears under a single heading in the Country Profile Series. Lastly, chapters 16 and 34, which deal with environmentally sound management of biotechnology, and transfer of environmentally sound technology, cooperation, capacity-building respectively, are presented together under one heading in those Country Profiles where information is relatively scarce.

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LIST OF COMMONLY USED ACRONYMS

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| ACS | Association of Caribbean States |
| AMCEN | Africa Ministerial Conference on the Environment |
| AMU | Arab Maghreb Union |
| APEC | Asia-Pacific Economic Cooperation |
| ASEAN | Association of Southeast Asian Nations |
| CARICOM | The Caribbean Community and Common Market |
| CBD | Convention on Biological Diversity |
| CIS | Commonwealth of Independent States |
| CGIAR | Consultative Group on International Agricultural Research |
| CILSS | Permanent Inter-State Committee for Drought Control in the Sahel |
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| COMESA | Common Market for Eastern and Southern Africa |
| CSD | Commission on Sustainable Development of the United Nations |
| DESA | Department for Economic and Social Affairs |
| ECA | Economic Commission for Africa |
| ECCAS | Economic Community for Central African States |
| ECE | Economic Commission for Europe |
| ECLAC | Economic Commission for Latin America and the Caribbean |
| ECOWAS | Economic Community of West African States |
| EEZ | Exclusive Economic Zone |
| EIA | Environmental Impact Assessment |
| ESCAP | Economic and Social Commission for Asia and the Pacific |
| ESCWA | Economic and Social Commission for Western Asia |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| FIDA | Foundation for International Development Assistance |
| GATT | General Agreement on Tariffs and Trade |
| GAW | Global Atmosphere Watch (WMO) |
| GEF | Global Environment Facility |
| GEMS | Global Environmental Monitoring System (UNEP) |
| GESAMP | Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection |
| GHG | Greenhouse Gas |
| GIS | Geographical Information Systems |
| GLOBE | Global Legislators Organisation for a Balanced Environment |
| GOS | Global Observing System (WMO/WWV) |
| GRID | Global Resource Information Database |
| HIV/AIDS | Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome |
| IAEA | International Atomic Energy Agency |
| ICSC | International Civil Service Commission |
| ICSU | International Council of Scientific Unions |
| ICT | Information and Communication Technology |
| ICTSD | International Centre for Trade and Sustainable Development |
| IEEA | Integrated Environmental and Economic Accounting |
| IFAD | International Fund for Agricultural Development |

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| IFCS | Intergovernmental Forum on Chemical Safety |
| IGADD | Intergovernmental Authority on Drought and Development |
| ILO | International Labour Organisation |
| IMF | International Monetary Fund |
| IMO | International Maritime Organization |
| IOC | Intergovernmental Oceanographic Commission |
| IPCC | Intergovernmental Panel on Climate Change |
| IPCS | International Programme on Chemical Safety |
| IPM | Integrated Pest Management |
| IRPTC | International Register of Potentially Toxic Chemicals |
| ISDR | International Strategy for Disaster Reduction |
| ISO | International Organization for Standardization |
| ITTO | International Tropical Timber Organization |
| IUCN | International Union for Conservation of Nature and Natural Resources |
| LA21 | Local Agenda 21 |
| LDCs | Least Developed Countries |
| MARPOL | International Convention for the Prevention of Pollution from Ships |
| MEAs | Multilateral Environmental Agreements |
| NEAP | National Environmental Action Plan |
| NEPAD | New Partnership for Africa's Development |
| NGOs | Non-Governmental Organizations |
| NSDS | National Sustainable Development Strategies |
| OAS | Organization of American States |
| OAU | Organization for African Unity |
| ODA | Official Development Assistance/Overseas Development Assistance |
| OECD | Organisation for Economic Co-operation and Development |
| PPP | Public-Private Partnership |
| PRSP | Poverty Reduction Strategy Papers |
| SACEP | South Asian Cooperative Environment Programme |
| SADC | Southern African Development Community |
| SARD | Sustainable Agriculture and Rural Development |
| SIDS | Small Island Developing States |
| SPREP | South Pacific Regional Environment Programme |
| UN | United Nations |
| UNAIDS | United Nations Programme on HIV/AIDS |
| UNCED | United Nations Conference on Environment and Development |
| UNCCD | United Nations Convention to Combat Desertification |
| UNCHS | United Nations Centre for Human Settlements (Habitat) |
| UNCLOS | United Nations Convention on the Law of the Sea |
| UNCTAD | United Nations Conference on Trade and Development |
| UNDP | United Nations Development Programme |
| UNDRO | Office of the United Nations Disaster Relief Coordinator |
| UNEP | United Nations Environment Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNFCCC | United Nations Framework Convention on Climate Change |

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| UNFF | United Nations Forum on Forests |
| UNFPA | United Nations Population Fund |
| UNHCR | United Nations High Commissioner for Refugees |
| UNICEF | United Nations Children's Fund |
| UNIDO | United Nations Industrial Development Organization |
| UNIFEM | United Nations Development Fund for Women |
| UNU | United Nations University |
| WFC | World Food Council |
| WHO | World Health Organization |

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|------|---|
| WMO | World Meteorological Organization |
| WSSD | World Summit on Sustainable Development |
| WTO | World Trade Organization |
| WWF | World Wildlife Fund |
| WWW | World Weather Watch (WMO) |

CHAPTER 2: INTERNATIONAL COOPERATION TO ACCELERATE SUSTAINABLE DEVELOPMENT IN DEVELOPING COUNTRIES AND RELATED DOMESTIC POLICIES

Decision-Making: No information available.

Programmes and Projects: No information available.

Status: No information available.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 2: INTERNATIONAL COOPERATION TO ACCELERATE SUSTAINABLE DEVELOPMENT IN DEVELOPING COUNTRIES AND RELATED DOMESTIC POLICIES - TRADE

Decision-Making: As a member of Gulf Cooperation Council (GCC) countries, Bahrain is making significant steps to harmonize and integrate its economy with the economies of these countries. Being a member of World Trade Organization (WTO), additional significant efforts (enacting new laws, introducing certain economic measures, reducing custom tariffs on certain items) have been made to modernize the economy and integrate it in the international market. As a step towards globalization, the Government of Bahrain abolished import duties on a number of foods and feed items and reduced duties on consumer goods to 5%. Additionally, no duties are imposed on import of raw materials or semi-manufactured goods.

Programmes and Projects: See under **Decision-Making**.

Status: Prior to the discovery of oil in the early thirties the economy was dependent on agriculture, the pearl industry and regional trading. The pearl industry flourished in the past because Bahrain was amongst the richest areas in pearls. Government revenues from the pearling industry were, to a large extent, based on nominal taxes and fees imposed on each pearling ship together with indirect taxes imposed in the form of custom duties on pearls exported.

Since the discovery of oil in 1932 Bahrain witnessed a variety of changes and by the beginning of the seventies when it became an independent state, socio-economic restructuring occurred at a rapid pace, boosted by the growing production of oil and gas industry, increased prices in the world market particularly during 1973. However, due to the fluctuation in oil prices, it is unwise to depend solely on oil as a principal source of income. Consequently, Bahrain has not only moved toward industrialization, but it has also attracted international financial institutions, making Bahrain an efficient financial centre in the Middle East. Bahrain exports oil and non-oil products, light industrial products, aluminum, vegetables and some foodstuffs. Total exports reached 1713.4 million Bahraini Dinars (BD) in 1996. Total imports, which include all necessary and complementary items, reached 1578.3 million BD in 1996. The total trade exchange was 3291.7 million BD in 1996 and the transit shipment was 26.6 million BD in the same year.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 3: COMBATING POVERTY

Decision-Making: No information available.

Programmes and Projects: See **Chapter 6** of this Profile.

Status: The Government of Bahrain has made significant improvements in raising the standard of living of the population by heavily investing in basic services and education.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 4: CHANGING CONSUMPTION PATTERNS

Decision-Making: One of the five issue-specific committees established by the national committee charged with preparing a national strategy to execute the Agenda 21 programme is the Committee on Changing Consumption Patterns. This committee is chaired by the Bahrain Chamber of Commerce and Industry, with members representing Ministry of Cabinet Affairs and Information, Bahrain Centre for Studies and Research, Ministry of Education, Bahrain Girl Renaissance Society and Bahrain Society of Economists.

The main tasks of the Committee are to: participate in suggesting programme and policies to encourage changing consumption pattern; define the effects of irrational consumption on economic growth; encourage consumption patterns and development in a way to minimize the environmental overstrains; develop a better understanding of the consumption role and pinpoint more sustainable consumption patterns; and participate in evaluation of the relation between production, consumption and environment, and study the effects of current changes in the status of modern industrial economies on the environment.

Programmes and Projects: See under **Status**.

Status: Eco-efficiency has been considered as one of the criteria that measures the environmental costs resulted from human activities. It reflects changes in production and consumption patterns of resources, which ultimately affect the rate of environmental degradation. Greater efficiency means maximization of resource use and minimization of wastes. In this regard, some resources are being used unsustainably in Bahrain. It is reported that water consumption, energy consumption, waste produced per household are on the increase within the Bahraini society. This increase may reflect inefficiency in resource use.

The concept of recycling is still new, and investors are reluctant to invest in this line of business.

The issue of behavior is very critical and pattern consumerism is not easy to change and needs time and persistent efforts. On the other hand, production pattern is easier to deal with through incentives, legislation and law enforcement.

There is more to be done at the regional, national, family and individual levels to foster the concept of resource efficiency and resource recycling in daily life of citizens. Further actions need to be taken in the fields of reducing energy costs, management of urban areas and public transportation.

See also **Chapters 4-Energy, 4-Transport** of this Profile.

Capacity-Building, Education, Training and Awareness-Raising: Public awareness campaigns were launched to increase public perception towards consumption patterns. Eco-efficiency, recycling and individual behaviors were the subject of these campaigns.

Information: No information available.

Research and Technologies: A number of industries adopted energy saving technology and cleaner production measures. An example can be cited here as a success story where at the Aluminum Bahrain (ALBA), high production efficiency was achieved through strict controls on inputs and outputs.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 4: CHANGING CONSUMPTION PATTERNS - ENERGY

Decision-Making: See **Chapter 4** of this Profile.

Programmes and Projects: No information available.

Status: Oil production and refining contribute 56.4% of state revenue. In the last few years dependence on oil has decreased, and revenue from the non-oil sectors is gradually increasing. However, revenue from oil will dominate for years to come.

Total energy consumption has been on the increase coupled with increasing the per capita energy consumption. For instance, electricity consumption per capita (kilowatts-hours) has increased by a factor of 1.54 in 1998 compared to 1980 level, which is relatively high compared to World average. This increase is attributed to the subsidized energy prices in part and excessive use of resources by people in their daily activities. See also **Chapters 4 and 9** of this Profile.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 4: CHANGING CONSUMPTION PATTERNS - TRANSPORT

Decision-Making: See **Chapter 4** of this Profile.

Programmes and Projects: No information available.

Status: Dependency on private cars, as an indispensable means of transportation contributes to the increasing hidden environmental, economic and social costs of these vehicles. Additionally, it marginalizes the public transportation system as an effective means for reducing energy consumption and putting a ceiling on carbon dioxide emissions in the country. See also **Chapter 9** of this Profile.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 5: DEMOGRAPHIC DYNAMICS AND SUSTAINABILITY

Decision-Making: No information available.

Programmes and Projects: No information available.

Status: The population reached over half a million in 1992. The Bahrainis represent about 62.5% of the total population, divided equally between males and females. The population has almost doubled since 1971.

Therefore, Bahrain is classified as a young community. Those who are of the ages between 15 and 44 represent 51% of the total population, whereas the older people (65 years and over) represent 2.3% only.

The population density is 910 inhabitants per square kilometre.

The total population of Bahrain is estimated to be 650,604 in 2001 of which 62.4% are nationals. Average annual growth rate is estimated at 2.7% for the period 1991-2001. The majority of the population is young of which 28% is under the age of 15. The Government considers that the population growth and fertility level too high. The government population policy aims to lower the fertility rate.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: See under **Status**.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 6: PROTECTING AND PROMOTING HUMAN HEALTH

Decision-Making: Since health services in Bahrain started in the early 1900s, the Government has been working hard to provide advance free medical care to all inhabitants of Bahrain. The Government has also adopted the World Health Organization’s goal to achieve “Health For All in the Year 2000.”

Programmes and Projects: See under **Information**.

Status: As a result of the health development experienced by Bahrain, the expectation of life at birth for both sexes rose dramatically from about 55 years in 1971 to 67 years in 1991. Health services begin at the Health Centres. There are 22 Health Centres and Clinics, 4 Hospitals and 5 Maternity Hospitals. Cases requiring additional care are brought to Salmaniya Medical centre, the biggest hospital in Bahrain, which is highly equipped and contains over 832 beds. The total number of beds in hospitals (Government and Private sectors) is not less than 1837.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: According to UNDP latest report on Human Development, Bahrain ranked 40 among countries of the World and the highest among Arab countries in terms of Human Development Index (HDI). A significant increase in life expectancy has been reached, from 63.5 in the seventies to 72.9 years in the nineties, 71.3 in 2000, with an index of 0.8 in 1999. Infant mortality rate dropped significantly from 55 per thousand births in 1970 to 13 in 2001. One hundred per cent of the population has access to safe drinking water, sanitation services and health services.

Research and Technologies: No information available.

Financing: The Government expenditure on health is over 8.5% more than that contributed to public expenditure, with revenue of approximately 6.7% of the expenditure.

Cooperation: No information available.

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apter 7: Promoting sustainable human settlement development

Decision-Making: It is the Government policy to provide housing in the various areas on the island, since housing is a key element for socio economic development.

Programmes and Projects: See under **Status**.

Status: The capital of Bahrain is Manama, where most of the commercial centres, Government departments and other service centres are located. Manama has experienced some migration to the suburbs and other towns and areas. Although the State of Bahrain is composed of various islands, the majority of the population is on the main Island, Bahrain. It is the centre for most activities and public services. Muharraq, the second largest island lies northeast of the main island. The third inhabited island is Sitra, east of Bahrain. Bahrain society is considered an urban and settled society. No Bedouins or tribes are present among the communities.

The Bahraini definition of urban is places or communities with a population of 2500 or more. Urbanization has been increasing, and this has also led an increase of domestic waste. At present, Bahrain's production of domestic waste of 1.2 Kg per capita is considered to be one of the highest in the world.

Due to the large increase in population, inhabited areas have expanded southwards to the desert and new towns have been established. The first was Isa Town, built in the sixties and Hamad Town, built in the late seventies-early eighties. A third town is presently being planned in the south east region. However the old housing areas have witnessed a variety of improvements. Due to its small size, the State experiences mixed development, industrial areas being located close to residential areas. Around 92% of the population is urban. Nearly, more than 90% of the total population lives immediately along the coast or in very close proximity to it. Population densities may reach up to 900 person/km² especially in Manama city, the capital, where 24% of Bahraini population resides.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 8: INTEGRATING ENVIRONMENT AND DEVELOPMENT IN DECISION-MAKING

Decision-Making: The Environmental Affairs Agency (EA) assumes such responsibility of integrating environmental concerns within plans of Government Ministries and coordinates activities regarding environmental issues among various stakeholders. However, it does not have the capacity to oversee the overall sectoral plans of each Ministry or work effectively across all sectors of institutions and agencies. The transition to sustainable development in the Kingdom of Bahrain is not an option to choose, but rather an imperative choice for the society's survival and the well being of future generations. Although an integrated national strategy for sustainable development has not been developed yet, elements for sustainable development are being embedded in sectoral development plans executed by various Governmental bodies in the country. Nevertheless, adopted development schemes and achievements on various aspects of country's sectoral developments form the ground basis for formulation of an overall national sustainable development strategy.

Bahrain Environmental policy is based on the precautionary principle, the polluter-pay principle, the sustainability concept, and the concept of shared responsibility (the cooperation principle) to fulfill the ultimate goals of sustainable development through harmonious action of all relevant actors. An integrated, cross-media approach to preventing and resolving environmental problems is being promoted and adopted, rather than the traditional medium-by-medium approach (air, water, soil). Bahrain is committed to the cause of environmental protection and has thus decided to incorporate Environmental Impact Assessment (EIA) into the industrialization process to solve the problems of pollution and environmental degradation.

The most important legislation was set forth as Amiri Decree No. 7 in August 1980, which formed the Environmental Protection Committee (EPC) and the Environmental Protection Technical Secretariat (EPTS). The EPC was attached to the office of H.H. The Prime Minister through the office of H.E. The Minister of Health, Chairman of EPC. Recently, an Amiri decree-law No.21 (1996) was enacted with to establish the Environmental Affairs Agency (EA) under the Ministry of Housing, Municipalities and Environment. The EA consists of two Directorates: Directorate of Assessment and Planning and Directorate of Environmental. The Amiri decree-law No. 21 (1996) outlined the mission. In addition to Amiri Decree No. 7 and Amiri Decree No.21, 14 kinds of legislation relating to protection of the environment has been issued as a series of Ministerial orders to control various disciplines from 1977 to 1996. In addition to the above, national effluent guidelines have been formulated on the basis of standard practices followed in the region. However, a comprehensive review of the standards and guidelines of other countries is in progress. It is intended after this study that the EA will formulate new guidelines. The political will and support for sustainable development in the country was expressed in the Charter of National Action (CNA) adopted by a referendum in 2001. The Charter is considered as a document setting the vision for future development in Bahrain. It lays the basis for the overall development of national sustainable policy aiming at achieving the balance between economic, social and environmental sectors. The Charter called for institutionalizing democracy, consolidating civil society associations, equity among citizens and transparency. Gender issue was a major concern too as the Charter explicitly referred to consolidating women rights, praised family values and called for legislation to protect them. The Charter emphasized the importance of education, culture and sciences and vowed state responsibility to advance them.

The issue of sustainable development was mentioned implicitly in the context of the CNA when it defines the objective of the rule in the State by stating "the objectives of the rule is to maintain the State, promote its status, preserve national unity and achieve constant and comprehensive development in areas of politics, economy, society, culture and others". Furthermore, chapter three of the Charter affirms the adherences of the State to the principles of economic freedom, guaranteeing private properties, economic justice and balance in contracts, diversification of the economy, protecting public funds and natural resources and protection of the environment and wildlife. It underscores the importance of exploitation of natural resources taking into account the non-harmful impact to the environment and health of people. Thus, developing national sustainable strategy along with environmental strategy for the country was underlined. A reasonable level of public participation, including women participation, on environmental issues has been reached. However, when it comes to decision-making process, the public role is still consultative in nature. A central committee for preparing a national plan to execute Agenda 21 has been formed from representatives of all Ministries, Non-government Organizations (NGOs), and

academia. The main objectives of the committee are to: formulate and integrate vision regarding the work plan for agenda 21 and the mechanisms of its implementation; suggest appropriate approach and capacity needed for assessment and preparation of Agenda 21 report; identify priorities; and give an opinion on other advisory issues. In order to facilitate their work, it was requested from all ministries, companies, occupational organizations, and women's societies that they each nominate a representative to participate in these committees. A coordinator from the EA was also appointed for each committee.

The national committee identified five national priority issues. Accordingly five sub-committees were formulated to deal with the identified issues. Those issues are: Management of water resources; Conservation of marine environment; Protection of the atmosphere; Management of wastes and chemicals; and, changing consumption patterns. Prioritizing issues does not mean deferring other issues such as desertification or biodiversity conservation. These issues are addressed within the overall integrated approach of environmental management. Building upon what has been achieved in terms of national goals for the past ten years, it is envisaged that the main elements of the proposed national sustainable strategy be focused on integration, social justice, preventive measures, and wise management of renewable natural resources.

National Environmental Strategy: At the present time, the government of Bahrain operates without a National Environmental Strategy (NES). The development of NES is fundamental and complementary to the national agenda 21 for the purpose of prioritizing the local environmental issues and visualizing the proper means of their management to secure sustainability of development at the national level. The execution of NES will start soon by developing two documents entitled “National Environmental Strategy” (NES) and “National Environmental Action Plan” (NEAP). The formulation of these two documents will result into the creation of a national capacity capable through partnership of balancing the diverse interests of economic, environment and society development. The partnership to be established will lead to the conception of a shared society vision of the future. This will ultimately systematize coordination and cooperation among the government authorities in Bahrain, its associated institutions, stakeholders, NGOs, target groups and communities at large. The Government authorities in Bahrain will have for the first time the proper guidelines and methodologies to effectively implement and monitor their sustainable development action plan. The involvement of all sectors, stakeholders, NGOs and target groups in the project will provide them with a learning experience and “in-service” training opportunity in planning for sustainable development.

Major Groups: Since the adoption of the Charter of National Action (CNA), significant steps have been made regarding resource mobilization and consolidating civil society organizations, which in turn may spur and activate interest and participation in synthesizing sustainable development policies.

It is hoped that the CNA will enhance and consolidate full public participation, through combining and strengthening the role of civil society associations, and allowing for a wider and more effective participation of stakeholders at decision-making levels. A good example of integration and participation is expected during the preparatory process of national environmental strategy and action plan, where full participation of stakeholders will take place and concerns of all sectors will be taken into consideration.

It is envisaged that formulation of sustainable development policy has to be coordinated by a high authority structure that enable all involved parties to participate and freely express their concerns and views. So far, the EA has managed to coordinate activities related to the environment among different Government and non-Government agencies. However, once sustainable development policy or strategy is put in place, it is anticipated that the mandate and role of the EA will be widened and its capacity be enhanced to be able to better coordinate plans among different agencies in the country and monitor various environmental related activities.

Programmes and Projects: A proposed project on Integrated Planning and Management for Environmental Resources in Bahrain will ensure that conservation of Bahrain's Biodiversity becomes an integral part of its development strategy thus ensuring the provision of institutional, human and financial resources through both public and private sources. The project is also aimed at developing an integrated approach to the protection and management of Bahrain's environmental resources, on land and in its coastal and marine waters. It will also address Environmental Quality Standards, the Environmental Impact Assessment Process, ecotourism opportunities, species at risk and threatened habitats. Another project is underway to formulate a National Biodiversity Strategy and

Action Plan (NBSAP) for Bahrain for subsequent implementation that will ensure the protection and sustainable use of its Biodiversity in accordance with articles 6 and 8 of the Convention.

The above two project proposals are in line with the SIDS and the Barbados Plan of Action. These proposals are as per the objectives of the United Nations Conference on Environment and Development (UNCED) 1992 and 1994 Global Conference for the Sustainable Development for SIDS. These projects highlight the priority areas and have strategic importance to the country as they address the core issues and major aspects, which are part of our national environmental agenda. Furthermore, the materialization of these projects will build and strengthen our existing capabilities and will integrate the diversified environmental activities already in progress. The projects will assist us in fulfilling our national duties, commitments and obligations towards Agenda 21.

These projects aim at conserving the ecologically fragile and finite environmental resources of the country, which are already under great stress mainly due to population explosion, varied economical and commercial activities and industrial expansion. Both the projects proposed are complimentary to each other and supports the inter-disciplinary and integrated management approaches on environmental conservation, resources management and controlling activities on biodiversity. The materialization of these projects will pave the way for better networking and development of new mechanism for planning and implementing projects on environmental conservation and activities related to biodiversity. The outcome and results will be coordinated and shared with other SID States and neighboring GCC countries. The implementation of these projects are expected to yield quantification results in terms of pollution reduction, waste minimization, conservation of land and marine resources leading to economic benefits, improved public health, development and training of human resources, improved quality of life and enhanced environmental awareness among the people.

Status: Bahrain is limited on geographical space and area, and the policy is to expand the development on reclaimed area gained from the intertidal zone. There is definitely a need for an integrated approach for land reclamation procedures. Such an approach will provide a full, comprehensive picture to ensure the best and wisest use of land, water and other resources, with the minimum of conflict and the sustainability of the Bahrain environment. Industrialization combined with the population increase has brought major pressures on the land area of Bahrain. There has been a considerable reclamation of land from the sea, which caused blocking of natural drainage channels killing date palm trees, adversely affecting mangrove swamps and stopping the flow of natural springs. Rapid industrialization has brought stress on the environment and other natural resources. While the primary aim of the new economic policy is to accelerate industrial development, improve operational efficiency and competitiveness, enhance exports and induce greater foreign investments, inevitably it will have both positive and negative environmental consequences.

A number of obstacles were faced on the way to the development of an integrated national sustainable development strategy. These include among others, institutional, legislative and technical problems. The most obvious difficulty is the absence of an effective cross-sectoral body or structure to prepare and monitor such a policy, due to the nature of the Government Ministries setup where work is carried out in a sectoral fashion according to the mandate of each Ministry. The current environmental trends of growing population, urbanization, industrialization, augmenting depletion of natural resources and biodiversity, and constant pressure on the natural environment suggest that inaction could prove to be detrimental and unfair for Bahraini future generations.

The Government officials in Bahrain are well aware that the real challenge of mounting a national sustainable development programme for the Kingdom is to foster, test, and disseminate ways to change the process of economic development, so that it does not destroy the national fragile ecosystems that support life and make it possible. Indeed, the Government considers both the economic development and the sound environmental management as complementary aspects of the same agenda.

Future initiatives in the country will concentrate on the development of a national sustainable policy that integrate all aspects of community sustainability, taking advantages of the positive atmosphere the Charter of National Action has created. It is anticipated within the next few months preparations for developing a national strategy on sustainable development be initiated and a setting that can locally and effectively set Agenda 21 in motion is being formulated.

Capacity-Building, Education, Training and Awareness-Raising: See under **Programmes and Projects** and also **Chapter 36** of this Profile.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: The Government of Bahrain is committed to affirming the partnership relations with the International community and the Regional Nations (such as the League of Arab States and the Gulf Cooperation Council), its efforts for the protection of the globe through the ratification of conventions and protocols, and its attendance at conferences such as the Earth Summit of the UNCED that took place in Rio de Janeiro in June 1992. See also under **Programmes and Projects**.

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CHAPTER 9: PROTECTION OF THE ATMOSPHERE

Decision-Making: Bahrain is firmly committed to the protection of the atmosphere and abating global warming. This commitment was reflected in signing (1992) and endorsing (1994) the United Nations Framework Convention on Climate Change (UNFCCC). Immediately following this ratification, a National Climate Change Committee of major stakeholders was formed. This committee is chaired by Bahrain Centre for Studies and Research, with members representing the Ministry of Health, University of Bahrain, Ministry of Oil and Industry, Ministry of Works and Agriculture, Meteorological Office, Directorate of Electricity, Public Transportation Organization and the Bahrain Medical Society.

The main tasks of this committee are to: prepare a database about the atmosphere to support decision-makers; prepare a strategy for protecting ozone; suggest a procedure to protect the environment from the trans-boundary movement of pollutants; determine pollution effects on health from stationary sources; and, suggest an action plan to protect the atmosphere. In the sustainable development policy that results from these consultations, Climate Change is one of the six main national priority issues. Currently, EA with full participation of stakeholders are considering formulations of policy options and mitigation measures to cope with possible impacts.

See also under **Status**.

Programmes and Projects: A national programme aimed at controlling activities that harm the atmosphere was initiated with the support of GEF/UNEP enabling activity programme. The programme includes an inventory of green house gases (GHGs), conducting vulnerability assessment, and adoption of mitigation measures. The study is at its final stages of completion whereas quantities of GHGs were identified and amounts of these emissions were quantified. Other activities undertaken or in progress by Bahrain at the national level include: preparing the Green House Gases Inventory (GHG); and developing other activities related to Climate Change (in progress).

See also under **Status**.

Status: Bahrain being a low lying island and also oil-producing country is facing the impact of climate change both directly and indirectly. Since the early nineties great consideration has been given to climate change issues and representatives from Bahrain have participated in international meetings relating to this subject.

Its contribution of CO₂ to the World total is less than 0.1%.

The increase in energy production as well as the ever-increasing number of vehicles is the main source of air pollution in the country. Generally, the ranges of air pollutant parameters do not exceed the international Ambient Air Quality Standard (AAQS) with exception of ozone and inhaleable particulates, which occur during the dust episodes. Nevertheless, the concentrations of the pollutants show little spatial variation across the Island.

Considerable accomplishments have been achieved in the protection of atmosphere. These include, establishments of air pollutant monitoring stations, adoptions of national standards for air quality, and control of emissions. Unleaded gasoline was introduced in 2000 and it is planned that lead gasoline will be phased out completely within 5 to 6 years. The EA is working with industrial companies to control pollution emitted from operations of these 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 EA 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 Aluminum Bahrain (ALBA), Bahrain Petroleum Company (BAPCO), Gulf Petrochemicals Industries Company (GPIC) follow the same trend.

At the regional level, participation in a regional Gulf Cooperation Council (GCC) and development of Task Force to study the impact of climate change on GCC countries have been initiated. At international, activities are underway to rectify the UNFCCC Environmental Affairs operates and maintain four automatic air quality monitoring stations around Bahrain. These sites are located at Manama, Askar, Bahrain Telecommunication Company (BATELCO) earth station (Ras Abu Jarjur) and Zallaq. The parameters monitored are sulfur dioxide, total reduce sulfur, nitrogen oxides, carbon monoxide, ozone, methane, non-methane hydrocarbons and inhalable

particulate (PM10) in the air. In addition, wind direction, wind speed, temperature, humidity and solar radiation are also measured. The ranges of parameter found during the monitoring period did not exceed the international Ambient Air Quality Standard (AAQS) with exception of ozone and particulate, which occur during the dust episodes. However, the concentrations of the pollutants show a little spatial variation across Bahrain.

A comprehensive legislation and institutional structures and capacity buildings need to be taken into consideration for effective continuation of these programmes.

Institutionalizing the issue of climate change and protection of the ozone layer need a comprehensive legislation addressing various aspects of these problems. Unfortunately such legislation has not developed yet. Additionally, inadequacy of trained human resources in various fields of climate change is apparent. Laws and codes within the framework of comprehensive legislation are to be set in a more integrated way to address these issues in particular, and to institutionalize the process in order to build needed human resource expertise.

Capacity-Building, Education, Training and Awareness-Raising: Public awareness campaigns explaining the importance of preserving the ozone layer and the consequences of depleting ozone layer are being initiated on regular basis.

Information: Currently, Bahrain is preparing the first National Communication Report for the Secretariat of the Convention. This report will constitute the GHG Inventory and other related activities that address the mitigation of GHG and assess the impact and vulnerability to climate change on the environment.

Air pollution concentrations vary in time and place. The main pollutants are monitored continuously in order to meet the objective of air pollution management and control strategies. In order to assess the potential impact of the various air pollutants on human health and environment, it is necessary to have reliable information regarding pollution sources and their location, and this requires especially designed equipment. Thus, air quality monitoring programmes are of fundamental importance in determining the air pollution, its sources, and provide the best prevention method. Risk assessment study yielded important information showing the vulnerability of coastal areas and other ecosystems to be affected by various changes in sea level. Bahrain's per capita consumption is <0.3 kg, and it is categorized as a developing country operating under Article -5 of the Montreal Protocol.

See also under **Status**.

Research and Technologies: See under **Status**.

Financing: No information available.

Cooperation: Bahrain endorsed and Montreal Protocol on 27 April 1990 and the London Amendment on 23 December 1992. An ozone office was established within the Environmental Affairs and a programme to phase out ozone depleting substances was implemented. See also under **Status**.

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Chapter 10: Integrated approach to the planning and management of land RESOURCES

Decision-Making: Bahrain has formulated a Land Use Plan for the year 2000 and beyond. There is a clear management policy in allocating land for industries, housing development, oil and gas processing, recreational and cultural activities, agriculture, public utilities, communications, ports and airports, road network and quarry activities. In addition, Bahrain's sustainable development policy contains six main priority issues, one of which is Terrestrial and Marine Resources.

Currently Land Use Plan is developed into the three categories: Residential; Industrial; Commercial and Agricultural. Also Land Reclamation Mechanism and a Strategy for Environmental Resources Management are being developed.

Bahrain has ratified international conventions that deal with the Protection of Specially Designated Areas e.g. Ramsar Convention.

See also Chapter 17 of this Profile.

Programmes and Projects: A proposed project on Integrated Planning and Management for Environmental Resources will ensure that conservation of Bahrain's Biodiversity becomes an integral part of its development strategy thus ensuring the provision of institutional, human and financial resources through both public and private sources.

The conservation of land of special Interest, which is mangrove at Hawar Islands, has been developed.

Status: Bahrain, being a small island developing State suffers tremendously of small land areas. Therefore great attention is being given to this issue to enable a sound utilization of coastal areas and resources. Expansion of land at the expense of coastal areas constitutes a major concern. Land is being protected by preventing indiscriminate waste dumping throughout Bahrain. There is a pressing need to develop an integrated approach to the protection and management of land and marine resources, taking into account the opportunities of tourism and much needed coastal and off-shore development.

Bahrain Island, which accounts for nearly 85% of the total area of the State of Bahrain, is low lying, with a maximum elevation of 134 metres. Apart from 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 sand, which supports little vegetation other than a few tough desert plants. The state comprises a group of some 36 islands, with a total land area of about 700 sq. km. The largest of these is Bahrain where the capital city, Manama, is situated.

Bahrain is limited on geographical space and area, and the policy is to expand the development on reclaimed area gained from the inter-tidal zone. There is definitely a need for an integrated approach for land reclamation procedures. Such an approach will provide a full, comprehensive picture to ensure the best and wisest use of land, water and other resources, with the minimum of conflict and the sustainability of the Bahrain environment.

An integrated approach to the protection and management of Bahrain's environmental resources of land and coastal and marine waters will be undertaken. It will also address Environmental Quality Standards, the Environmental Impact Assessment Process, ecotourism opportunities, species at risk and threatened habitats.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: See under **Decision-Making**.

CHAPTER 11: COMBATING DEFORESTATION

Decision-Making: No information available.

Programmes and Projects: No information available.

Status: No information available.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 12: MANAGING FRAGILE ECOSYSTEMS: COMBATING DESERTIFICATION AND DROUGHT

Decision-Making: No information available.

Programmes and Projects: No information available.

Status: No information available.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: Bahrain is considering signing the International Convention to Combat Desertification in Countries Experiencing Drought and/or Desertification (CCD).

The State of Bahrain, with the Gulf Cooperation Council, Islamic Bank for Development, UNEP/Regional Office for West Asia (ROWA) and Arabian Gulf University, organized a Symposium dealing with the desertification and land reclamation in the GCC countries (22-25 November, 1993).

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CHAPTER 13: MANAGING FRAGILE ECOSYSTEMS: SUSTAINABLE MOUNTAIN DEVELOPMENT

Decision-Making: No information available.

Programmes and Projects: No information available.

Status: No information available.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 14: PROMOTING SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT

Decision-Making: Agricultural development has adopted a policy on the use of agricultural chemicals (fertilizers and pesticides) that is governed by the international regulations on safe use depending on their chemical, natural and biological properties to curb environmental pollution and control its impact. See also under **Status** in **Chapter 18** of this Profile.

Programmes and Projects: There are projects for land reclamation, development of land drainage schemes, desertification control and organic fertilizer use. See also under **Status** in **Chapter 18** of this Profile.

Status: Arable and permanent crop areas do not exceed 6,000 ha. Bahrain is working toward enlarging the arable area, upgrade productivity, optimize utilization of available water resources and increase yield per hectare through soil conservation. See also under **Status** in **Chapter 18** of this Profile.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: See also under **Status** in **Chapter 18** of this Profile.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 15: CONSERVATION OF BIOLOGICAL DIVERSITY

Decision-Making: At the National level the Bahrain Government has given considerable attention to the protection of Biodiversity. This has been translated into issuing regulations and informing institutions that are responsible for these issues. There is an ambitious plan to protect its rich Biodiversity for national and global good. Bahrain's sustainable development policy contains six main priority issues, one of which is Biodiversity.

The Environmental Affairs Agency has strengthened its relation with Governmental and Non-Governmental organizations in order to facilitate executing its assignments. It has maintained its distinguished and goodwill ties with many establishments and companies from the private sector including non-governmental societies. Bahrain Wild Life Committee has been established. A National Biodiversity Committee, with the main objective to formulate a National Biodiversity Strategy and Action Plan (NBSAP) has been developed. Amiri Decree Laws were enacted to protect areas such as Hawar Island Mangrove area, which are well-known internationally as wet land areas.

Programmes and Projects: The Sustainable Development Policy contains the following project proposal: the formulation of a National Biodiversity Strategy and Action Plan (NBSAP) for Bahrain for subsequent implementation, which will ensure the protection; and sustainable use of its Biodiversity in accordance with article 6 and 8 of the Convention. The above two project proposals are in line with the SIDS and the Barbados Plan of Action. These proposals are as per the objectives of the UNCED 1992 and 1994 Global Conference for the Sustainable Development for SIDS. These projects highlight the priority areas and have strategic importance to the country as they address the core issues and major aspects, which are part of our national environmental agenda. Furthermore, the materialization of these projects will build and strengthen our existing capabilities and will integrate the diversified environmental activities already in progress. The projects will assist Bahrain in fulfilling its national duties, commitments and obligations towards Agenda 21.

These projects aim at conserving the ecologically fragile and finite environmental resources of the country, which are already under great stress mainly due to population explosion, varied economical and commercial activities and industrial expansion. Both the projects proposed are complimentary to each other and supports the inter-disciplinary and integrated management approaches on environmental conservation, resources management and controlling activities on biodiversity. The materialization of these projects will pave the way for better networking and development of new mechanism for planning and implementing projects on environmental conservation and activities related to biodiversity. The outcome and results will be coordinated and shared with other SID States and neighboring GCC countries. The implementation of these projects are expected to yield quantification results in terms of pollution reduction, waste minimization, conservation of land and marine resources leading to economic benefits, improved public health, development and training of human resources, improved quality of life and enhanced environmental awareness among the people.

Status: Bahrain is very rich in Biodiversity. It possesses hundreds of species of flora and bird life. Indeed one of its small islands is famous for having the world's largest colony of Cormorants. Conservation of Biodiversity is therefore one of the most pressing issues at the national level.

Capacity-Building, Education, Training and Awareness-Raising: Public media to make TV and radio highlight the importance of Biodiversity is being established.

Information: At the regional level, study on the possibility of establishing marine protected Areas is in progress.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: Bahrain has ratified the following conventions and agreements: the Convention of the Biological Diversity (CBD); the Convention on Wetlands of International Importance as Waterfowl Habitats (Ramsar, 1971);

the Convention on the Conservation of Migratory Species; and, Kuwait Action Plan for the Protection of Marine Environment from pollution. See also under **Information**.

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CHAPTERS 16 AND 34: ENVIRONMENTALLY SOUND MANAGEMENT OF BIOTECHNOLOGY AND TRANSFER OF ENVIRONMENTALLY SOUND TECHNOLOGY, COOPERATION AND CAPACITY-BUILDING.

Decision-Making:

Technologies: While the Environmental Affairs Agency (EA) seriously considers the introduction of the Environmental Management and ISO 14000 as future target, many industries have been awarded ISO 9000 series certification showing their commitment for achieving quality production.

The concept of Cleaner Production was introduced in Aluminium Bahrain (Aluminum reduction plant) at a cost of Bahrain Dinars (BD) 95 Million and is also being introduced in an integrated Iron and Steel plant and other metal processing industries. Also the EA has been encouraging the Environmental Management System (EMS) in industries through Compliance Plans to environmental regulations.

Biotechnologies: No information available.

Programmes and Projects:

Technologies: See **Chapters 4 and 9** of this Profile.

Biotechnologies: No information available.

Status:

Technologies: It is well known that cleaner production and zero waste technology hold tremendous promise for the alleviation of many problems associated with industrialization. The EA is taking a proactive step to spread this approach in industry, and it stands now as one of Bahrain's major activities.

Industries are working toward ISO 14000 Certification. Like other developing countries, Bahrain faces obstacles in the implementation of new technology due to lack of immediate transfer of technology from developed countries and due to lack of experience. See also **Chapters 4 and 9** of this Profile.

Biotechnologies: No information available.

Capacity-Building, Education, Training and Awareness-Raising:

Technologies: Some regulatory means are introduced as part of the process of environmental impact assessment, and training is imparted in this field for staff abroad. Clean production processes and the concepts of eco-efficiencies have been promoted through seminars and workshops.

Biotechnologies: No information available.

Information:

Technologies: The EA is linked to the Mercure System. The governmental information/statistic system exists.

Biotechnologies: No information available.

Research and Technologies:

Technologies: Bahrain is trying to get support to establish cleaner production centre.

Biotechnologies: No information available.

Financing:

Technologies: No information available.

Biotechnologies: No information available.

Cooperation:

Technologies: No information available.

Biotechnologies: No information available.

CHAPTER 17: PROTECTION OF THE OCEANS, ALL KINDS OF SEAS, INCLUDING ENCLOSED AND SEMI-ENCLOSED SEAS, AND COASTAL AREAS AND THE PROTECTION, RATIONAL USE AND DEVELOPMENT OF THEIR LIVING RESOURCES.

Decision-Making: As a national obligation, with regional and international commitments to protect the marine area, The Environmental Affairs Agency (EA) has coordinated a number of activities aiming at protection of marine resources. A committee for the Protection of the Marine Environment was formed from various stakeholders including NGOs in the country. The committee is chaired by the National Committee for the Protection of Wildlife, with members representing the Directorate of Fisheries, Bahrain Centre for Studies and Research, University of Bahrain, Ministry of Housing, Municipalities and Environment, Ministry of Education, Bahrain National History Society. In the sustainable development policy resulting from these consultations, Terrestrial and Marine Resources is one of the six main priority issues of national policy.

The main tasks of this committee includes: (1) prepare guidelines to protect coastal zones, (2) prepare an action plan to protect nationally and internationally important marine resources, (3) study the effects of sea level rise due to climate change on coastal areas, and (4) prepare a plan to encourage research related to marine environment and effecting factors.

The committee has called for the adoption of an integrated approach for land reclamation procedures that harmonizes the need for development with sustainability of the environmental resources in the country. To this end, the EA in coordination with other relevant Governmental authorities undertook an assessment of the impact of dredging and land reclamation on the environment. Appropriate alternative approaches concerning environmentally sound management of such activities have been formulated through the involvement of all authorities concerned with the process and impact of reclamation and land dredging on the environment to ensure sound decisions and reduced impacts.

An integrated coastal zone management approach has since been adopted as the most effective mechanism that could manage the marine environment and achieve sustainability. Included in this approach is the designation of “Sensitive Natural Areas.” A number of laws were enacted to protect marine and coastal environment; however, these laws need updates, revisions and clear emphasis on sustainable development of coastal and marine resources. The EA plan is concentrating on the development of strategic plans for coastal zone management and integrated management of marine resources. See also under **Programmes and Projects, Status and Cooperation** and also **Chapter 10** of this Profile.

Programmes and Projects: The Environmental Affairs Agency has initiated a monitoring programme with the ultimate goal of establishing sound management of effluent discharge into the marine environment. The following strategies were adopted to implement the goal: Establish a database; Assess stress on the marine environment; Establish national standards on effluent discharge into the marine environment; and Implement periodical monitoring and evaluation programmes.

Status: As an island state, the importance of marine and coastal ecosystems in Bahrain cannot be under-estimated. Bahrain, being a small island developing state suffers tremendously of small land areas. Great attention is, therefore, being given to this issue to enable a sound utilization of coastal areas and resources. Expansion of land at the expense of coastal areas constitutes a major concern. There is a pressing need to develop an integrated approach to the protection and management of land and marine resources, taking into account the opportunities of tourism and much needed coastal and off-shore development.

Bahrain is limited in geographical space and area, and the policy is to expand the development on reclaimed area gained from the intertidal zone. There is definitely a need for an integrated approach for land reclamation procedures. Such an approach will provide a full, comprehensive picture to ensure the best and wisest use of land, water and other resources, with the minimum of conflict and the sustainability of the Bahrain environment. The proposed project will also ensure that conservation of Bahrain’s Biodiversity becomes an integral part of its development strategy thus ensuring the provision of institutional, human and financial resources through both public and private sources. The country has about 126 km of coastlines and 8,000 km² of marine area. Bahrain marine area is an important natural resource. It is a main source of wealth and has supported people with fish and pearls for hundreds of years. The total annual seafood consumption is estimated at 16.7 kg/person, however these

resources are subject to pollution, to over-exploitation, and to coastal development projects that require extensive dredging and land reclamation.

Most important sources of pollutants are oil spillage from tanker accidents, oil explorations, oil shipping and loading operations. Additional sources include land-based pollutants where treated, partially treated and untreated domestic sewage, agricultural and industrial wastes are discharged directly or indirectly into the shallow coastal water. Nearly 106,000 m³/day of secondary treated water is dumped into the sea causing eutrophication problems and affecting mangrove stands.

Dredging and coastal reclamation projects are putting additional pressures on marine habitats, especially coral reefs. The consequences of these pressures are degradation of marine resources, declines in fish stocks and biodiversity loss. It is reported that about 82% of coral reefs in Bahrain's marine area are endangered due to bleaching events and pollution. The EA future plans will concentrate on adaptations of policy measures on sea level rise resulting from climate change, and developing policies on siltation of sea floor, coral reefs, over fishing, integrated coastal zone management and conservation of marine resources in cooperation with the concerned authorities. An integrated approach to the protection and management of Bahrain's environmental resources of land and coastal and marine waters will be developed. It will also address Environmental Quality Standards, the Environmental Impact Assessment Process, ecotourism opportunities, species at risk and threatened habitats.

Capacity building and pooling resources of agencies and institutions working in marine resources are needed to effectively contribute to the development of sustainable marine resources management policy including development, implementing and monitoring in light of increasing interest in coastal and offshore tourism development projects.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: Coastal Zone Management and Marine Habitat Survey through using Landsat-V a study were conducted to determine marine ecology in Bahrain's coastal water. This study of 312 sites mapped the ecology of all the shorelines and coastal areas. The final product was a set of 17 maps depicting the distribution of marine habitats, coastal ecology and areas recommended for protection, as well as a comprehensive volume describing the habitats of the marine environment including the physical, chemical and biological influences. After an interim of ten years, the survey will be repeated, in June 1997, to determine the changes that might have occurred to the habitats cover. Among other things, the studies confirmed that reclamation and coastal activities have adversely affected the intertidal habitats, and mangroves were also found on the verge of destruction.

Research and Technologies: See under **Information**.

Financing: No information available.

Cooperation: Internationally, Bahrain ratified the Ramsar Convention in 1998 and a number of special coastal interest areas were declared as protected sites. These include mangrove stands at Tubli Bay and Hawar islands and their marine surrounding. The country signed the United Nations Convention on the Law of the Sea (UNCLOS) in 1982 and the International Convention for the Prevention of Pollution of the Sea by Oil (MARPOL) in 1985.

Regionally, Bahrain is a member of the Regional Organization for the Protection of Marine Environment (ROPME), which was established by eight coastal states of the region (Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the UAE) on 24 April 1978 to be the governing body to protect the Arabian Gulf and Gulf of Oman. Several protocols have been adopted to facilitate coordination between member states to implement the regional programs and activities. Thereby, Bahrain has signed and ratified the following protocols: (1) Kuwait regional convention for the cooperation on the protection of marine environment from pollution; (2) Protocol concerning regional cooperation in combating pollution by oil and other harmful substances in case of emergency; (3) Protocol for the protection of the marine environment against pollution from land based sources; and (4) Protocol concerning marine pollution resulting from exploration and exploitation of the continental shelf.

In addition, in 1985, the head of States of the Gulf Cooperative Council (GCC) adopted the general principles on the protection of the environment in the region to form the basic guidelines and Code of Conduct towards the individual and collective programs and activities in the various disciplines of the environment.

On the regional scale, an attempt has been made to describe the kind of pollutants expected from industrial activities, the danger posed to the marine environment and to human health by pollution from land-based sources and the serious problems resulting in coastal waters of many regional states, principally due to the release of untreated, insufficiently treated and/or inadequately disposed of domestic or industrial discharge. Noting that the existing measures to prevent, abate and combat pollution caused by discharge from these activities were not available, a protocol has been signed by all countries in 1990, and ratified by Bahrain in April 1990 entitled Protocol For the Protection of the Marine Environment Against Pollution From Land Based Sources. Accordingly, all member states are obliged to report periodically, their effluent analysis to the ROPME. This should ultimately lead to sound management with control on all land-based effluent discharge into the marine environment.

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CHAPTER 18: PROTECTION OF THE QUALITY AND SUPPLY OF FRESHWATER RESOURCES: APPLICATION OF INTEGRATED APPROACHES TO THE DEVELOPMENT, MANAGEMENT AND USE OF WATER RESOURCES.

Decision-Making: Water is given high priority among other national priority issues in Bahrain due to the limited freshwater resources and escalating water demand. A Committee for the protection of freshwater resources was formed with four main tasks: defining and evaluating freshwater resources; protecting freshwater quality, ecosystems and preventing groundwater pollution; integrating development and management of water resources; and, studying climate change effects on water resources. Bahrain has ratified the Convention on Wetlands of International Importance as Waterfowl Habitats (Ramsar Convention). See also under **Status**.

Programmes and Projects: Great management efforts have been made to deal with the problem of depleting groundwater resources. Work has been concentrated on rehabilitating and maintaining domestic water distribution network, thereby reducing water leakage from 35% to 10%. Programmes and measures have been introduced including public development of alternative water resources. The use of recycled wastewater started in 1980s and has been increasing ever since. Currently 30% of sewage effluent resulted from main treatment facility is tertiary treated and being used in watering forage crops and landscape. Current plans aim at fully utilizing recycled wastewater of the expected effluent of 200,000 m³/day by 2010, which will save 20% of current annual abstract. Officials are very much cautious about the use of wastewater in agriculture. All necessary precautionary measures have been taken to rationalize such use in order to minimize the impact of soil and groundwater pollution on human health.

Status: Bahrain suffers from a scarcity of water resources. The population is totally dependent on groundwater resources and desalinated water facilitates to meet its demand for freshwater. Domestic water increased at 1.6% annually in the period 1976-1986, and since then at 6% per annum. Average per capita water use in the country has doubled since the seventies to reach an average well above 500 liter per day in 2000, which is considered high compared to the world average. Nearly 82% of water demand is met by groundwater abstraction, while desalinated water contributes to 13% and tertiary treated sewage effluents and agricultural drainage water are accounted for 4% and 1%, respectively. The unsustainable use of groundwater (125% over use) resulted in the drop of groundwater level, deterioration of groundwater quality, drying up of springs, salinization and deterioration of agricultural lands, and increasing dependency on salinated water.

Bahrain had in the recent past years a million palm trees whereas currently palm trees do not exceed 400,000. This decline is attributed to salinization problem, over-consumption of water, and conversion of agricultural lands into commercial and residential uses. Industrial sector depends on its self-produced desalinated water. About 7 million m³ is produced annually and the production is planned to increase to about 10 million m³ per year in 2010.

Agriculture plays an important role in the livelihood of Bahraini families; however, it consumes 66% of abstracted groundwater while its contribution to national economy is about 1%. Two guiding principles have been followed to manage water more effectively in agriculture. The first approach has dealt with the issue of reducing groundwater abstraction, while the other has concentrated on finding alternative irrigation water for agriculture and ever-growing landscape projects. A number of actions have been worked on to reach these two objectives, including: enacting and strictly enforcing laws to reduce groundwater abstraction; increasing water use efficiency in agriculture; improving irrigation methods (modern irrigation techniques — 75% of agricultural area is under flood irrigation); replacing high-irrigation requirement crops with others of less water demand; introducing tariffs for using groundwater; and using treated sewage effluent.

The unsustainable use of groundwater resources has had severe impact on quantity and quality of groundwater resources. The magnitude of the problem will intensify as the population increases and various sectors of the economy expand. Future work in the field of water management will be directed towards formulation of a comprehensive national water policy that emphasizes demand management rather than augmentation of supplies. Further, extreme aridity of the climate, limited water resources and high water demand of various expanding sectors of the economy are major constraints for sustainable use of groundwater resources in Bahrain. The deficit between available water and water demand is growing and expected to increase in the near future.

The problem of water deficit is not limited to Bahrain. Water inadequacy is widely known in the Arabian Peninsula states, which depend heavily on desalination. Water scarcity constrains plans and curtails agricultural expansion to meet demand for food. Thereby, water shortage as a problem has to be tackled regionally in cooperation with international agencies.

There is a need to review policy on water resources. A critical review must address legal institutional reforms, economic consideration and water conservation and enforcing of existing laws and regulations, as well as investing in developing desalination technology. Cooperation and support of donors and related international agencies in research development, especially in the improvement of desalination technology and capacity-building are indispensable assets in this regard.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: See under **Decision-Making** and **Status**.

Financing: See under **Status**.

Cooperation: See under **Decision-Making**.

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CHAPTER 19: ENVIRONMENTALLY SOUND MANAGEMENT OF TOXIC CHEMICALS, INCLUDING PREVENTION OF ILLEGAL INTERNATIONAL TRAFFIC IN TOXIC AND DANGEROUS PRODUCTS.

Decision-Making: A multi-disciplinary Committee for Environmentally-Sound Management of Waste and Chemicals was established as one of the five issue-specific committees by the national committee responsible for preparing a national strategy for Agenda 21. This Committee is chaired by the Ministry of Oil and Industry, with members representing Bahrain Aluminum Extrusion Company (BALEXCO), Al-Zamil Coating Factory, Bahrain Aluminum (Alba), Environmental Health Directorate, Bahrain Chemical Society, Ministry of Commerce, and Bahrain Centre for Studies and Research. The main tasks of this committee are to: (1) prepare a mechanism to control industrial chemicals and their daily usage; (2) propose an appropriate legal mechanism and to increase awareness in controlling waste and chemicals; (3) prepare a documentary system for the packing and storage of chemicals; (4) prepare a mechanism to prevent the trans-boundary transportation of hazardous waste; (5) suggest effective procedures to encourage the reduction of waste through recycling; (6) study a proper location for the disposal of industrial waste; (7) study the choice of regional treatment of waste; and (8) suggest a mechanism to disseminate the available studies in the field of waste and chemical materials. See also under *Hazardous Wastes* in **Chapter 20-22** of this Profile.

Programmes and Projects: See under **Status** and also under *Hazardous Wastes* in **Chapter 20-22** of this Profile.

Status: Bahrain utilizes large volumes of chemical compounds and materials that are based on chemicals that have the potential to be harmful in this manner. A joint effort between relevant authorities has led to sound procedures dealing with the safe handling and disposal of chemicals including those of toxic, hazardous and radioactive nature. There is a close follow-up and coordination between all authorities concerned with chemical production, transport, recycling, treatment, storage, and finally disposal to ensure sound management of such potentially harmful products. See also under *Hazardous Wastes* in **Chapter 20-22** of this Profile.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: See under *Hazardous Wastes* in **Chapter 20-22** of this Profile.

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CHAPTERS 20 TO 22: ENVIRONMENTALLY SOUND MANAGEMENT OF HAZARDOUS, SOLID AND RADIOACTIVE WASTES

DECISION-MAKING:

Hazardous Wastes: A number of ministerial orders and decrees have been enacted and adopted by the Environmental and Municipalities Affairs pertaining to the issue of wastes and waste management. These legal measures aim at controlling, reducing, minimizing and eliminating threats caused by these materials to the environment and human health. Standards for healthcare waste management were finalized and adopted in June 201, whereas standards for industrial waste management (collection, storage and handling, transportation, recycling, etc.) are expected to be finalized soon. Criteria and parameters for management of used oils have been prepared for adoption.

Effluent guidelines are mandatory to all existing plants discharging their effluent into the marine environment. Environmental Impact Assessment (EIA) is required for new industries as well as non-industrial establishments including those that generate hazardous wastes. EIA clearance is usually given by the EA in coordination with the Ministry of Industry. Both the Government and industries have signed A Memorandum of Understanding, which provides a flexible system to promote both industrial investment and sustainable development. The Environmental Affairs Agency (EA) plays a vital role in monitoring waste management and coordinating works among agencies. See also **Chapter 19** of this Profile.

Solid Wastes: See above, under *Hazardous Wastes* and also **Chapter 19** of this Profile.

Radioactive Wastes: No information available.

Programmes and Projects:

Hazardous Wastes: The EA places great emphasis on waste recycling and re-use of wastes. A number of wastes are being recycled including oily wastes, aluminum dross, solvents, wastepaper, aluminum cans, etc.

Solid Waste: See above, under *Hazardous Wastes* and also under **Status**.

Radioactive Wastes: No information available.

Status:

Hazardous Wastes: The Government encourages industries to convert for cleaner production, prevention and minimization of wastes, and increasing production efficiency. In this regard, assistance of international organizations and concerned institutions are needed. See also below, under *Solid Wastes*.

Solid Wastes: Rapid industrialization and population growth in the past two decades have generated a broad spectrum of waste in terms of quality and quantity. Solid waste management has thus become a major national concern and now it draws intense attention as one of the priority management areas due to its environmental consequences and public health implications. The waste is classified into municipal liquid and solid waste, industrial effluents and solid waste, health care waste and chemical waste. It was reported that 1000 tons of municipal waste are generated per day, which give an average of 1.67 kg/person/day or well above 600 kg/person/year, which is considered relatively high compared to the average of developing countries. Domestic waste is increasing annually by 3.4%, whereas industrial solid and oily wastes as well as solid healthcare wastes are on annual rise by 1.2% and 5% respectively. Most of this waste is dumped in landfill sites. Oily waste and lubricants from automobiles is collected and exported. The limited incineration and separation facilities in the region are neither sufficient nor efficient.

There are many small companies involved in collection and segregation of waste paper, car batteries, glass, plastic, aluminum cans, metals, and wood. Some of these wastes like aluminum are being recycled in Bahrain. These activities have reduced the amount of waste that needs to be incinerated or put in landfill.

Separation facilities in the region are neither sufficient nor efficient. Generally speaking, there is a need to change the consumption pattern and habits in the region. The average composition of waste contains more than 50% food (left over), 4-10% papers, plastics, food and drinks package, about 0.6 - 4% cans and glass. Future plans and targets of work will concentrate on devising policies that foster a change towards more sustainable pattern of waste management; the plans include: (1) development of solid waste master plan; (2) preparation and implementation of

waste management policy and environmental management system for industries; (3) minimization and recycling of wastes; and, (4) personnel training on solid waste management.

Radioactive Wastes: No information available.

Capacity-Building, Education, Training and Awareness-Raising:

Hazardous Wastes: No information available.

Solid Wastes: See under **Status**.

Radioactive Wastes: No information available.

Information:

Hazardous Wastes: The EA has suggested an Integrated Environmental Monitoring (IEM) approach to be developed, which involves various activities, some of which are already implemented. These activities deals primarily with constructing a database for waste management along with other activities involving technicalities of waste management, such as site visits, scrutiny of waste manifest forms, expending export producers, construction of storage sites, etc, as well as evaluation of municipal waste management system and monitoring groundwater quality near toxic waste sites.

Solid Wastes: See also under *Hazardous Wastes*.

Radioactive Wastes: No information available.

Research and Technologies:

Hazardous Wastes: See under **Programmes and Projects and Status**.

Solid Wastes: See under **Programmes and Projects and Status**.

Radioactive Wastes: No information available.

Financing:

Hazardous Wastes: No information available.

Solid Wastes: No information available.

Radioactive Wastes: No information available.

Cooperation:

Hazardous Wastes: Bahrain ratified in April 1990 the Protocol From the Protection of the Marine Environment Against Pollution From Land Based Sources. Bahrain also ratified the Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and Their Disposal in 1992, and it entered into force in 1993. Other regional and international protocols have been actively pursued, including MARPOL 73/78 for which a National Steering Committee has been formed and regional meetings have been held.

Wastes cannot be recycled in Bahrain especially hazardous wastes are exported to countries that have the facilities for recycling. Exports are usually done according to the codes and regulations of the Basel Convention. No waste classified under Basel Convention's annexes is exported from Bahrain. The secretariat of the convention is kept informed on the steps undertaken toward the implementation of the articles. The Regional Organization for the Protection of the Marine Environment (ROPME) is in the process of finalizing a regional protocol complementing the Basel Convention on the trans-boundary movement of hazardous wastes across borders, and the Gulf Cooperating Council (GCC) countries are also working on unified rules to deal with industrial waste. An Amiri Decree No. 13, 1995 was issued on 3 May 1996 to accede to the International Convention on Civil Liability for Oil Pollution Damage (CLC), 1992 and its protocols of 1976 and 1992, and the International Convention on the Establishment of An International Fund for Compensation for Oil Pollution Damage (FC), 1971 and its protocols of 1976 and 1992. CLC 1992 and its protocol 1992 and Fund 1971 and its protocol 1976 entered into force for Bahrain on 1 August 1996, whereas protocols for both Conventions (CLC & FC) entered into force for Bahrain on 3 May 1997. CLC forms the basic structure on which the regimes of liability and compensation for Oil Pollution Damage from ships are based, and the aim or function of the Fund Convention is to provide supplementary compensation to those who cannot obtain full and adequate compensation for Oil Pollution damage under the CLC.

Solid Wastes: No information available.

Radioactive Wastes: No information available.

CHAPTERS 24 TO 32: STRENGTHENING THE ROLE OF MAJOR GROUPS

Women: Decision-Making: Women's societies were among those requested to provide representation on all five of the committees organized to implement the National Strategy to execute Agenda 21, including committees on: protection of freshwater resources; environmentally sound management of waste and chemicals; protection of the marine environment; protection of the atmosphere; and changing consumption patterns.

Children and Youth: No information available.

Indigenous People: No information available.

Non-governmental Organizations: No information available.

Local Authorities: No information available.

Workers and Trade Unions: No information available.

Business and Industry: Decision-Making: Companies were among those requested to provide representation on all five of the committees organized to implement the National Strategy to execute Agenda 21, including committees on: protection of freshwater resources; environmentally sound management of waste and chemicals; protection of the marine environment; protection of the atmosphere; and changing consumption patterns. See also **Chapter-Industry** of this Profile.

Scientific and Technological Community: No information available.

Farmers: No information available.

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CHAPTER 33: FINANCIAL RESOURCES AND MECHANISMS

Decision-Making: The Ministry of Finance and National Economy vision for the coming decade involves 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.

In the context of fiscal policy, the Ministry's vision seeks to balance the budget over the medium term while maintaining low levels of external debt. In order to achieve this objective, the Ministry is in the process of diversifying the revenue base through enhancing non-oil revenues and increasing the role of private sector in the economy. The Ministry will continue to accord priority to safeguarding social welfare and supporting infrastructure projects.

Programmes and Projects: No information available.

Status: Bahrain's economy is a market-based economy. The diversification of the economy is the main objective of the economic policy. Oil, which was the mainstay of the economy of the early stages of development, contributed around 18% of the real GDP in 2000. Manufacturing 12%, trade 13%, financial corporation 19%. See also **Chapter 2-Trade** of this Profile.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: Real Gross Domestic Product is estimated at 7.2 billion dollars in the year 2001, with an average growth rate of 4.4% for the period 1997-2001. Latest figure on GDP per capita was reported at US\$11,067. The economy is supported and served by modern infrastructure.

Research and Technologies: No information available.

Cooperation: No information available.

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CHAPTER 35: SCIENCE FOR SUSTAINABLE DEVELOPMENT

Decision-Making: No information available.

Programmes and Projects: No information available.

Status: No information available.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER 36: PROMOTING EDUCATION, PUBLIC AWARENESS AND TRAINING

Decision-Making: The Environmental Affairs Agency (EA) cooperates with other Ministries and Major Groups, such as private schools and societies, in executing all specialized programmes focused on increasing public awareness in regard to national, regional and international environmental issues. The EA collaborates with the Ministry of Education on regular introduction of environmental topics, literature and issues of national, regional and international nature in the school curriculum.

Recognizing the importance of education, the Government of Bahrain has given great support for development and improvement of educational systems in the country. Curriculum development was built upon three foundations, which contribute to fostering sustainable development within the Bahraini society. These foundations concentrate principally on the Bahraini individual (the outcome of the educational process). The first pillar emphasizes the values of education based on traditional heritage and Islamic culture. The second is promoting science education through accessing the most advanced scientific and technological knowledge and linking education to labor market. The third is taking innovative measures in curriculum development and moving towards continuous education. Although the phrase of sustainable development is not worded in these principles nevertheless, the concept of sustainability is embedded in these pillars.

The Ministry of Education has put considerable efforts to realize these principles and directives through developing programmes and adopting activities to fulfill objectives of the educational system. Future vision of the educational system in Bahrain incorporated a great deal of environmental related directives as well as the underlying principles of sustainable development. The vision was engineered to fit Bahraini society development needs while benefiting from the broad base of provisions contained in the Universal Declaration on “Education for all.” The followings are the main directives contained in a project document that has been approved by the Government in 1996: Making education accessible to all citizens and promotion of equality; Insisting upon learning acquirements; Broadening the scope and means of basic education; Promoting learning environment of education process; and, Reinforcing contribution in development of education system. See also under **Status**.

Programmes and Projects: To harmonize the educational system with sustainable education and life long learning, number of projects conducted during the nineties; most importantly are the studies of the compatibility between labor market requirements and the outputs of the educational system with the help of UNDP. Additionally, formal and informal educations have been adopted and vocational training has been broadened to cope with market needs. Computer technology was introduced into curricula schools and environmental education was introduced through seminar sessions, awareness campaigns, scouts and school clubs.

Awareness-raising programmes include: painting and drawing competitions among students; stage shows; lectures at school; TV interviews; scientific field trips; and so forth.

In coordination with relevant public and private sectors, the EA celebrates the following events to engender a concern and caring attitude: World Health Day (7 April); Earth Day (22 April); Regional Environment Day (24 April); World Environment Day (5 June); and Arab Environment Day. (14 October). Many schools have been encouraged to start recycling activities, and leading schools have already started Ecology clubs. Children regularly take part in clean-up campaigns and project work on environment. On World Environment day, in 1992, the EA supported NGOs in organizing a “Mini Earth Summit” in Bahrain. The conference was a big hit and was not only a learning experience for the participating students, but also received attention in the community. The Central Municipal Council (CMC), together with the Directorate of Heritage and Museum, celebrated the Environmental occasion by a three- year carnival entitled, ‘Who adopts a Palm Tree’ in which date palm seedlings were distributed among the children to plant and nurture in their gardens. Considerable attention is given to training and general and professional staff, by supporting or encouraging them both to pursue their academic studies and to participate in workshops, technical conferences, seminars and specialized training courses. This is seen as a part of the continuous process to achieve the ultimate goal in making the Environmental Affairs Agency a learning institute.

The training institutes in Bahrain are sectoral in nature and job specific focus. The Ministry of Works and Social Affairs along with the private sectors have established a series of vocational training centers covering wide range of training programmes and activities. Some of these centers are specifically designed to address certain needed

expertise in industry or commercial and financial businesses. Vocational training, on job training and re-training programmes are widely spread in the country. See also under **Status** and the heading **Capacity-Building, Education, Training and Awareness-Raising** in the various chapters of this Profile.

Status: Education is a process that empowers people with required knowledge to deal with developmental and environmental issues among the other issues. It is one of the most important tools by which people have the capacity to assess and address their sustainable development concerns. Regular education in Bahrain started in 1919 when the first boys' school was opened in Muharraq town. Nearly ten years later (in 1928), the first girls school was opened. In 1929 education was put under direct control of the Government, through the Ministry of Education. Education in Bahrain is in three stages: Primary stage (6 years), Intermediate stage (3 years and Secondary stage (3 years). Higher education is available for secondary school graduates and can be obtained through the Bahrain University, Arabian Gulf University and specialized institutes. Great attention is given to the importance of environmental protection awareness for the public and decision-making levels, and broad participation is encouraged wherever appropriate.

In the aftermath of the referendum on the Charter of National Action (CNA) new societies primarily (NGOs) were officially declared and started their activities. Some of which are dedicated to promoting environmental awareness and sustainable development. Environmental societies are campaigning in schools and public places for the protection of environment. Every attempt is made to develop an earth watching, earth-protecting, earth-caring, and earth- helping attitude in the minds of children. However, environmental and sustainable development training have not been completely introduced as a training programme or fully integrated into other programmes.

Although the guiding principles for environmental protection and nature conservation have been introduced into the educational curriculum, the broad concept of sustainable development has not been fully integrated into the curriculum yet as a plan of work. Society in general still lives in the environmental paradigm and has not been fully integrated in the sustainable development course of work. Thus, more time is needed to create and foster such a change. However, it is fair to say that innovative approaches to learning have been incorporated in the educational curriculum and efforts of reorienting education towards sustainable development have made significant progress for the last ten years. Future activities need to promote a sustainable development course of change. These initiatives may include, developing multi-disciplinary courses and emphasizing innovative teaching methods to promote sustainable development thinking in minds of young generation. Capacity building in this regard is needed to prepare a programme of work in education within the framework of setting the local agenda 21.

Information: The country has made great strides in educational achievements. The gross enrolment ratio in primary schools reached 106% along with 94% in secondary schools and 18% in third level of schooling as of 1999. The illiteracy rate dropped from 21.0% in 1991 to 12.3% in 2001 with a 17.0% among females compared to 7.5% among males. These percentages are considered low compared to other countries in the region whereas the overall illiteracy rates among men and women in Arab countries in 1995 were 31% for men and 57.2% for women. The total number of students of all schools reached 120, 657 in 1993, distributed among 162 Government schools and 31 private schools.

Research and Technologies: No information available.

Financing: Public expenditure on education reached 4.4% of GNP and 12% of the Government expenditure in the period of 1995-1999.

Cooperation: No information available.

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CHAPTER 37: NATIONAL MECHANISMS AND INTERNATIONAL COOPERATION FOR CAPACITY-BUILDING IN DEVELOPING COUNTRIES.

This issue has been covered either under **Chapter 2** or under the heading **Cooperation** in the various chapters of this Profile.

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CHAPTER 38: INTERNATIONAL INSTITUTIONAL ARRANGEMENTS

This issue deals mainly with activities undertaken by the UN System.

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Chapter 39: International legal instruments and mechanisms

This issue has been covered under the heading **Cooperation** in the various chapters of this Profile.

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CHAPTER 40: INFORMATION FOR DECISION-MAKING

Decision-Making: No information available.

Programmes and Projects: No information available.

Status: See under the heading **Information** of the various chapters of this Profile.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Research and Technologies: No information available.

Financing: No information available .

Cooperation: No information available.

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CHAPTER: INDUSTRY

Decision-Making: Effluent guidelines are mandatory for all existing plants discharging their effluent into the marine environment. Moreover, the Environmental Affairs Agency (EA) and the Ministry of Oil and Industry have realized the importance of requiring Environmental Impact Assessment (EIA) for new industries, whereby both the Government and industry have signed A Memorandum of Understanding which provides a flexible system to promote both industrial investment and sustainable development. This has been re-stated in the Amiri decree-law No. 21 (1996), whereby industry and as well as others involved in development, shall get the approval and the consent of the EA before the start of a project. The EA has prepared the EIA procedures for development projects under the authority of H.E. the Minister.

The main guiding principle of the EA is to balance development objectives with environmental protection. Sustainable industrial development and protection and conservation of Bahrain's natural resources are the ultimate goals. Industry is being asked to promote cleaner technology, minimize waste, install pollution control equipment and increase efficiency and recycling.

New development projects are carefully analyzed by the EA and, where necessary, the developer is requested to submit environmental impact statements. As a result of Government efforts and EA policy to mitigate and minimize stress and hazards to the environment, the discharge of untreated and insufficiently treated waste water into the sea has been reduced through the expansion of the sewerage system, the installation of treatment plants among large industries, environmentally oriented industries and the improvement of some treatment facilities in various plants.

Furthermore, the EA has requested all industries through the Ministry of Oil and Industry to perform self-monitoring for their effluent and to report the result periodically to the EA, which collects random samples to ensure quality and compliance. The EA in cooperation and coordination with concerned authorities and major companies is finalizing a plan of action to combat industrial accidents. The plan is based on the manual for "Awareness and Preparedness of Emergencies at the Local Level (APELL)" and some scenarios planned by major industries. Minimum wages are set by the Government and observed by employers, and child labor laws are strictly enforced.

Programmes and Projects: See under **Decision-Making** and also under **Status** in **Chapter 9** of this Profile.

Status: Work force constitutes around 47% of the total population in 2001, of which women's participation constitutes about 22%. However, women have stayed on the less advantage side as their income remains at 77% of men's income for comparable jobs. The unemployment rate has dropped from 6.3 in 1991 to 5.5% in 2001. Nearly 41% of the total work force is nationals and the Government encourages participation of nationals in all sectors of the economy. In fact, targets are being set to provide work opportunities for nationals in existing industries or by creating new opportunities in trade, finance, and tourism services, as well as in small and medium size enterprises (SMEs) and micro projects.

Capacity-Building, Education, Training and Awareness-Raising: See under **Information**.

Information: The EA took the initiative of translating and printing APELL manual in Arabic and of distributing it to all Arab Countries and specialized institutions.

Research and Technologies: See under **Decision-Making**.

Financing: No information available.

Cooperation: See under **Information**.

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CHAPTER: SUSTAINABLE TOURISM

Decision-Making: The Environmental Affairs Agency intends to develop forty-three hectares of mangrove swamp into a wetland conservation area. The Cabinet of Ministers, in the session No. 1341 of 16 April 1995 and by Ministerial Order No. 1 of 13 June 1995 further declared full protection for the mengal and a ban on coastal landfill. This development will allow the public to experience and enjoy the natural history of Bahrain's coastline.

Programmes and Projects: See under **Decision-Making** and **Status**.

Status: There are plans for a museum, walkways, and bird watch towers, ultimately aiming to convert it in to a tourist spot. Also planned is an education center, which will publicize the importance of the reserve as nursery grounds to fisheries.

Capacity-Building, Education, Training and Awareness-Raising: See under **Status**.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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