TakingITGlobal

Digital Inclusion

In

Preserving the Environment

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Contents:

Abstract:

This document based upon the use of satellite data, information and communication technologies including Internet and geographic information systems to monitor, assess, and manage ecosystems and water resources is now being widely developed. Our country needs to promote biodiversity conservation, so as to aid sustainable development and to help alleviate poverty. The document will involve scientific research, gather data from specialized centers and will also emphasize the necessity to outreach to affected communities. It will promote the use of remotely sensed data to produce sets of maps of extreme vulnerability to water resources, ecosystems, associated resources, for local people and decision-makers.

Back Ground:

In 1992, M.S.Swaminathan wrote a book titled from *" Stockholm to Rio de Janeiro",* Briefly reviewing the progress made in achieving the quest for harmony between humankind and nature from time to time of the UN Conference on the Human Environment held in Stockholm in 1972 up to the UN Conference on Environment and Development held at Rio de Janeiro in 1992.

He wrote in his edition of 2002 "*From Rio de Janeiro to Johannesburg*":

The UN Summit on Sustainable Development now scheduled to be held at Johannesburg, South Africa, from 26 August to 4 September 2002, was originally to be held from 2 to 11 September, but the dates were brought forward. The reason was that the dreadful date, 11 September, marked the entry of humankind into an era where the fear of one another has reached unprecedented heights. The Johannesburg Summit is being convened ten years after the Earth Summit held at Rio de Janeiro in 1992 and thirty years after the UN Conference on the Human Environment held at the Stockholm in 1972, to take stock of the current status of our common ecological future and to examine how far the concept of sustainable development has been converted from a desirable goal into practical accomplishments.

The Stockholm Conference resulted in the establishment of the UN Environment Programme (UNEP) at Nairobi, as an instrument for shaping global governance of environmental issues. Unfortunately, UNEP could not live up to its early expectations due to constraint of financial and political support. It is high UNEP is developed into a **World Environment Organization**, on the lines of the World Trade Organization. Even if the name is not changed, UNEP's mandate and political backing need to be enlarged.

At Rio, several international conventions like those relating t Climate and Biodiversity as well as in Agenda 21 containing guidelines for sustainable development were adopted. Later, a Convention on Desertification was taken up. The UN Convention on the Law of the Sea also came into force. More recently, an International Treaty on Plant Genetic Resources for Food and Agricultural was ratified in the forum of FAO. Fortunately, the Global Environment Facility (GEF) set up just prior to Rio has been receiving good financial support and is rendering extremely valuable service. GEF has saved many biodiversity and hydrologic hotspots from total destruction and has been effectively serving as the financial mechanism for the Climate and Biodiversity Conventions.

In spite of all these positive signals, sustainable development is still a far cry, particularly if the social dimension is added to those of ecology and economics. There is a growing violence in the human heart, to some extent due to a feeling of social exclusion and injustice on the part of those who feel that they are losers in the present pattern of development. Mahatma Gandhi asked many decades ago: "How can we be non-violent to nature, if we are going to be violent to each other?" It's obvious that the principles of ethics and equity enshrined in the Convention on Biological Diversity have been extended to human diversity. The increasing intolerance of variance and pluralism in human societies underlines the need for **Convention on Human Diversity** that will help to foster understanding and appreciation of differences in terms of gender, colour, religion, languages, ethnicity, or political belief.

We see today increasing conflicts in region characterized by gross social and economic inequity. Thousands of young men and women in Johannesburg, as in many other cities of the world, have no jobs and no hope for a healthy and productive life. However, they often have guns, leading to a threatening climate of violence. It is likely that at the Johannesburg Summit more money will be spent on protecting the participants than what the wealthy nations are likely to

pledge for protecting the planet. Like other UN meetings, Johannesburg has poverty eradication as one of its goals. If speeches and statements would have led to poverty eradication. We will not be witnessing the increasing rich-poor divide today. According to UNDP, 200 ultra-rich persons in the world currently earn more than the 2 billion living in poverty.

Damage to biological and human heritage is also continuing unabated. Since Rio, some highly disturbing and anti-conservation and anti-sustainable development terms like 'ethnic cleansing', 'bio-privacy', and 'bio-terrorism' are frequently appearing in the mass media. The threat of nuclear warfare is again looming large on the horizon, although this had receded to the background after the end of the Cold War and the breaking of the Berlin Wall. While until recently the eradication of smallpox was considered a triumph of modern immunization technology, steps have recently been taken in the United States to inoculate several groups of professionals against smallpox as a precaution against a possible terrorist attack. Similarly the 'dirty bomb' scare has led to severe restrictions on the handling of radioactive in research laboratories.

What then is the role of Johannesburg Summit?
Can it shed some light where only darkness prevails now?
What should be the outcome of Johannesburg Summit?

'Do' Ecology: A Message of Hope for the Johannesburg Summit

If I were to describe my hope in two words, it is **'do ecology'**.
In 1973, soon after the Stockholm Conference on the Human Environment, I elaborated this concept in my Coromandel Lecture, "Agricultural on the Spaceship Earth":

The environmental policies advocated in the richer nations are designed
To protect the high standard of living resulting from the unprecedented

Growth in the exploitation of nature resources during the last century.
It is of necessity a policy based on a series of 'don'ts'. The poor nations,
In contrast, are faced with the desire and need to productive more food
From hunger and thirsty soils, more clothing, and more housing. They
Need a 'do ecology' and not just a 'don't' philosophy.

In operational terms 'do ecology' involves the creation of new eco-jobs. Since eco-jobs are knowledge intensive, the knowledge era, initiated by the digital, space and biotechnological revolutions, provides uncommon opportunities for realizing the goal of jobs for all.

The M.S. Swaminathan Research Foundation (MSSRE) organized an interdisciplinary dialogue on theme 'Environment, the New Economy, and New Employment ' at Chennai from 28 to 31 January 2002, with support from Global Environment Facility. Its main purpose was to identify opportunities for fostering environmentally and socially sustainable job-led economic growth.

Today we know that the famine of jobs or livelihood opportunities resulting in inadequate family income is the basic cause of the famine of food at the level of individuals. Where hunger rules, peace cannot prevail. Sustainable employment or livelihood opportunities hold prevail the key to peace and progress.

Though our planet is politically divided by frontiers and concepts of sovereignty, our fates are ecologically intertwined. While ecology and communications unite us, economics is unfortunately serving as a divisive force. Trade is becoming free but not fair. Globalization should be designed in a 'win-win' mode for all and should not result in creating a large number of losers and some winners. This can be achieved if we make opportunities for sustainable livelihoods/employment opportunities for youth as the yardstick for measuring the beneficial impact of globalization. **Jobs for all** should be the bottom line of trade arrangements,

including export and impact policies. WTO should subject its agreements to a livelihood impact analysis.

Thanks to the onset of t the age of innovation and invention, we have exceptional opportunities for fostering job-led economic growth. For this promise to be realized, political will and action as reflected in priorities in investment in human resource and infrastructure development are a most. There is no single or simple solution to the problem of overcoming the growth of unemployment in the world. The problem is so vast and yet the opportunities are so great that we should foster the fusion of political will, professional skill, and national and global partnerships, to achieve the goal of **sustainable livelihood opportunities for all**. We can learn from successes, as for example from the integrated approach to on-farm and non-farm employment adopted in China through the Rural Township Enterprise Programme. The co-operative dairy movement in India based on small-scale production and on animal nutrition based largely on agricultural residues, in another good example of production by masses, since this provides over 50 million women with secure livelihoods. Global, regional, and national partnerships will be necessary to achieve a paradigm shift from jobless to job-led growth.

Youth constitute the majority of population in most developing countries. If governments acknowledge the opportunity to work and thereby earn one's livelihood as a basic right as well as a basic prerequisite for internal and international peace and human security, they should design strategic interventions which will help to build the self-esteem and competence needed to undertake self-employment. Unity of goals, but multiplicity of approaches, will be needed to achieve success. The complex problem of youth employment and its multiple dimensions will have to be dealt with in a desegregated manner, as for example, first generation learners (i.e., the children of illiterate parents) as well as 'school push-outs' (often girls) and handicapped youth will have to receive special attention. Without peace and security, there can be no progress in any

field of human endeavor. Therefore, if youth employment efforts go wrong, nothing else will have the chance to go right.

I would like to suggest a frame work for generating sustainable employment and livelihood opportunities for all. The basic strategy would include enhanced opportunities for skilled employment in the primary, secondary, and tertiary sectors of economy; an integrated approach to technology, training, techno-infrastructure, and domestic and expert trade; public policies for enlarging the space for remunerative and market-driven self-employment; and, consortiums of public and private sector companies for fostering assured marketing opportunities through buy-back arrangements.

To operationalise this strategy we would need to:

- Promote location-specific jobs, based on the natural and human resources endowments of the area
- Carry out livelihood/job impact analysis of all technology-driven development projects
- From in each compact area a "Jobs for All Consortium" consisting of appropriate representatives of government and non-government organizations, business and industry, service oriented civil society associations, women's groups, financial institutions, bilateral and multilateral donors, and the mass media.
- Organize a network of training and capacity-building institutions capable of imparting market-driven skills.
- Develop marketing infrastructure needed to link primary producers with domestic and international consumers, and promote an Employment Infrastructure Fund as well as Venture Capital Fund for small-scale decentralized production enterprises.
- Encourage, whenever appreciate, a 'production by masses' approach, rather than 'mass production' and labour-displacing technologies;

support such decentralized small-scale production with key centralized services in order to reduce transaction costs.

- Develop institutional structures which can confer the power of scale to small producers both in the production and post-production phases of the enterprise.
- Facilitate the organization by young entrepreneurs of effective structures like Eco-enterprises Parks, Biotechnology Parks, Food Parks, Horticulture, Poultry, and Dairy Estates, Renewable Energy Parks, ect.
- Assist in creating more non-farm employment opportunities in rural areas and provide opportunities to young farm, commerce, home science, veterinary, fishing, and engineering graduates to organize socially relevant and economically viable services.
- Help unemployed youth to acquire the necessary self-confidence and skills to embark upon initiatives which can help to bridge the digital, genetic, gender, and other divides.
- Devise short-term non-degree training programmes at appropriate universities and technical institutions to help build the capacity of youth to harness both traditional and frontier technologies. The aim should be to assist the country to progress rapidly in the technological transformation of crop and animal husbandry, fisheries, agro-forestry and forestry, agro-processing, and small rural and urban enterprises.

The report of the Brundtland Commission was titled '*our Common Future*'. The period from Rio to Johannesburg has amply demonstrated that there can be no happy common future for humankind without a better common present. However, extending the extrapolation domain of successful experiences and examples will be possible only if we understand the basic principles underlying such efforts. We should emulate the example of the DNA molecule (the basic unit of heredity and

life) and design programmes capable of replication, recombination (i.e., marriage of successful experiences), and mutation (mid-course correction when needed, or even total recasting of strategies where appropriate). Thus, unique successes can be converted into universal progress.

Food and drinking water occupy the first position in the hierarchical needs of human beings. I have, therefore, chosen sustainable food and water security as the index of our progress towards achieving the humanistic goals of Stockholm, Rio de Janeiro, and Johannesburg. Appropriate in this context is George Herbert's verse:

Sweet, Peace, where dost thou dwell?
I humbly crave,
Let me once know.
I thought thee in a secret cave,
And ask ' d if Peace was there,
A hollow wind did seem to answer, No:
Go seek elsewhere.
At length I met a rev ' rend good old man:
Whom when for Peace
I did demand, he thus began:
"Take of this grain, which in my garden grows,
And grows, for you;
Make bread of it: and that repose
And peace, which ev ' ry where
With so much earnestness you do pursue,
Is only there."

Introduction:

Global environmental change is one of the most pressing international concerns of the 21st Century. These changes may include the effects of global warming, stratospheric ozone depletion, and large-scale changes in land cover due to human activities such as biomass burning.

On the other hand, In an era of increasing global integration and diminishing distances, some areas and some sections of community remain vulnerable to changes and are even disadvantaged by the increasing economic and social integration. New technologies, especially information and communication technologies (ICTs), are changing the ways in which people around the world work and how goods and services are produced and marketed. The effective use of ICTs has led to increasing productivity and economic growth in many economies of the world. As technologies become more sophisticated, further use can be made of the potential of ICTs to accelerate productivity, increase economic growth and lead to overall development. The increased use of the Internet, mobile telephony and wireless-based applications has led to increasing discussion about the creation of a "knowledge-based economy".

However, while many countries are benefiting from the increased use of ICTs, there are also many others who have yet to take advantage of ICTs and are even being marginalized by the lack of ICT. As a result, the increasing spread of ICTs in certain countries and regions such as North America, European Union, the Newly-industrialized economies of Asia and the lack of capacity for ICT use and dissemination in many other economies, including most African economies, has led to the creation of what is called a "digital divide" between economies with access to and utilization of ICTs and those with very little ICT use or penetration. The use of ICTs in many developing countries is much lower as compared to developed countries. The United Nations Development Programme estimated that only around 14 per cent of all Internet users around the world were from

developing countries and there were wide disparities within regions and countries as well. For instance, in Africa, out of an estimated 1.6 million Internet users, around one million are in South Africa. This is in contrast to North America where around 60 per cent of all Internet users reside even though it has only five per cent of the world's population.

It is essential to establish programs and projects to deal with this increasing disparity in access to and usage of ICTs around the world. For this, the involvement of young people is a necessity since they form the core of the future development of any economy. They are the "trustees of the future". In addition to their future role as teachers, leaders and campaigners for development, the youth also suffer more from various problems than other sections of the society. In many developing countries, young people often find it difficult to access information, education, employment and income generating opportunities. ICT has the potential to lead to effective youth development, building up their capacity to act as future teachers and leaders and contribute to the development of their countries. ICTs have been promoted by international organizations, non governmental organizations and also by governments as a tool for economic and social development in both rural and urban areas. Most importantly, ICTs can be utilized to increase the flow of information between the youth of various communities across national boundaries to enable them to access, use and share information on various issues of concern to them. The benefits of ICTs, of especial concern to the youth of developing countries like those in Africa, are:

- Distance learning
- Healthcare information and provision
- Information provision and job creation: government services, agricultural information
- E-commerce including web site development

In addition to the recognition of the need to bridge the digital divide, there is also increasing concern that the introduction of ICTs into remote regions, as in Africa, will change social and traditional relationships and not always for the better. Some argue that provision of safe water and healthcare is more important than providing mobile phones and computers. However, the youth of today, including those in developing countries, need to be aware of technological tools which they can use for their development and, thus, for the overall development of their countries. By marginalizing them in accessing and using available technology to develop their capacities and increase opportunities for income generation, the youth in developing countries would lag behind those in other countries with access to ICTs. Thus, it is essential to promote the access and use of ICTs for development in Africa in order to lead to increased overall development and capacity-building. ICT is a tool for development and as such it can be used to benefit local youths and communities while ensuring that indigenous knowledge does not suffer. As a caution, it is essential to remember that introducing technology does not automatically lead to information exchange, empowerment and better lifestyles for all. The introduction of ICT has to be combined with effective dissemination, long-term supportive policies from the government and a commitment to help the youth in using ICT for income generation and capacity-building. [1]

But, what's meant by: Information & Communications Technologies?

[1] Information technology for the development of youth in Africa
AYF/BGP/2001/2 27 April 2001

Chapter I

The Use of the Satellite Data, Information and Communication Technologies to promote the Biodiversity Conservation

1. A. What's meant by: Information & Communications Technologies? (ICT)

ICT can be defined as a set of activities that facilitate, by electronic means, the capturing, storage, processing, transmission, and display of information. This paper uses the term information and communication technologies (ICT) to encompass the production of both computer hardware and software as well as the means of transferring the information in digital form. It is includes low cost forms of communications such as radios.

Another term commonly used to describe the changes produced by information technology is the digital economy. This expression emphasizes the new opportunities created by transforming information into a binary digital code. The digital economy refers to more than the boom and bust cycle of many new ventures aiming to tap the potential of the internet for commercial purposes. The more profound effect of ICT is likely to be in improving the efficiency and reach of the mainstream production of goods and services, in both the public and private sectors of the economy.[2]

[2] Information and Communication Technology -Youth Employment Themes-

1. B. Biodiversity . . . What is it? [3]

Biodiversity is a term which is often used in environmental literature and yet seldom properly understood, but we will try to find a definition.

A good but somewhat technical definition of biodiversity:

Biodiversity, or biological diversity, is the term for the variety of life and the natural processes of which living things are a part. This includes the living organisms and the genetic differences between them and the communities in which they occur. The concept of biodiversity represents the ways that life is organized and interacts on our planet. These interactions can take place on scales ranging from the smallest, at the chromosome level, to organisms, ecosystems, and even to entire landscapes.

For more clear, we can use the Kid's definitions,

Translation for kids:

Here's a challenge: Imagine if you can, every single living thing on Earth. There are millions of species of plants, birds, reptiles, mammals, fish, shellfish, amphibians, insects, arachnids (spiders), and microorganisms such as bacteria. Try to imagine them all, on a planet teeming with life. Don't forget to put yourself in the picture! Now think about what makes each one of those species different from the others. Got a headache yet? Think about what makes them look and act different, what different kinds of habitats and climates they all live in, what their different needs are, and how they interact with one another. If you can, imagine

[3] Kids Corner of:-

even what differences you'd see between them if you could look at each one through a very powerful microscope. If you can do this, you've got a good idea of what the term biodiversity means. It's a mind-boggling concept, because it covers Earth's variety of life in all its forms and processes. Biodiversity, which is a short form of the words biological diversity, is really about the ways that life is organized and interacts on our entire planet. And that's a lot to think about!

On the other hand, In the 1960s, the desire to monitor the Earth's environment was linked with new technology that enabled us to observe our planet from space – giving humans our first global view of Earth. This new Technology known by Satellites.

1.C. What are satellites? [4]

Before 1957, the word **satellite** meant one thing — a small body that revolved around a larger astronomical body. Today we call these "natural satellites." In 1957, the Soviets launched the first "artificial **satellite**, "Sputnik 1. Today there are hundreds of artificial satellites in orbit around the Earth. These satellites are used for many purposes, such as communications, weather forecasting, and navigation, as well as observing the Earth. Satellites used to observe the Earth carry a variety of instruments to study the land, ocean, air and life, as well as their interactions. For example, Scientists at NASA's Langley Research Center use several satellites now in orbit to measure some very specific atmospheric phenomena, such as the amount of ozone in the atmosphere, and to help them distinguish between

[4] NASA Facts
National Aeronautics and Space Administration **-Langley Research Center**
Hampton, Virginia 23681-0001 FS-1996-08-08-LaRC

environmental changes caused by humans and those that occur naturally.

Data gathering and interpretation

The technology used on a **satellite** varies, depending on its mission. Computers aboard a **satellite** can receive, store and transmit information in the form of radio signals sent to and from stations on Earth. For Earth scientists, the receipt of the data begins a long process of determining what the data means.

By incorporating the data into computer models (which use mathematical formulas called algorithms) researchers can simulate, or model, Earth's processes — how the atmosphere, oceans and land surfaces interact as a system. Scientists hope that incorporating global **satellite** data into their computer models will help them better understand the interactive roles of Earth's systems, and help them predict how the Earth's environment will change over time.

*Most satellites are lifted into orbit by multistage rockets. Satellites, powered by solar cells and auxiliary batteries, orbit more than 100 miles above the Earth's surface. The **satellite's** orbit, and the instruments it carries,are dependent on its mission. Communication satellites orbit more than 22,000 miles above the Earth relaying radio and TV signals, while most Earth-observing satellites orbit several hundred miles about the surface measuring the atmosphere, oceans and surface*

Some Ongoing NASA Satellite Missions

NASA Langley researchers use many satellites to study atmospheric variables and their effects

• MAPS •

THE **M**EASUREMENT OF **A**IR **P**OLLUTIONFROM **S**ATELLITES

(**MAPS**) instrument produced the first global measurements of atmospheric carbon monoxide (CO) in 1981 when it flew aboard the Space Shuttle Columbia (STS-2).

MAPS' most important finding was that air pollution is a worldwide phenomenon, not just a problem in industrialized countries. In1981, and in subsequent shuttle flights in October 1984 and 1994, MAPS measured high values of CO pollution in the tropics caused by seasonal biomass burning. In 1997, MAPS will be mounted to the Russian space station Mir to monitor global CO levels during a year of seasonal changes.

• ERBE •

THE **E**ARTH **R**ADIATION **B**UDGET **E**XPERIMENT

(**ERBE)** is made up of three satellites launched in the mid-1980s. Since then, ERBE has been the primary source of global data for studying the heating and cooling of the atmosphere. This data may tell us the extent to which global warming is occurring. ERBE technology also measures the effects of clouds on the exchange of energy between the sun, Earth and space. The ERBE sensors measure energy from the sun in various wavelengths: reflected shortwave solar radiation (light that does not reach the Earth but is reflected off clouds) and long wave emitted energy (the heat that is emitted into space by the Earth). By analyzing long-term measurements of these energy components, scientists can study the Earth's climate. ERBE has provided the most accurate data ever obtained on short-and long wave radiant energy, helping us better understand how clouds reflect and absorb sunlight, and the heat emitted by the Earth into space. NASA scientists have used this data to make important contributions to climate prediction by improving how clouds are represented in atmospheric models.

• CERES •

THE **C**LOUDS AND THE **E**ARTH'S**R**ADIANT**E**NERGY**S**YSTEM **(CERES)** instrument is a follow-on to ERBE. CERES will be able to better identify cloud properties as well as help scientists better understand the Earth's energy budget. CERES will be launched in late 1997 aboard the **T**ropical **R**ainfall **M**easuring **M**ission (TRMM) spacecraft, as part of NASA's Mission to Planet Earth Program.

• SAGE I AND II •

THE STRATOSPHERIC AEROSOL AND Gas EXPERIMENT I (SAGE I) measured ozone, particles in the upper atmosphere (aerosols) and nitrogen dioxide from 1979 to 1981. Using a process called solar occultation, sensors on SAGE I measured sunlight coming through the atmosphere to determine how much sunlight was absorbed. The amount of absorption indicates the amount of various sunlight absorbing gases, like ozone, or aerosols, that are present. Solar occultation occurs as the satellite experiences sunrises and sunsets, when the light is not too bright to obscure readings. SAGE I produced the first global atmospheric data of this type.

SAGE II began operation in 1984 with the launch of the Earth Radiation Budget Satellite. SAGE II, which is still operating, provides global measurements of the vertical structure of ozone, nitrogen dioxide, water vapor and stratospheric aerosols. The SAGE II data helped scientists understand the causes and effects of the Antarctic ozone hole, and has made invaluable contributions to understanding the decline of stratospheric ozone over the Earth's mid-latitudes.

• HALOE •

THE HALOGEN OCCULTATION EXPERIMENT (HALOE), launched in 1991 aboard the Upper Atmosphere Research Satellite (UARS), measures ozone and other atmospheric gases. Like SAGE I and II, HALOE uses the solar occultation technique; however, it measures visible infrared light and uses a filter which separates the gases according to their individual light "signatures." Analysis of the HALOE data proved conclusively that the Antarctic ozone hole was caused by human- produced chlorofluorocarbons (CFCs).

CAUSES AND EFFECTS OF GLOBAL CHANGE

Global Warming

Global warming occurs, in part, because of the increase of certain atmospheric gases, such as carbon dioxide and methane, often caused by human activities. These gases trap heat inside the Earth's atmosphere. Increases in global temperatures over time could change precipitation patterns and growing seasons in many parts of the world. While isolated data sets gathered from several locations on Earth indicated global warming was occurring, it was not until **satellite** data found a worldwide change that scientists began to see the correlation between the factors contributing to this warming, the rate at which it might occur, and the role of human activities.

Ozone Depletion

Ozone is a gas in the upper atmosphere (stratosphere) that absorbs harmful ultraviolet radiation from the sun, protecting life on Earth. Ozone depletion occurs when ozone reacts with chlorine and other compounds in the presence of sunlight. NASA **satellite** studies have found that the main source of chlorine in the stratosphere is human-produced chlorofluorocarbons (CFCs) which are used in refrigeration, air conditioners, and industrial solvents and cleaners. When CFCs are released; they drift up into the stratosphere and can destroy ozone. The destruction of ozone has been documented through **satellite** observations since the 1980s. Because of this evidence, nations throughout the world signed the 1987 Montreal Protocol to phase out production and use of CFCs by the year 2000.

Deforestation

Human impacts on the Earth's system are most visible in changes to the land. As human population grows, we alter the landscape for agriculture, to harvest timber, and to build cities. Deforestation and changes to land cover reduce the Earth's ability to absorb carbon dioxide, a major greenhouse gas. Land cover change also influences local weather and climate, and reduces **biodiversity**.

Through **satellite** studies, NASA scientists study global vegetation and other land processes to better understand their role in regulating the Earth's climate.

Global Biomass Burning

Biomass burning is the burning of the world's living and dead vegetation for land clearing, land use change and domestic use. Approximately 90 percent of global burning is human initiated; a small percent is the result of lightning. Biomass burning has increased considerably over the last century. Biomass burning is a significant global source of carbon dioxide and methane, the leading greenhouse gases. Burning also produces gases which lead to the production of ozone in the lower atmosphere where it is harmful to living things. Smoke from the burning produces methyl bromide which leads to the depletion of ozone in the stratosphere, and the carbon particles become atmospheric aerosols which can block sunlight.

Natural Changes

Not every change is human-made. Although relatively small in comparison to human factors, natural occurrences also play a role in global change. For example, volcanic eruptions, such as the 1991 eruption of Mount Pinatubo in the Philippines, can inject large quantities of dust, gases and particles (aerosols) into the atmosphere that produce short-term effects similar to climate change. Aerosols from the eruption of Mount Pinatubo cooled global temperatures through 1993. Because eruptions are natural variations in the climate record, studying volcanoes provides valuable information to global climate change researchers.

Conclusion

The adage, "a picture is worth a thousand words," holds especially true for **satellite** data – a global **satellite** "picture" can help scientists "see" the whole Earth and better understand its many interdependent systems. NASA will continue to study the Earth from space, and improve our **satellite** remote sensing abilities, through its ongoing Mission to Planet Earth Program.

On the other hand, the present global trends in the areas of preventing adverse changes and sea level and in the protection of the ecological foundations for sustainable agriculture are not encouraging. However, there is still chance for achieving the goal of 'food and drinking water for all' in this century, because of the uncommon opportunities opened by science and technology (Swaminathan 1996), which means the extreme need for the satellites, especially at the field of water; we pass by the era of the Green Revolution.

Chapter II

A Glance at the world's water through ICT

2.A. Why water?[5]

First, access to water is a right and a basic need. The UN's Committee on Economic, Social and Cultural Rights recently stated;

"The human right to water is indispensable for leading a life in human dignity. It is a prerequisite for the realization of other human rights"

Second, although water is the subject of only one of the goals contained in the Millennium Declaration, it is vital to achieving the others, such as poverty, education and gender equality. To take just three examples: providing segregated toilet facilities in schools is in many societies a pre-condition for the further education of girls; the availability of private toilets and water in-house or close by would make a big difference to the Lives of millions of women; and irrigation is and will increasingly be a prerequisite to increasing food production to feed the growing world population.

Third, water has been underemphasized and neglected in the past, compared to other sectors. The costs of neglect, which are cumulative, are now better understood than in the past.

Fourth, access to clean water and proper sanitation, and attention to wastewater disposal and treatment, has proven benefits to public health. Poor water and

[5] **Report of the World Panel on Financing Water Infrastructure**
CHAIRED BY MICHEL CAMDESSUS REPORT WRITTEN BY JAMES WINPENNY

sanitation is an important cause of diseases such as diarrhea (4 bn cases each year, with 2.2 mn deaths), intestinal worms (affecting 10% of the population of the developing world) blindness from trachoma (6 mn cases), cholera (where there have been 90 separate outbreaks since 1996) and schistosomiasis (200 mn people infected).2 Carrying water long distances and waiting at water sources wastes the energy and time particularly of women and children, at the expense of family activities, education and productive work.

Fifth, effective water resources development and management are basic to sustainable growth and poverty reduction, in several ways. Broad-based water resources interventions such as major infrastructure provide national, regional, and local benefits from which all people, including the poor, can gain. Because it is usually the poor who live in degraded landscapes, interventions aimed at improving catchments quality and provide livelihoods for the poor are of major importance. Broad-based water service interventions (aimed at improving the performance of water supply and energy utilities, user associations and irrigation departments) benefit everyone, including the poor. Finally, water service interventions (such as water and sanitation and irrigation services for the un-served poor) play a major role in reaching some of the MDGs.

2.B.Water for our future: what are the trends? [6]

In a world experiencing great population growth and ever increasing water use, our concern about the future is very understandable.

Global trends are not optimistic, and show increasing environmental, social, and economic difficulties as a result of the many competing pressures on our natural resources. The themes chosen this year for World Water Day and World

[6] **Information based on the *UN World Water Development Report* (UN/WWAP), *Our Future Climate* (WMO), *Vital Water Graphics* (UNEP)**

Meteorological Day (22 and 23 March respectively) sound the alarm: both emphasize the future ('Water for the future', 'Our future climate').

What is needed to reach the goals that the international community has set for itself by 2015? What water projections are the scientists making for the the next twenty, fifty years? What are the regions most threatened by water stress? What are the likely impacts of climate change on water? These are some of the issues raised when we look to the future.

The main pressures

During the past century, the world population has tripled, and water use has increased six-fold. These changes have come at great environmental cost: half the wetlands have disappeared during the 20th century, some rivers don't reach the sea anymore, and 20% of freshwater fish are endangered.

These environmental consequences also entail social and economic costs. While agriculture uses more and more water every year, to meet the food demands of a growing population, other users are competing for the same water: more people means more energy required, and more hydropower. Industrialization, especially in the Western world, has had serious, and often negative, effects on water quality; currently, global markets move the most polluting industries to the developing countries, usually near cities where population growth and informal settlements already put a lot of pressure on water resources.

In 2020, 60% of the world population will be urban, a concentration that makes urban water infrastructure development an extremely urgent issue. These are but some of the factors influencing the world's water resources, complicated by the fact that they are all interlinked, and can't be approached separately.

Population growth in Asia

2000: 3 700 million inh. (1 350 million urban inh.)

2025: 4 740 million inh. (2 400 million urban inh.)

2050: 5 222 millions inh.

Source: UN Population Division

Population growth in less developed countries

2000: 4 900 million inh.

2025: 6 600 million inh.

2050: 7 700 million inh.

Population growth in more developed countries

2000: 1 193 million inh.

2025: 1 241 million inh.

2050: 1 219 million inh.

Water availability: what are the projections?

By 2050 at least one out of four people is likely to live in countries affected by chronic or recurrent shortages of freshwater.

A number of scenarios have been developed based on the most recent UN population projections :

- according to the most alarming projection: nearly 7 billion in 60 countries will face water scarcity by 2050
- according to the lowest projection: under 2 billion people in 48 countries will face water scarcity by 2050

Water scarcity won't hit all regions the same way:

- Over the next two decades, population increases and growing demands are projected to push all the West Asian countries into water scarcity conditions.

- North and Sub-Saharan Africa are the other regions most threatened: by the year 2025, it is estimated that nearly 230 million Africans will be facing water scarcity, and 460 million will live in water-stressed countries.

Water availability

According to the World Water Development Report, the poorest countries in terms of water availability are:

Kuwait (where 10 m³ is available per person each year)
Gaza Strip (52 m³)
United Arab Emirates (58 m³)
Bahamas (66 m³)
Qatar (94 m³)
Maldives (103 m³)
Libyan Arab Jamahiriya (113 m³)
Saudi Arabia (118 m³)
Malta (129 m³)
Singapore (149 m³)

The impacts of climate change

According to the WMO/United Nations Environment Programme (UNEP) Intergovernmental Panel on Climate Change (IPCC), continued increases of greenhouse gases will cause the global mean temperature to rise from1.4 to 5.8°C and the sea level to rise from 9 to 88 cm by the end of the century compared to 1990 levels. Climate change actually accounts for about 20% of the global increase in water scarcity - countries that already suffer from water shortages will be hardest hit.
If we don't change our habits, climate change will increasingly have impressive environmental, social and economic impacts and costs. For example:

- Food security: The most probable effect of a significant increase in global temperature will be a general reduction in potential crop yield in most tropical and subtropical regions. Arid lands may be the most affected, as the vegetation there is sensitive to small changes in climate.

- Extreme events: Droughts and floods will grow in intensity. Heavy precipitation events will also lead to more frequent landslide, avalanche and mudslide damage. Some coastal cities will be threatened by flooding.

- Health: tropical diseases will be found at increasingly higher latitudes. Disease vectors, such as mosquitoes, and water-borne pathogens (poorer water quality, food availability and quality) will be subject to changes.

- Ecosystems: While some species may increase in abundance or range, climate change will increase existing extinction risks of some more vulnerable species and lead to a consequent loss of biodiversity.

- Urgent action is needed: the 2015 goals

In order to reverse these negative trends, the international community has defined certain water targets to be reached by 2015. Among the first priorities is the access to water supply and sanitation: these human basic needs are prerequisites for moving towards a sustainable use of our resources, and thus to controlling the negative impacts of human beings on our environment.

Immense efforts will be needed in order to achieve these goals:

- reaching the Millennium Development Goal on access to water supply ('reduce by half the proportion of people without sustainable access to safe drinking water by 2015') means giving access to clean water to an additional 274,00 people each day.

- The equivalent target in the sanitation domain, issued from the World Summit on Sustainable Development ('reduce by half the proportion of people without access to sanitation by 2015'), means giving access to proper toilets to an additional 342,000 people each day.

Attaining these targets has an enormous cost, which will probably be one of the most important challenges that the international community will have to face over the next 15 years.

2.C. The Nile, not just a river in Egypt: [7]

'All of Egypt is the gift of the Nile.'

Spoken over 2000 years ago by the Greek historian Herodotus, these words remind us of the fascination the Nile River has long held for us. The longest river in the world, it flows through 10 African countries, bringing water and life to millions of people. It is both a vector of life, and a model of partnership and sharing.

Before air travel gave easy international access, rivers were the major transportation arteries, carrying goods and produce to cities developing on their banks. The Nile provided trade, stimulated economic growth, allowed Egypt to develop. The papyrus reeds growing on the river's banks were turned into paper, baskets, boats and sandals. Every year, the Nile would flood, allowing Egyptians to build irrigation channels to carry water into the fields. The rich black mud formed by the flood waters revitalized the soil and enriched agricultural production.

[7] ©UNESCO; Dominique Roger. Egypt

Later, the Nile, still just as essential to everyday life, became a cultural site as well, an area for recreation and sailing. Today, the construction of dams, particularly the Aswan High Dam, has allowed a year-round supply of water.

But Egypt not just a Nile, it is more than this.

As the Egyptian Environment is a very rich one,

Although Environment in Egypt faces some challenges; such as, The information systems and multidisciplinary expertise required for environmental management in Egypt is still being developed, In addition, the implementation of sustainable development principles generates new tasks to further establish and practically address the links between environment, demography, economics and society. On the regional and global fronts, the Egyptian portfolio is expanding with opportunities and challenges that compound national responsibilities and place additional demands for know-hoe and technology on the Egyptian agenda. Financial resource mobilization is a vital challenge to the sustainability of environmental initiatives.

So In the few next lines we will try to give a simple preview of some Egyptian ministries involved in the Environmental field, Biodiversity and ICT.

Chapter III

Egypt through the Environmental Era

3.A. Integrating Environment and Development in Decision-Making:[8]

Decision-Making: The Cabinet of Ministers is the coordinating body regarding national policies and decision making. The Egyptian Environmental Affairs Agency (EEAA) in cooperation with all government bodies is working to implement Agenda 21 chapters and integrating environment and development in decision-making.

Programmes and Projects: Integrating the sense of ecologically rational management of natural resources and social development while achieving desired economic growth, represents the objective of the Ministry of State for Environmental Affairs and its executive arm, the EEAA. This also represents a challenge for other Government entities and the nation at wide. The environmental policy of the Government of Egypt seeks to implement laws for the protection of the environment through developing institutional and legislative frameworks at national, regional and local levels. The environmental policy in Egypt hinges upon seven directives stated as follows:

§ Strengthening partnerships at the national level;
§ Supporting bilateral and international partnerships;
§ Enforcing Law4/1994 for the protection of the environment and Law 102/1983 for Natural Protectorates and all other environmental legislations;
§ Supporting institutional strengthening and capacity building at the EEAA audits regional branch offices;
§ Promoting integrated environmental management systems;
§ Integrating the use of market-based instruments in the field of environmental

[8] Egypt Country Profile

protection; and

§ Promoting the transfer and adaptation of environmentally friendly technologies.

Programmes are in place to integrate the environmental dimension into the national planning and development policies, and to provide support for institutions working in the environmental field. The updating of the National Environmental Action Plan (NEAP) has been initiated in 1999. An implementation component of the NEAP is expected to propose a number of well designed programmes and projects responding to the needs of sustaining environmental resources at the level of Governorates. Capacity building and resource mobilization are two other components of this plan.

Status: The Environmental Protection Law issued in 1994 is currently enforced. The law provides for the use of environmental management mechanisms, which include command and control measures such as the setting of appropriate standards, the application of the polluter pays principle (through the implementation of penalties and fines) and the use of environmental impact assessments (EIAs).

A draft National Agenda 21 was prepared which defines the roles of the various government agencies within the framework of the Earth Summit with a view to avoiding overlap of responsibilities. Environmental units are established in sector ministries and at the local government level which coordinate with the national body, the EEAA. A number of pilot projects are already being implemented at the local level. To further enhance the decentralization of environmental management, EEAA is currently in the process of establishing regional branch offices to cover the various Egyptian governorates. The branches are in different phases of completion. The NEAPhas initiated a number of local partnerships through an extensive series of training programmes and workshops.

NEAP also supported local environmental initiatives varying from tree-planting to preservation and development of Wadi Degla near Cairo. Small business

involvement is also promoted to take part in implementing the national action plan.

At the Governorate level, a number of Governorate Environmental Action Plans (GEAP) has been prepared based on a wide scale consultation process with governmental and non-governmental stakeholders. The GEAP experience served as a valuable input to emphasize the linkage between social management, economical development and environmental pollution. Five Governorates have completed GEAPs. In 1997, together with C21 Programme launched a process to update its NEAP. It is anticipated that the NEAP will include an assessment of environmental priorities and management programmes required to address emerging challenges within the context of globalization and its impact on the Egyptian economy and social structure.

Capacity-Building, Education, Training and Awareness-Raising: Within the NEAP framework, particular attention is given to training programmes targeting all stakeholders, both at the local and national levels with the aim of developing the ability to participate in the definition of environmental concern and solutions. Training and education, representing cross cutting, are included as components within all environmental initiatives. This is emphasized within the Ministry of State for Environmental Affairs efforts toward decentralization of environmental management. During 1999/2000, the MSEA supported the “Green Corner Initiative” which is implemented under the auspices of H.E. Mrs Susan Mubarak. The initiative targets selected schools and libraries in six Governorates and relies on techniques and interactive tools designed specifically for younger generations with the age group 7-15. During 1999/2000, capacity building activities targeting EEAA staff members included both local and overseas training and participation in overseas environmental courses. A total of 12 staff members received training in the following fields:

§ Environmental management;

§ Air pollution technologies;

§ Industrial wastewater treatment technologies;
§ Municipal wastewater treatment technologies;
§ Environmentally compatible technologies for the pulp and paper industries;
§ Natural resource evaluation;
§ Solid waste management; and
§ Environmental technologies.

Challenges: see page 33

Information: Currently in process as well are the Environmental Information and Monitoring Program (EIMP) and the Egyptian Environmental Information System (EEIS) Project, which will assist GOE decision-makers to formulate and implement timely and appropriate environmental policies, legislation and programs.
Research and Technologies: No information available.

Financing: The Environmental Protection Law provides for the creation of an environmental protection and development fund to be managed by the EEAA. This fund's objectives are to support demonstration and pilot projects, address environmental disasters, assist environmental research and training, and support environmental promotion activities. It will be financed through state budget allocations, the tourism and environment fund, income from natural protectorates, penalties, fines and charges, and contributions from donors. The Social Fund for Development also provides social loans for projects where environmental and social dimensions are considered.
International development agencies are contributing in some environmental protection projects.

Cooperation: Implementation of environmental policy in Egypt relies on a number of cooperation agreements and protocols with international and national partners. Within this scope, the MSEA/EEAA undertakes facilitating, coordinating and/or

implementing roles. Environmental programmes implemented with international partners are designed and implemented with a number of line ministries and Governorates where the MSEA/EEAA plays the role of the national focal point. The MSEA/EEAA also includes within its structure the Departments for International Affairs and Technical Cooperation. The former coordinates technical aspects related to multilateral environmental agreements in close cooperation with the Ministry of Foreign Affairs. The latter undertakes the technical preparations of bilateral agreements in close cooperation with the Ministry of International Cooperation.

3.B. Protection of the Atmosphere:

Decision-Making: Policies and decision-making regarding the protection of atmosphere is done within two national committees. The first is a ministerial committee formed of: Ministry of State for Environmental Affairs, Ministry of Petroleum, Ministry of Industry and Technological Development, Ministry of Electricity and Energy, and Ministry of Transportation. The second is the National Coordinating Committee for Climate Change and Ozone, which also includes various stakeholders. The Egyptian Environmental Affairs Agency and the Organization for Energy Planning are the central organizations which support the decision making process.

Programmes and Projects: In the Energy and Transportation sector, the following projects have been implemented or under implementation (see chapter 4):

§ Cairo Air Improvement Project;
§ Fuel cell bus demonstration Project;
§ Hybrid-Electric Transportation Bus Project; and
§ Natural gas switching programmes

In the Energy sector and with respect to climate change, Egypt participated in the US country Studies Program in a two-phase program on greenhouse gas inventory refinement and vulnerability and adaptation problems as well as a project funded within the same program on drafting a national climate change action plan. Egypt is also implementing a UNDP/GEF capacity building project on climate change. Starting in 1981, the Ministry of Electricity and Energy elaborated a continuous Programme for rehabilitating old generating units by ones of higher efficiency. In industry and regarding the protection of the ozone layer, Egypt has launched the Egyptian Programme for Protecting the Ozone Layer.

Status: In the energy sector, promotion of renewable energies is currently an adopted policy. Supported by many international donors, 300 MW of wind turbines are under installation and scheduled to be operating by 2003. The New and Renewable Energy Authority (NREA) has prepared a Programme for implementing series of solar thermal power plants. This includes the first Integrated Solar Combined Cycle System (ISCCS) with a 100-150 MW capacity in Kuraymat. This project has a target date of operation during 2004. Natural gas utilization reached 88% of total fuel for all power plants connected to the gas grid. The efficiency of the transmission and distribution systems has been improved through a program for reducing losses within these networks. Between 1981 and 1999, the total losses in the National United Power System declined from 19% to 13.2%. For environmental benefits, all power plants built during the last decade were dual fuel to enable substitution of heavy fuel oil by natural gas.

In industry, ozone depleting substances were banned and the ministerial decree 977/1989 which bans the use of CFCs in the aerosol industry starting from 1990. 34 companies in the foam production sector participated in a program to eliminate and substitute the use of CFCs. The program includes CFC-free technology transfer and training. 20 companies in the refrigeration sector are participating in a program to use CFC-free technologies.10 companies in the solvents sector are in the process of substituting ozone-depleting substances. A

committee was formed to implement the articles of Montreal Protocol regarding the import and use of Ozone Depleting Substances. The Ministry of industry also participated in the national committee on climate change and provided information on the industrial processes which contribute to a large extent in the greenhouse gas emissions like the cement industry, iron & steel, coke…etc. A report was prepared on the national greenhouse gas emissions from industrial processes. To reduce air pollution, several programmes in energy efficiency and energy management were implemented. The programmes focused on improving boilers and furnaces efficiencies, improving steam systems and improving the electric system.

In the transport sector, and through the Cairo Air Improvement Project, fifty municipal busses in Cairo are converted to run on natural gas in Cairo. In addition, 26,000 vehicles, including taxis, have been switched to run on CNG. Currently, the process of inspection and tune-up of more than 4,000 buses of the Greater Cairo public transportation fleet is underway.

As for climate change efforts, Egypt has prepared the first National Action Plan for Climate Change in 1997.

Currently, EEAA is updating the action plan. The efforts done in protecting the atmosphere are mainly hindered by: lack of cleaner technologies; and high investment needed to apply those technologies.

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

§ Training centres established in electricity sector;
§ Comprehensive training programme by Ministry of petroleum;
§ Training energy managers by Organization of Energy Planning (OEP); and
§ Mass media awareness campaigns on energy and environment.

Information: Information on air pollution is available at the EEAA. Air quality monitoring stations are gathering data from different sites and transfer it to laboratories for analysis.

Research and Technologies: The following are the technologies introduced to reduce pollution of the atmosphere.

§ Fuel-cell technology;

§ Hybrid-electric bus;

§ Methane recovery from landfills;

§ Railway electrification;

§ Energy efficient technologies; and

§ Renewable energy sources

Financing: Programmes and projects are financed either through state budget or joint financing between government and an international development bank. Other sources of funding include private sector through BOT/BOOT/BOO systems and foreign grants.

Cooperation: Signed and ratified both the United Nations Framework Convention on Climate Change, on 5 December 1994, and the Montreal Protocol on 2 August 1988. Egypt is currently preparing an update for its national communication on climate change. Egypt has been implementing technical cooperation programmes through bilateral ODA (Official Development Assistance) and other forms of economic cooperation, which includes training programmes related to management of power generation and power transmission facilities, renewable energy, mining and oil refinement technologies as well as energy efficiency improvement.

3.C. Integrated Approach to the Planning and Management of Land Resources:

Decision-Making: No information available.

Programmes and Projects: No information available.

Status: Egypt has undertaken a number of measures to promote sustainable land management. It has developed land-use maps and has plans to curb industrial and urban encroachment on arable lands. Nurseries have been established for the forestation of new roads, improvement of existing plantings along roads, and for the establishment and maintenance of gardens. Areas of sand dunes are also being stabilized through tree planting.

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.

3.D. Combating Deforestation:

Decision-Making: The Ministry of Agriculture has responsibility for forest resources, which are limited due to the countries arid, dry North African climate.

Programmes and Projects: The El Kasr Project is a pilot project, implemented in a region near the City of Marsa Matrouh, which aims at desertification abatement and the sustainable development of the region through community participation with the residing bedouins.

Status: Internationally, Egypt fully supports all initiatives to combat desertification and conservation of the existing forest resources of the world.

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.

3.E. Management Fragile Ecosystems: Combating Desertification and Drought:

Decision-Making: Egypt's efforts to combat desertification started in an early stage and were mainly led by the Ministry of Agriculture. A National Coordinating Committee (NCC) was established in response to the adoption of UNCCD requirements. The NCC is currently headed by the deputy Prime Minister, Minister of Agriculture and with membership of representatives from the Ministries of Water Resources and Irrigation, Local Development, Planning and Foreign Affairs. Membership also includes representatives from the Parliament, scientific community, private sector and NGOs.

Programmes and Projects: The National Action Plan for Combating Desertification is currently being prepared. It includes:

- Identification of stakeholders and increasing awareness; and
- Initiating a system of communication for data exchange between Stakeholders and integrate the current projects being implemented with the mainstream objectives and action of the NAP.

Several accomplished, current and planned projects were reported in Egypt's report to COP4 including:

- El-Qasr rural development project in the North West coast;
- Integrated soil and water improvement project;
- Shorouk rural development project;

- Water and sustainable agriculture development in Siwa;
- South Valley development project; and
- Identification and monitoring of sand dunes

Status: The national strategy to combat desertification stipulated some of the following policies:

- Increasing the efficiency of using the available water resources;
- Conserving the fertile land resources, reclaiming the degraded land to restore its production and placing more land in the production system; and
- Supporting the agriculture research

The following are some of the projects related to combating desertification:

1) *Modernization of the Egyptian agriculture in the Nile Valley and Delta* - This project is aimed at enhancing agricultural productivity, prioritizing technologies related to efficient irrigation, raising awareness and improving socio-economic services.

2) Sustainable resource management of the North West coastal zone - Integrating the population in developing the area by increasing the water harvesting, storage and efficient water use. Build public awareness and capacity and develop replication strategy so that the project activities could be extended to other ecosystems in Egypt and other countries.

3) Alternative management of resources in the Oasis - Special attention would be given to the eminent threat posed by the encroaching and dunes, indigenous crops and vegetables will be used as raw materials for a profitable food processing industry and indicators would be used to quantify and assess the achieved outcomes.

4) Identification, monitoring and stabilization of sand dunes - Vulnerable regions in the country are: western portion of Aswan. Settlements of El Farafra and El Dakhla Oasis, Nile Valley between Minya and Assiut, human settlements in the

northern delta region and the newly constructed El Salam Canal and Kantra-Rafah rail road in Sinai. The project would establish a national system for combating the adverse effects of dunes comprising:
a) Validation of past Egyptian experience. b) Undertaking interdisciplinary space imagery to show dune characteristics, c) defining appropriate methods and procedures, d) establishing an early warning system and e) defining a reference code for environmental impact assessment.

5) A forestation in Egypt - The general objectives if the projects are: conserving the fertile land against erosion, providing raw materials and additional source for people ion rural areas. Improve microclimate condit ions and sequestering of CO2, propagating endangered plant species in national parks, and strengthening the linkage between relevant stockholders.

6) Desertification Information System - The objectives of this project are: establishing a national network to share data and Information among stakeholders, defining a set of standard methodologies and procedures that would provide a reference framework to identify priority areas, satisfying the needs of policy makers and local community in terms of dynamic scenarios and impact assessment in several domains, improving the efficiency if NAP by improving the quantity and quality of needed information, and developing and adopting sets of baseline data and indicators to asses progress of implementation of NAP.
It has to be mentioned though, that global commitment to combating desertification has been much delayed.

Financing of projects represents major impedance to developing countries, including Egypt, to implement programmes. Moreover, regional cooperation to this end remains ineffective in identifying long-term solutions and a range of alternatives that can be locally adapted.

Establishing the link between combating desertification and poverty reduction is an urgent priority for countries suffering from desertification, particularly in African region. There is a critical need to demonstrate successful practices related to rain-fed agriculture, management of dry land and sand dunes. The weakness of global and regional mechanisms designed to address desertification needs to be addressed as a first step toward effective implementation of such a vision.

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

Information: No information available.

Research and Technologies: A strong scientific establishment in the universities and research institutions (such as Agricultural Research Centre) supported the research needs of the agricultural development of Egypt. Three illustrative examples could be given to demonstrate this important contribution:

- Soil testing was adopted as a basis for effective and rational fertilizer recommendations;
- Integrated pest management was introduced to increase yield and minimize pollution;
- Remote sensing was utilized to assess land capability, monitor sand dune movements and determine the extent of urban encroachment on cultivated lands.

Expansion of the use of drip irrigation and water conservation technologies in new reclaimed lands.

Financing: No information available.

Cooperation: Egypt ratified the International Convention to Combat Desertification in Countries Experiencing

Drought and/or Desertification Particularly in Africa on 7/7/95

3.F. Management 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.

3.G. Promoting Sustainable Agricultural and Rural Development:

Decision-Making: The Cabinet of Ministers coordinates activities of all ministries in Egypt and set-up national development policies. The Ministry of Agriculture and Land Reclamation is responsible for promoting sustainable agriculture. A strategy is being implemented by the Ministry of Agriculture to promote and encourage sustainable farming practices and technologies. The Ministry of Local

Development is involved in development of rural areas. Other ministries are also involved in rural development.

Programmes and Projects: The Ministry of Agriculture is developing agriculture extension programmes that are timely and meet the needs of a growing Egypt amidst a changing global environment. A major focus of the Programme deals with decentralizing planning and implementation of extension programmes for rural development of field crops, horticulture, and the production of animals, poultry and fish in order to make local programmes more accessible and meaningful to farmers. The national action Programme to combat desertification highlights the necessary national mechanisms to manage the irrigated lands, rain-fed lands and range lands. The Government of Egypt plans to reclaim 150,000 acre annually. The treated sewage water has been channeled into desert and has been planted with tree for production of wood. This has been established in 19 locations, which will have positive impacts on environment and agriculture resources. Currently, two major national projects on land reclamation are taking place: Toushka project to cultivate 540,000 Feddan in Upper Egypt and Salam Canal that will add 600,000 new reclaimed Feddan in Sinai. The National Plant Genetic Resources Unit in Egypt was established in 1995 within the Ministry of Agriculture (NPGRU/E). The unit worked out a National Strategy Plan regarding the activities of the unit.

Status: The Ministry of Agriculture has developed a strategy for agriculture development in Egypt, which has the following main objectives:

- Ensure the optimum allocation, utilization of agricultural resources while conserving and improving those resources;
- Better utilization of comparative advantages to increase exports; and
- Create new opportunities for gainful employment in rural areas.

The studies on the impacts of the agricultural economic policy reform Programme on agricultural development in Egypt have shown that Egyptian farmers have been highly responsive to agriculture research findings, agriculture extension,

technology transfer and price incentives. The cultivated area increased from 6.2 million Feddans in 1982 to 8 million Feddans in 1998. The value of plant production increas4ed from LE 3.5 billion in 1982 to LE 41.8 billion in 1998. The total production of fruits increased from 2.6 million tons to 6.5 million tons in 1998.

As for conservation and sustainable utilization of plant genetic resources, the following activities have been finalized or started:

- A National Plant Genetic Resources Committee has been established;
- Country report on plant genetic resources activities in Egypt has been prepared and submitted to FAO;
- The NPGRU gave technical advice to members of the national network;
- Working manuals for germplasm collection, processing, conservation, evaluation and data documentation were prepared; and
- A Plant genetic resources station was established in the North East Coast of Egypt.

Integrated pest management in agriculture (IPM): Recognizing IPM as a valuable component of a sustainable agricultural system, the nationally policy is currently based on the reduction of dependence on agriculture pesticides and enhancement of cultural practices, combined with proved biological and alternative control technologies. A plant protection coordinating steering committee for the recognition and evaluation of IPM components was established in the MOA. The future national development strategy for IPM will focus ion the efficient use if natural enemies, new innovative approaches through molecular biology in the critical identification of pest strains, development of induced resistance plant varieties through biotechnology, the establishment of computerized IPM website and the assessment of pesticide risks and benefits.

Rural energy transition to enhance productivity: Activities in renewable energies are undergoing including projects on solar energy utilization for grain drying, thermal control in greenhouses, evaluation of solar pumping systems and use of

biogas technology. Other applications under study or implementation include the utilization of plastic houses as field solar dryers, use of cotton stalks to produce biomass to produce energy.

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

Information: Information on rural development can be accessed through the IDSC.

Research and Technologies: No information available.

Financing: Most activities in the agriculture sector in Egypt is financed by the private sector. The State budget acts as an extra funding source for major development projects. Loans from foreign development banks as well as private sector in Egypt also participate in rural development programmes. Public participation in financing infrastructure in rural areas provided funds for such projects as in the case of “Shorouk” project.

Cooperation: Cooperation in issues related to sustainable agriculture and rural development is ongoing with several international organizations: IBRD, UNDP, FAO, WFP and UNEP.

3.H. Conservation of Biological Diversity:

Decision-Making: The Cabinet of Ministers is coordinating all efforts and is responsible to develop national policies and strategies. The Egyptian Environmental Affairs Agency, Governorates, Ministries of Tourism, Interior Agriculture, Higher Education and Scientific Research, CITES Management

Secretariat and the coast guards are involved in the protection of biological diversity.

Programmes and Projects: The National Action Plan for Biodiversity Conservation in Egypt represents a major response to Egypt's commitment to 24 regional and international environmental agreements in the field of Biodiversity and nature conservation. The programmes and projects are designed to achieve the following objectives:

§ Develop institutional and human resource capabilities in this field
§ Mobilise national resources for biodiversity conservation
§ Design and implement integrated management systems for natural protectorates
§ Streamline national efforts for nature conservation with global commitment to this end.

The following are brief description of programmes and plans in that field Wetlands Conservation: MedWet Coast Programme. The MedWet Coast programme is a regional initiative aiming at protecting the ecological systems within Mediterranean wetlands and coastal areas. The Programme focuses on three main protected areas of international significance:

§ Zaranik is located along the northern coast of the Sinai Peninsula and composed of salty marches falling to the east of Lake Bardaweel. The area is significant habitat for migratory birds and endangered Mediterranean Sea turtles. The MedWet Coast programme relies on public participation and the development of eco-tourism;
§ Omayed, is located west of Alexandria and accommodating important fauna and flora species. The Programme will primarily support biodiversity studies in the area and the implementation of initiatives to protect endangered species;
§ Lake Barolos is situated along the northern coast of the Nile Delta, and considered among internationally significant wetland areas in the Mediterranean. The Programme aims at developing an integrated management plan for the lake, taking into consideration present and future economic

activities while addressing environmental problems affecting the lake.

Two projects are providing the necessary capacity building component and are the driving force of nature conservation in South Sinai where 40% of then Governorate is presently proclaimed protected areas. Other projects aimed at the conservation of wetlands in the Nile Delta and the Mediterranean coast is under implementation.

Development and management of Wadi Rayan in the western desert is currently in action. Plans are in place along the west coast of the Red Sea that is preparing the entire coastal and marine area as a Marine Park, which on completion will be the second largest Marine Park in the world. A GEF/UNDP assisted project on the conservation and sustainable use of medical plants and development of local knowledge is scheduled to start late 2001.

Legislation for environmental conservation and the protection of the biodiversity has been promulgated in terms of Law 102/1983 for protected areas and Law 4/1994 for the protection of the environment.

Status: 1- With the restructuring of the Egyptian Environment Affairs Agency in 1992, the Nature Protection Department was formed to oversee nature conservation in Egypt, including the implementation of law 102/1983 for the Natural Protectorates and managing the national network of Protected Areas. A total of 21 Protected Areas have been established in Egypt representing a wide range of critical ecosystems. Civil servants and many NGOs are also involved in implementing or disseminating information related to the department action plan.
2a- Due to its strategic geographic location at the juncture of three continents and its diverse habitats, Egypt has rich plant and animal life. The National Biodiversity Country Study inventoried the plant and animal species in the country.

However, because much of the existing information is outdated, field studies are required to assess the current status of Egypt's biological resources. Indications

are that Egypt's biodiversity is being lost at an accelerated rate, with habitat destruction, pollution and over exploitation the main threats to the country's wildlife. For example, based on current trends, unless mitigation measures are taken, Egypt in the next ten to twenty years will stand to lose most of its large animal populations.

2b- To fulfil the country's obligations under the Biodiversity Convention, a National Biodiversity Unit (NBU) was established within the Nature Protection Sector. A workshop on Egypt's biological diversity was held in November 1992, from which a National Biodiversity Action Plan was formulated. The NBU, in cooperation with the scientific community, has since produced a number of landmark studies of Biodiversity, including the National Habitat Diversity Study in 1993 and the National Biodiversity Country Study in 1995. At present the NBU is establishing a National Biodiversity Data Bank to facilitate the monitoring and management of Egypt's biological resources. In 1997 the NBU began development of a National Biodiversity Country Strategy. It is hoped that the Government will be able to raise funds for Biodiversity projects in Egypt, such as those, which have been identified by the National Biodiversity Action Plan. Some of these projects include captive breeding for endangered wildlife, a gene bank to preserve plant and animal genetic resources, and a Natural History Museum to promote biodiversity research and education.

3- Protected Areas have proven to date to be the most important management tool to protect the nations biodiversity. Approximately 8% of the country was protected under law 102/1983, and it is expected that coverage will expand to 15% by the year 2017 by adding another 19 protected areas. The European Community (EC) has been working closely with EEAA (Nature Protection Department) since 1988 in the field of national park management. Collaboration began with the project to develop the management and infrastructure of Ras

Mohammed National Park, and was subsequently expanded to establish a protected area network in South Sinai with Nabq and Abu Galum Protected Areas, St. Katherine protectorate and Taba protectorate.

4- A plan for a national system of protected areas has been developed and the management of these areas will make use of the modern technology such as GIS and remote sensing along with other tools. The local economic value of these protected areas and their contribution to the national economy is being investigated particularly through the development of ecotourism. Plans are also in hand for the establishment of a Natural History Museum, a National Gene Bank and a captive breeding programme for rare and endangered animals destined for re-introduction. A database on Egypt's protected areas, the flora and fauna as well as all the international conventions and protocols Egypt has ratified has been established and maintained

5- Hunting management also plays a role in Egypt's biodiversity strategy. Many different types of hunting take place in Egypt; these are classified as hunting for sport, tourism, subsistence or commercial trade. Hunting has tended to be excessive in Egypt, leading to the depletion of the nations wildlife. Since 1992, Egypt has made significant improvements in hunting management with steps taken to organize sport hunting for game birds, in particular for tourism. To control illegal hunting, a system has been set up to monitor hunting in the desert, and raids have been carried out on shops selling protected species of wildlife. In 1996 a study was conducted with support from DANIDA to explore ways to enhance the implementation of the provisions of Law 4/1994 pertaining to hunting. The study recommended that a hunting management system be devised in Egypt to manage hunting on a sustainable basis with a coordinating body established to oversee implementation of the system. It is important to note here also that there has been considerable improvement in the institutional and legal set-up for the implementation of CITES Convention and the enforcement of related national laws.

Constraints: While gigantic steps towards the conservation of the natural resources are evident, there are still some aspects that need to be improved. The most important of these are those limiting factors that require a great input of financial resources and training. The National Conservation sector lacks the status equal to the task and due to the present low profile, competent, professional and dedicated staff are limited, and due to salary constraints very difficult to recruit. The development of a strong identity for the Conservation Biodiversity Sector will improve the productivity and enhance the support from the private sector. There is a generally low level of environmental awareness in Egypt. The enormous task of public awareness in a large number of populations requires a large staff and a vast increase in the present human and financial resources. Environmental control is limited mainly due to the limited human capacity and low level of environmental awareness. The limited progress in the national conservation education is mainly due to the extreme shortage of staff and the means to produce the necessary material and present a reasonable profile in the media.

The management of some protected areas is limited by a serious lack of appropriate equipment such as boats and moorings in the Red Sea monitoring programmes, or the availability of aircraft to patrol large marine areas. The provision of such equipment would greatly enhance the achievements of the NCS and contribute to the national conservation Programme

Capacity-Building, Education, Training and Awareness-Raising: Two EU funded projects are providing the necessary capacity building component for the rangers in the protected areas in South of Sinai. Different projects within EEAA are providing technical assistance and capacity building for rangers along the Red Sea coast. Visitor centers have been built in 11 of the protected areas (with another 2 under construction), along with access roads and staff accommodation. A training centre for ranger training is now established in Sharm El Sheikh and runs regular national and international training programmes.

Information: The Egyptian Environmental Information System is the main source for environmentally related information. A long term Programme for monitoring coral reefs in the Red Sea is currently being implemented. A national biodiversity data and information system was designed under the Convention on Biological Diversity,

Research and Technologies: Geographic Information System (GIS) and remote sensing are being used to document the natural and ecologically sensitive sites.

Financing: Entrance fees have been introduced in a number of the protected areas to raised revenues for their management.

Cooperation: Egypt signed the Convention on Biological Diversity in 1992 and ratified it in 1994. Its most recent report to the secretariat was submitted in 1997. Egypt ratified the Convention on International Trade in Endangered Species of Wild Fauna and Flora in 1978 and submitted its latest report to the secretariat in 1996. International cooperation is an important component of Egypt's biodiversity strategy. Egypt has signed more than eight international agreements having provisions for nature conservation. To fulfill the country's obligations under the Biodiversity Convention, a National Biodiversity Unit (NBU) was established within the Nature Protection Sector.

At present the NBU is establishing a National Biodiversity Data Bank to facilitate the monitoring and management of Egypt's biological resources. Nature Protection Sector has been active in the conventions and following-up on convention compliance. The Government of Egypt has played a major role in the Biodiversity Convention, and was one of the first countries to sign the agreement in 1992. During the past two years, steps have been taken to improve regulation of international trade in endangered wildlife as obligated under the CITES convention of 1979. Egypt cooperates with a number of international

organizations, including UNEP, the European Union, WWF, IWRB, and Bird life international.

3.I. Environmentally Sound Management of Biotechnology and Transfer of Environmentally Sound Technology, Cooperation and Capacity-Building:

Decision-Making: The National Bio-Safety Committee (NBC) composed of number of institutions is the official body responsible for ensuring that biotechnology continues to be safe and facilitating access to modern biotechnology generated abroad. Every organization involved in the NBC is mandated to establish its own Bio- Safety Committee (IBC).

The NBC is formed of EEAA (representing Ministry of Environment), Ministry of Health, Ministry of Agriculture, Ministry of Industry, Ministry of Trade, Ministry of Foreign Affairs, and the Ministry of Higher Education and Scientific Research.

Programmes and Projects: *Technologies:* Egypt has a programme to promote cleaner production. For example, the Egyptian Environment Affairs Agency (EEAA) will continue to administrate the National Industrial Pollution Prevention Program (NIPPP) to promote low cost pollution prevention measures and cleaner production technologies that will yield environmental and economic benefits for industry. Outputs include replicable demonstration projects in the various sectors. The national Programme for an Environmental Management System (EMS) was instituted to promote ISO 14000 certification; in the course of that program's ongoing activities, EEAA shall develop, within one year, a work plan for assisting industries to formulate and implement the System. The national program for an Environmental Management System (EMS) was instituted to promote ISO 14000 certification; in the course of that programme's ongoing activities, EEAA shall develop, within one year, a plan for assisting industries to formulate and implement the System. Egypt is currently preparing a National Programme for the Promotion of Environmentally Sound Technologies (EST), formulated along the following sectoral lines:

Freshwater resources management; waste and hazardous waste management; manufacturing and chemical processing; energy production; and transportation. Programmes of Action will be provided as soon as the overall programmes are finalized.

Biotechnologies: The Egyptian Environment Affairs Agency (EEAA) has initiated several activities and programs, which cover the approach of environmental management of biotechnology in coordination with other line ministers.
Each IBC is responsible to:
§ Establish a program for inspection;
§ Assemble a set of oriented guidelines that comply with the NBC guidelines;
§ Review periodically r-DNA researches; and
§ Adopt emergency plans covering accidental spills and personal contamination

Status: *Technologies:* Since 1993, a National Ozone layer protection Unit has been fully operational at the EEAA with an established experience record on national and regional levels. A National Ozone panel was also established in partnership with stakeholder ministries and the Federation of Egyptian Industries. The role of the private sector in this regard has also been considered and they are represented in this panel. More than 2400 tons of CFCs have been phased out and the establishment of a Halon bank is underway, so is the implementation of two projects to substitute Methyl Bromide as a fumigant agent. Efforts are ongoing to set up an import and export licensing system that would ensure monitoring, control and reporting of Ozone Depleting Substances consumption to Ozone Secretariat. Resource mobilization for environmentally sound technologies is a critical issue, particularly for small and medium enterprises. A number of projects are designed and implemented to support the SMEs through providing access to credit for pollution abatement activities and the setup of green businesses coupled with disseminating technical know-how. At present, the most present need of the growing Egyptian environmental technology market

is to develop and commercialize advanced environmental technologies to support the local manufacturing sector in this respect. National priorities are related currently to integrated solid waste management and air quality monitoring and pollution abatement technologies.

Biotechnologies: A- As a part of its environmental sector strategy, Egypt has a number of objectives concerning the sustainable management of biotechnology. These include expanding the technologies of biotechnology in afforestation and agriculture, eliminating over dependence on agrochemicals by developing the technologies and production of biological fertilizers, raising public awareness regarding the relative beneficial aspects and safe application of biotechnology to contribute to sustainable development, and improving the technologies of biological treatment of water and wastewater. B- While Egypt ratified the Convention on Biological Diversity and signed Protocol on Bio-safety, current national legislation does not recognize that being a GMO makes an article different, requiring specific declaration, labeling, handling or treatment, while the international market is bound with such products in health care, food, agriculture, raw materials and industry. The Environmental Law in Egypt makes no mention of GMOs, accordingly, domestically produced or imported GMO could be legally released into the environment and consumed by people and animals with neither notification nor labeling. In 2000, The Egyptian Environmental Affairs Agency, with financial support from UNEP, produced a framework for a national bio-safety instrument, including a draft legislation, which has been reviewed by the Ministries of Foreign Affairs and Justice but still needs further review and refinement before it could be sponsored by the Ministry of Environment for legislative consideration.

Capacity-Building, Education, Training and Awareness-Raising: *Technologies:* To facilitate the transfer of ESTs to small and medium sized enterprises, Egypt has a Programme to Strengthen the Industrial Capability to Manage its Environmental Responsibilities. For each category of generators of small

quantities of waste, EEAA will prepare mitigation plans, including photo-processing laboratories, dry-cleaning plants, gasoline stations, etc.
For medium-quantity generators, EEAA will prepare action plans in such areas as metal founding, lead smelters, tanneries and the electroplating industry. *Biotechnologies:* The Agriculture Genetic Engineering Research Institute is providing training for future high caliber scientists in the field to ensure sustainable biotechnology in Egypt.

Information: *Technologies:* Information on cleaner technologies promoted in Egyptian industries is available at the Egyptian Environmental Affairs Agency. Also, the federation of Egyptian Industries is carrying out a project to disseminate cleaner technologies. Information on these technologies and types of targeted industries can be accessed through the Environmental Department at the Federation.

Financing: *Technologies:* The private sector is investing in new and cleaner technologies to increase their profitability while complying with environmental regulations. However, the public sector, now mostly under privatization, is suffering from lack of finance to upgrade the old polluting technologies. It is expected that through the privatization process, those industries will be able to invest in upgrading their old technologies. Few projects are jointly implemented between the Government (represented in EEAA), the industry and an international institution such as the World Bank. Green loans are being provided to industries for implementing pollution abatement projects. The EEAA has also created the Environmental Protection Fund, which allows industry to utilize for pollution abatement with lower interest rates than the commercial loans. *Biotechnologies:* The research efforts made in this filed are mainly covered by the state budget allocated for general research purposes. Private sector is encouraged to invest in research and implementation of new biotechnology applications.

Cooperation: *Technologies/ Biotechnologies:* Several projects are being implemented in industry for pollution control and abatement as a result of several international cooperation agreements.

3.K. Protection of the Oceans, All Kinds of Seas, Including Enclosed Semi-Enclosed Seas, and Coastal Areas and the Protection, Rational Use and Development of their Living Resources:

Decision-Making: The Egyptian Environmental Affairs Agency (EEAA) is responsible for Egypt's Sea and Coastal zone policies (Mediterranean Sea and Red Sea). Different authorities are responsible for the implementation of such policies. Ministry of Defense and EEAA are the main controlling, monitoring and patrolling agencies in Egypt. The Ministry of Transport (Maritime Affair Sector) is responsible for Maritime transport in general and responsible for the implementation of all IMO conventions such as MARPOL 73/78 and
London Dumping Convention, 1990 (OPRC) where EEAA is the Competent State Authority. Tourism Development Authority (TDA), Fisheries Development Authority and Egyptian General Petrol Corporation (EGPC) are among the main users of the coastal zones. Universities and Research Centers are among other authorities that take part in Egypt's decision-making process.

Programmes and Projects: The Framework Programme for Development of a National Integrated Coastal Zone Management (ICZM) Plan for Egypt was prepared in 19996 in which, the major issues confronting the coastal zone were identified. The short-term objectives of the Framework were implemented during the last few years. Now a day, Egypt is implementing the medium term objectives identified by the Framework. A committee for the National Integrated Coastal Zone Management issues was established by a Ministerial Decree 59/1998. A project for preparing an ICZM Plan for the Egyptian Red Sea Coastal and Marine Resources and financed by GEF was carried out in coordination between EEAA,

TDA and Red Sea Governorate (1996- 1999). The updating of the National Oil Spill Contingency Plan (NOSCP) was one of the important (1997 – 1998) joint projects implemented by EEAA.

The NOSCP was merged and presented to all involved authorities in 1998 and it is fully operational now.

Moreover, its mandate was extended to include all kind of marine pollution emergencies but not causality. A continuous Environmental Integrated Monitoring Programme (EIMP) was established in 1997. Currently, the EIMP is operating in full capacity to monitor the air and marine environment at both, the background and the ambient levels. Inspection of Industrial Land-Based sources of marine pollution is maintained through a Central Unit for Industrial Inspection and Compliance in coordination with EEAA Regional Branches and Laboratories.

Biodiversity and the conservation of marine life are by themselves continuous activities, Southern Sinai and the Red Sea protectorates are typical Marine Parks where EEAA implement numerous programmes and projects. They are mainly aiming at the protection of existing ecosystems and maintaining their species composition and rehabilitation of damaged ecosystems.

Status: Two completely different seas, the Mediterranean Sea and the Red Sea, border the Egyptian coastline. Each of them has its specific physico-chemical characteristics, biodiversity, ecosystems and problems. Generally, the hazards threatening the coastline bordering both seas are of the same nature but different in magnitude. The

Red Sea coastline, being more sensitive and diverse in terms of natural resources, is exposed to numerous threats arising from the conflict in the use of its resources, the shipping activities, the non-point sources of pollution and the sporadic development of its shoreline. As a result of different programmes and projects implemented so far, few hot spots and issues were identified. At present, mitigation measures are being implemented, but the expected results are not yet apparent, as it requires some time to detect positive or negative changes.

The coastline bordering Mediterranean Sea is suffering primarily from a chronic erosion problem. Sever pollution problems are observed in very few locations, especially in front of major cities. Such problems are well identifies and mitigation measures were implemented and positive signs began to be apparent. Other less severe problems threatening the Mediterranean Sea coastline is related to shipping activities and sporadic development. An

Integrated Coastal Area management Plan was developed for one stretch in the Mediterranean Sea coastline, Fuka –Matrouh area, in cooperation between EEAA and PAP/RAC of the MAP/UNEP (1992 – 1998). At present, EEAA is in the process of preparation of NPA for the Egyptian side of the Mediterranean Sea and the Red Sea.

Capacity-Building, Education, Training and Awareness-Raising: Capacity building is one of the important issues in protecting Egypt's marine environment. Training of EEAA staff and other stakeholder employees is a key factor to ensure the quality if service provided. This was directed toward Environmental Management, Risk Assessment and Identification, Monitoring and Inspection, etc. Training was carried out as On Job training, through tailor-fit courses, pre-designed courses in competent institutes. Training took place in Egypt, USA, Sweden and Japan. Since 1998, four training courses for Combating Marine Pollution are carried out, on a yearly basis, with the help of one competent educational institute in Egypt, the Arab Academy for Scie nce, Technology and Maritime Affairs. Taking into consideration that protection of the marine environment is a common interest, it was rational to educate other partners and raise their level of awareness toward environmental issues. This was addressed through seminars tailored for specific target groups. The most obvious series was introducing EIA to Tourism Investors Corporations, Bankers and other Governmental bodies. A series of seminars for shoreline cleanup from oily wastes addressed to tourism investors, petroleum companies and other interested groups were organized.

Information: Information and its availability is a crucial issue in environmental management in general. This was well-identified by EEAA. An advanced information system was designed and established in EEAA premises. Data is collected from different projects such as EIMP, NOSCP, and GEF. Moreover, the data is originated from Protectorates and linked to the EEAA information system. Some of the data are accessed from the EEAA Internet web site.

Research and Technologies: Cooperation and coordination in the field of environmental research and technology are encouraged by EEAA. Universities, Research Institutes and lead Governmental Laboratories are integral part of EEAA research facilities. Monitoring programmes are carried out by competent local institutes. Research in the field of mitigation of the impact of oil spills on the coastal and marine environment is carried out by the Local and International Universities and Research Laboratories.

Financing: Financing coastal zone and marine activities is taken over by EEAA through the Egyptian Environmental Fund, the recurrent budget and the investment budget. Some of the activities are jointly financed by donors and the Egyptian Government. Up till now, the mechanism to finance all ICZM Plan activities is not apparent.

Cooperation: Egypt is party to 30 global and regional treaties, conventions and other agreements relating the marine and other aspects of the environment. Two sub-regional agreements with neighboring countries to cooperate and react collectively in case of marine pollution causality. Egypt is very much part of the “global alliance” striving to balance the needs of conservation with the needs of development.

3.J. Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management and Use of Water Resources:

Decision-Making: The Ministry of Water Resources and Irrigation (previously, the Ministry of Public Works and Water Resources) is mandated to control and manage all fresh water resources in Egypt including the surface and subsurface water. In addition to construction, supervision, operation, and maintenance of all the irrigation structures and drainage networks, the Ministry is also responsible for providing all other sectors with their needs of good quality fresh water in due time. The Environment Law No. 4 of 1994 has been issued to protect the environment in Egypt in general. Law No. 4 refers to Law 48 of 1982 for pollution abatement on the water resources in Egypt and mandates the Ministry of Water Resources and Irrigation to implement the law in collaboration with other concerned ministries. Law 12, 1984 is the law governing the management and operation of the irrigation and drainage systems in Egypt.

The Ministry of Water Resources and Irrigation has prepared a National Water Policy till the year 2017 including three main policy themes: 1) Optimal use of available water resources; 2) Water quality protection and pollution abatement; and 3) Development of new water resources in cooperation with the Nile Basin riparian countries.

Various interested or affected individuals, organizations, and government entities took parts in the policy development prior approval by the Miniseries Cabinet and People‘s Assembly. Along the same line the Government completed Land Water Master Plan for the whole country including activities related to water and land use. Through a policy reform Unit with the Ministry of Water Resources and Irrigation had adopted a policy to enhance and promote farmer’s participation in operation and maintenance of canal and drain system, which resulted in the formulation so far of around 5000 water user associations.

Programmes and Projects: The following programs and projects are being implemented as per the National Water Policy till the year 2017:

Optimal use of the available water resources (water management for sustainable development) - Several programs has been carried out by the Ministry of Water Resources and Irrigation to optimize the use of the limited and fixed available fresh water resources. These programs will continue till the year 2017 and have so far completed the:

Improvement of the Irrigation systems on the branch and field canal level in an area of around 400,000 acres in the old land which is expected to result in saving in the irrigation water by 5-10 %; Installation of tile drainage systems in a area of five million acres and rehabilitation of old drainage network in another 1.5 million acres to leach salt from the soil profile and improve the soil fertility; Rehabilitation of irrigation and drainage pumping stations;

Introduction of new varieties as early mature and salt tolerant; and Replacement and Rehabilitation of the existing grand barrages and structure on the Nile and main canals. In the mean time, the government of Egypt intends to reclaim an area of 3.4 million acres to add of the current 8.0 million acres of agriculture lands. The current uses and future plans and needs spatially and temporally are identified and agreed upon through ministerial committees in participatory approach involving all major stakeholders at various levels of the decision making process.

Water quality protection and pollution abatement - Water Quality Status: drainage water in Egypt may be polluted from three main sectors: agriculture, industry, and domestic. Contamination arises from both point and diffuse sources. Inadequate industrial and domestic wastewater treatment plants and the rapid increase of the population and industrial activities have created significant pollution problems with serious health implications. The impacts of pollution are many and diverse but the general picture is the deterioration in the ecological quality of aquatic systems such as phosphorus induced eutrophication and threats to human health and well-beings from nitrates, pathogens, pesticides and other hazardous substances. These pollutants also offset the planned reuse scheme by reducing the amount of drainage water available for reuse for reclamation projects in the

future. Currently the government is reusing around 5 billon cubic meters of agriculture drainage water and 0.5 BCM of treated wastewater. However, the government faces multidimensional challenges in sustaining the current reuse and promoting more drainage water reuse over the next decades. The challenge is to develop pollution control plans that are cost effective, compatible with the state of social and economic development and provide achievable benefits.

The policy theme is realized preventive measures and long-term policies. The preventive measures are carried out through the regular assessment of the water quality status and suitability for various uses in addit ion to laws enforcement to protect water resources against pollution. The Ministry of Water Resources and Irrigation established and operates a National Program of Water Quality Monitoring in the Nile, canals and drains and lake
Nasser. The substantial lab work is carried out by the Central Laboratory for Environmental Quality Management affiliated to National Water Research Center. The monitoring program includes 300 locations for surface water and 230 locations for groundwater. On the other hand, the long term policies to control pollution include: coverage of open conveyance system passing through urban system to closed conduits; coordination committee with other concerned ministries were formulated to put priorities for wastewater treatment plants due to budget limitation; and the introduction of environmentally safe weed control methods (mechanical, biological and manual) and banning the use of chemical herbicides. Subsidies on fertilizers and pesticides were removed and some long lasting effect agricultural chemicals were also banned. Public awareness programs are taking place about the importance conserving Egypt's water resources in terms of quality and quantities.

On the other hand access to safe drinking water and sanitation expected to better protect the water resources from pollution. During the last 20 years 220 wastewater treatment plant were established to increase the potentiality from 1 million m3/day to 8.2 million m3/day (25 lit/day/Person to 110 lit/ day/ person).

With regard to drinking water, 1900 drinking water treatment plants were established to increase the potentiality from 5.8 million m3/day (120 lit/day/person) to 18 million m3/day/person (275 lit/day/person) covering 90% of the population.

Development of new water resources in cooperation with the Nile Basin riparian countries (transboundary issues) -Bilateral cooperation with the River Riparian is carried out through joint agreements to develop the river-shared resources. On the regional scale and recognizing that cooperative development holds the greatest prospect of bringing mutual benefits to the region, the Nile riparian including Egypt took an historic step in the establishment of the Nile Basin Initiative. The Council of Ministers of Water Affairs of the Nile Basin States formally launched the Initiative in February 1999, the Initiative includes all Nile countries and provides an agreed basin-wide framework to fight poverty and promote socio-economic development in the region. The Nile countries seek to realize their Shared Vision through a Strategic Action Program, comprising basin-wide projects, as well as subbasin joint investment projects. The basin-wide Shared Vision Program, a broad based program of collaborative action, exchange of experience, and capacity building. While at the same time, groups of countries - one in the Eastern Nile and another in the Nile Equatorial Lakes region - have identified joint, and mutually beneficial, investment opportunities at the sub-basin level. To raise broader donor support for the Nile Basin Initiative and its portfolio of cooperative projects, a first meeting of the International Consortium for Cooperation on the Nile (ICCON) took place June 26-28, 2001, in Geneva through which the donor community pledged around 140 million USD to support the NBI programs.

Status: No information available.

Capacity Building, Education, Training, and Awareness-Raising: The Ministry of Water Resources and Irrigation accentuate on capacity building, education, and training. Within the last decades around 170 professionals from the National

Water Research Center have completed their master and ph. D. from local and foreign universities in various disciplines in water resources management, irrigation and drainage. The Main Training Center of the Ministry is giving annually 200 courses for around 2500 trainees. A specialized training center was also established to give courses in land drainage due the large size of the National Drainage Program the government is implementing. To strengthen the ministry's capacity for awareness raising program the Water Communication Unit was established. The Unit publishes regular newsletters, media announcements and carry public awareness campaigns to prompt water saving and protection measures.

Information: The Main Information Center (MIC), established in 1994, is responsible for collecting, verifying, and publishing the water resources and supply and demand data. It implements many information systems including irrigation canals attributes, water distributions, and Nile basin rainfall and discharge historical data. The MIC publishes its information through the intranet, and Internet. MIC is currently connecting with different water resources and management regional information centers in the Middle East. Additionally, information, and research findings are disseminated through newsletters, progress reports and via national, regional, and international conferences and seminars. Currently, the cropping pattern is identified by market needs and decided upon solely by farmers. A mechanism is put in place to give early warning about planting time and cropping pattern in all the cultivated lands in Egypt, to help match the supply with actual demand for agriculture. The mechanism is expected to ensure the proper distribution of irrigation water and eliminate water stresses especially in the summer session.

Research and Technologies: Since establishment, the National Water Research Center of the Ministry of Water Resources and Irrigation and its twelve research institutes have carried out mainly applied research and technology transfer that tackle the diverse problems that face the water sector Egypt. Research results

and studies related to integrated water management helped, among other things, identifying the quantity and quality of drainage water in Egypt that could be re-used safely for irrigation; evaluation and adoption of proper improved irrigation systems for old and newly reclaimed areas, the hydraulic design and stability of the new Esna barrage, etc. In tackling these various problems, a multidisciplinary approach was used to ensure the proper coverage of all aspects and successful implementation. On the other hand, local and foreign universities and consulting firms were used where relevant and needed. To support the decision and management process of water system, the use of new technology of GIS and remote sensing are widely adopted along with mathematical models and decision support systems. The ministry and the research center are support by a central library with strong links to other relevant libraries and entities to exchange research results and findings.

Financing: Government of Egypt through the Ministry of Finance funds all-freshwater programs and projects. Some of the research and water quality monitoring programs are financed jointly by the Government and international donors.

Cooperation: Egypt in involved in many regional and international organizations that coordinate activities and share knowledge and experiences in the field of integrated water management system. Being one of the ten countries sharing the Nile Water, Egypt is member in the Nile Basin Initiative establish in 1999 and also a member is other similar organizations and networks in the Arab and Mediterranean regions.

Future Issues and Challenges Facing the Water Sector:- The water sector in Egypt is facing many challenges including water scarcity and deterioration of water quality due population increase and lack of financial resources.

Fragmentation of water management and lack of awareness about water challenges are also a problem. Further more, technical and financial assistances might be essential at this stage to implement the numerous ambitious programs.
Enhancement of the private sector participation (PSP) in management and operation of the water section Egypt is expected to help facing the above mentioned challenges. However, several models for PSP are yet to be evaluated and tested. Additionally, institutional reform is also needed for water related ministries. Feasibility studies, capacity building and training are key factors to a successful transfer process which turn requires some additional funding.

3.L. Environmentally Sound Management of Toxic Chemicals Including Prevention of Illegal International Traffic in Toxic And Dangerous Products:

Decision-Making: The following agencies are concerned with toxic chemicals policies: Ministry of Industry, Ministry of Agriculture, Ministry of Health, Ministry of Petroleum, Ministry of Interior, Ministry of Electricity.
The Ministry of Environmental Affairs/Egyptian Environmental Affairs Agency is responsible for coordination and follow-up on updating the lists of toxic chemicals.
The Ministry of Agriculture regulates pesticides through the Supreme Committee for Pesticides.
The Ministry of Industry and the Ministry of Labour control industrial chemicals.
The Ministry of Health and Population controls pharmaceuticals. The Ministry of Petroleum controls petrochemicals.
The Ministry of Defense controls chemicals used for military purposes,
And the Ministry of Electricity and Energy controls chemicals used in facilities as well as radio active sources through the Nuclear Energy Authority affiliated with it. EEAA oversees, with the Ministry of Health and Population and other

Ministries, the implementation of the specific section of the Environmental Law 4 that concerns hazardous substances and hazardous wastes. The Customs authority works with competent ministries to control the chemicals trade.

Programmes and Projects: In compliance with the requirements of Agenda 21, Egypt has prepared a National Profile for Chemical Management and submitted it to UNITAR in 2000. In cooperation with the Swiss Government, EEAA has initiated the establishment of an information and management system for the safe handling of hazardous substances. The system includes all hazardous substances imported and locally produced. The system is currently implemented in coordination with the six Ministries indicated in Law 4 as well as the Customs Authority and the Civil Defense Authority. The system aims at setting up an on-line communication network among the aforementioned institutions and EEAA where required information concerning hazardous substances will be available and can be accessed instantaneously. Information on the network includes lists of banned hazardous substances, substances requiring licensing for handling and use, and others that can be handled freely. In addition, guidelines concerning the safe storage, transport and packaging of such substances are available. Also, described the licensing requirements by competent authorities as stipulated in law 4 and its executive regulations. Then system will be fully operational by the end of 2001.

Two poison information centers exist at Alexandria and Ain Shams University Hospitals in Cairo. Some treatment of chronic poisoning is undertaken in the context of occupational health at Cairo University., kasr El Aini, where there is also work on pesticides. Some medical toxicology work is reported to have been initiated at the Universities of Menufeya and Assiut. An emergency medicine ambulances service is operating with radio telephone contact in the Cairo area, and in Alexandria and is planned to be extended to the whole country.

Status: Egypt is a rapidly economically growing country with extensive use of chemicals in a wide spectrum if several sectors. While there is high population density in the cities, a significant proportion of the population lives in rural areas where agrochemicals are extensively used. Toxic chemicals are also widely used in a multitude of small-scale workshops and cottage industries, such as textiles, tanning and metal working, found in every town and urbanized areas throughout the country. A growing number of chemicals are used in the home and surrounding domestic environment. Chemicals are inappropriately handled and often poorly labeled. There is poor awareness among the public about toxic risks of chemicals. Some four million tons of chemicals and chemical products are imported per year into Egypt, representing about 95% of manufactured chemicals found in the country. These chemicals include a wide range of toxic substances such as pesticides, amines, solvents, heavy metals, acids and alkalis. With general lack of effective control on emissions of chemicals to air and water and no adequate toxic waste disposal, there is a potential for major problems from environmental exposure of populations to chemicals.

The storage and transport in urban areas of highly dangerous chemicals create a potential for major chemical disasters, the risks for which have no yet been properly evaluated. Adequate chemical emergency preparedness and response plans do not exist and the rescue and emergency medical services are not trained to deal with chemical incidents.

Pharmaceuticals, which play an important role in heath care, are widely available and increasingly misused; and there is a parallel use of traditional medicines, which are not adequately controlled scientifically, either from the point of view of efficacy or safety.

Unintentionally produced chemicals like the Dioxins and Furans, which are by-products of open burning of municipal and clinical wastes create serious health and environmental problems at dumping sites. Populations may also be exposed to the risk of poisoning by naturally produced chemicals and toxins including plants, scorpions, snakes, and in coastal regions, venomous fish. A variety of

natural products are used in traditional products, e.g. coloring additives to food. The composition of such products is often unknown; no evaluation has been made about health risks and the use of these products is not controlled. The infrastructure for dealing with chemical safety in Egypt is limited. An integrated chemical safety Programme implemented in a coordinated manner among different responsible authorities does not yet exist. Existing control measures are fragmented and do not provide complete coverage for the country. There is often lack of coordination, even within ministries and authorities.

One of the forma bases, the Ministry of Health and Population has established a unit for chemic safety; work has been initiated to survey exposure to chemicals and to prepare a registry of chemical products; to survey chemical incidents; and to develop public awareness on problems of chemicals. The Ministry of Agriculture has excellent laboratory facilities for analysis of chemical contaminants and pesticide residues in food. The use of pesticides in Egypt has been dramatically reduced through advanced integrated pest management programmes (IPM). In 1999, a ministerial decree was issued by the Ministry of Industry, which restricts the handling of 145 toxic substances without permission. A database on hazardous substances and toxic chemicals in industry was established.

The Ministry of industry participated in preparing the work plan for a national strategy for dealing with hazardous wastes and toxic chemicals. Also, it participated in a workshop jointly with the WHO and other ministries to discuss the national Programme on the chemical safety. A ministerial decree to ban the use of asbestos in any new industrial establishments or expansions of existing ones. The use and handling of Asbestos is currently restricted and being substituted with other materials. 80 types of pesticides were banned, including Arsenic, Cadmium and Lead. The National Profile of Chemical Management was recently issued.

Constraints: Egypt shares with many developing countries a lack of adequate capacities and capabilities to achieve sound management of chemicals, these include:

§ Inadequate capabilities to assess the potential toxicity and to control the nature and purity of imported or domestically produced chemicals;
§ Handling of chemicals by inadequately informed or trained personnel, especially operators in small-scale enterprises;
§ Shortage of management skills needed to deal safely with technology transfer and with the storage transport and use or disposal of chemicals;
§ Lack of effective mechanisms for coordinating the work of those responsible for different aspects of chemical safety;
§ Lack of means of coping with chemical accidents, including the treatment of victims and the subsequent rehabilitation of the environment;
§ Inadequate legal framework for the proper management of chemicals and for the implementation and enforcement of regulations for industries; and consumer hazardous substances; and
§ Lack of adequate system and facilities for treatment of hazardous wastes.

Capacity-Building, Education, Training and Awareness-Raising: Workshop on chemical safety joint with World Health Organization was conducted.

Information: The Ministry of Industry is preparing lists of toxic chemicals and banned substances. Information on pesticides is available at the Ministry of Agriculture. A national chemical information system is under establishment.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: In cooperation with UNITAR, Egypt is currently in the initial stages of the PRTR Programme development process during which the involvement of

key stakeholder groups and interested parties is sought and initial Programme objectives are identified. Special emphasis in Egypt is placed on linking the PRTR work to an ongoing effort to establish a national chemicals information system.

3.M. Environmentally Sound Management of Hazardous, Sold and Radioactive Wastes:

Decision-Making: *Hazardous wastes:* The generators of hazardous wastes are responsible for issues related to their field of activity. The Ministry of State for Environmental Affairs/Egyptian Environmental Affairs Agency is working closely with other government entities such as Ministry of Industry, Ministry of Local Development,

Ministry of Health, Ministry of Petroleum, and Ministry of Electricity, Ministry of Agriculture, and Ministry of Interior. Solid wastes: Egyptian Environmental Affairs Agency and Governorates are coordinating activities when dealing with solid waste problems. Radioactive wastes: The nuclear safety authority under the Ministry of Electricity and Energy is responsible for all safety issues regarding handling and disposal of radioactive wastes.

Programmes and Projects: *Hazardous wastes:*

1. Lists of hazardous substances are developed in coordination with six line ministries. The lists are updated and distributed over the interrelated agencies.

These lists will be subject to continuous revision and updating in view of the national and international activities. A project for management and information system for hazardous substances has been established in EEAA and six line ministries (Ministry of Agriculture, Ministry of Industry, Ministry of Health, Ministry of Petroleum, Ministry of Electricity and Ministry of Interior) in addition to civil defence and customs. This project aims at setting up an on-line communication network among the involved ministries and EEAA where information could be

shared and accessed instantaneously. Information on the network include the lists of hazardous substances classified as:

- banned hazardous substances
- Hazardous substances that require licensing for handling and use
- Others than can be handled and used freely

Guidelines concerning safer storage, transport and packaging for these substances are also available. Plans are in place for extension of the network to other concerned bodies and authorities and establishing the necessary linkage between the information available on the network and the national contingency plan for environmental disaster.

2. Through the environmental policy Programme, some guidelines to strength the implementation of the National Law are in place. This includes developing the guiding document for safe storage and handling of hazardous wastes taking into consideration the compatibility issue:

– Licensing and permitting system disposable and others
– Appropriate treatment and disposal technologies
– Characterization and identification of hazardous substances

3. Some projects for establishing integrated system for hazardous wastes are ongoing. This includes:

- Integrated management of industrial wastes in Alexandria, the system will include among its components: construction and operation of treatment and landfill facility.
- Integrated management of industrial solid waste in one of the industrial cities in Giza Governorate (6 October)
- Site selection of the appropriate for landfill of hazardous waste all over Egypt using GIS and providing the technical specialization for preparation and operation.
- An integrated environmental management system in one of the industrial areas in Sharkeya (10th of Ramadan City)

Solid Wastes: Solid waste management has been identified among priorities. A national strategy addressing institutional and financial sustainability of solid waste systems was prepared and currently under implementation.

The strategy is based on a vision to develop Governorate capabilities in this field to ensure that integrated systems are effectively implemented relying on international experience and sustainable technological alternatives. The following are ongoing programmes and projects in the solid waste management:

- privatization of waste management in pilot Governorates
- plans for construction of sanitary landfills in major cities
- Integrated system for management of construction and final demolition waste and site selection
- Production and distribution of construction waste containers
- Rehabilitation of integrated solid waste management in rural villages

A project for selection of the appropriate sites for landfill of municipal solid waste using the GIS system is ongoing, together with provision of the technical guidance for preparation and operation of these sites. The list of hazardous waste of the health care (HC) activities is produced and distributed. Other lists of agriculture, petroleum, and electrical activities are in the final phase of production and issuance. A national strategy for health care wastes is prepared by EEAA in coordination with the Ministry of Health. EEAA in coordination with the Ministry of Health has issued the safe limits of emissions from HC wastes incineration and the guidelines for using sterilization technologies for treatment.

The Ministry of Health and Population is currently implementing a national strategy and Programme for safe management of HCW. A Ministerial Decree for the list of hazardous HCW was issued and a HCW management permitting system has been implemented since 1997.

The national Programme for integrated HC waste management demonstrated safe incineration in Cairo University Hospitals is in operation. A central unit for sterilization of HC waste is also in operation.

Status: *Hazardous wastes:* - Industrial wastes: Industry is the main source for hazardous wastes. The generation of hazardous wastes is not confined to large-scale inductees. Small-scale industry, small workshops, garages and very small production units collectively produce large quantities of hazardous wastes. Their volume is usually difficult to monitor and quantify. Further more, transport services, hospitals, research laboratories and even household are sources sometimes of dangerous materials. The types of hazardous wastes generated from industrial activities in Egypt are varied according to the industrial sector. The main industrial sectors are textiles, chemicals, and pesticides. Fertilizers, petrochemicals, pharmaceuticals, paper and pulp, steel, metallurgical and food. The chemical industry is by far the main source of hazardous wastes in the developed regions in Egypt. Recent estimates have indicated that about 50% of all industrial activity is concentrated in Greater Cairo and about 40% in Alexandria. The rest is in Delta and Upper Egypt, and new cities.

The Ministry of Industry surveyed and documented the solid wastes from industrial activities of the public sector companies and disposal methods of those wastes including the hazardous wastes. Currently, a list of industrial hazardous wastes is being prepared in order to issue a ministerial decree to regulate the handling and disposal of those hazardous wastes according to Basel Convention. Industrial wastes (including hazardous wastes) are generated from about 24,518 establishments distributed nation-wide. Types and impacts of wastes differ according to the activity, technology uses and location of each establishment. A study was conducted to establish a database on heavy metals in industrial wastewater. The study covered 70% of industrial establishments. Greater Cairo has more than 51% of the total industrial activity, followed by Sharkeya Governorate, Alexandria Governorate then the rest of all other Governorates. It is expected that those three Governorates are the greatest generators of industrial wastes. Due to lack of funding, the study was not completed. The current and future activities of the Ministry of Industry include projects on collection and onsite separation of industrial wastes, relocation of lead smelters, tanneries and

textiles from Cairo to new industrial zones, recycle and reuse of industrial wastes, safe landfill of industrial wastes.

Lacking the necessary treatment and disposal facilities, it has frequently been the case that hazardous industrial waste generated by these industries has been disposed in the vicinity of their plants, or in the nearby desert areas or transported to public dump sites mixed with municipal waste, and when improperly land filled , it contaminates the groundwater. Scavengers at dump sites are exposed to serious health hazards when scavenging hazardous substances. The main obstacles impeding the implementation of most of the projects are the lack of funding and lack of trained workers in that field. During 1999, Ministry of Environment initiated a 3 year demonstration project to establish a hazardous waste landfill in the Governorate of Alexandria. The project focuses on the construction of the landfill and mobilizing the participation of large quantity generators across the Governorate.

The completion of the draft national hazardous waste list during 1999 was one of the most significant initiatives implemented. All competent authorities will use this list for better control and safer handling of such wastes.

Healthcare wastes (HCW):- HCW disposed with other municipal wastes had created serious health and environmental problems in Egypt. EEAA in cooperation with the Ministry of Health and Population and Cairo

University had developed a pilot demonstration project for an integrated environmentally sound management of health care wastes. The national Programme for integrated healthcare waste management demonstrated safe incineration at Cairo University Hospitals. Limits for the safe emissions from HCW incinerators will be issued and reviewed.

Solid wastes: The national municipal solid waste strategy was formed and based on a vision to develop governorates capabilities in this field and to ensure that integrated systems are effectively implemented relying on international experience. Nationwide, a landfill Programme was initiated which focuses on

landfill citing, identification of alternative disposal techniques and means of elimination of illegal burning of wastes. Currently,
an assessment of the feasibility of available areas for landfill citing in each Governorate is being carried put using GIS. Privatization Programme of municipal solid waste management is initiated and it started with major cities such as Alexandria. Solid waste management in Egypt is facing institutional and financial barriers. Within the
Governorates, human capacity as well as financial resources are missing or weakly existing.

Capacity-Building, Education, Training and Awareness-Raising: *Hazardous wastes* - Regional training centers are established to extend technical and advisory services to Arab states. Capacity building programmes are being planned to establish the experience among users and producers and regulating bodies. Efforts are underway to institutionalize a national framework for hazardous waste management that will initially focus on the 10th of Ramadan Industrial City. In coordination with the Secretariat of Basel Convention, EEAA has established the Regional Training Centre for transfer of clean technologies and management of hazardous wastes. The centre has been established at the Environmental Mitigation Centre – Cairo University and will provide assistance to the Arab Countries. In cooperation with the United Nation Institute for Training and Research (UNITAR), EEAA is currently developing a Programme for the Pollutant Release Transfer and Register (PRTR) in Alexandria.

Solid wastes: Media campaigns for properly disposal of solid waste. National workshops are planned in cooperation with the Institute for Public -Private Partnership. The workshops promote private sector involvement and allow an exchange of understanding of the significant role private companies can play in solid waste management.

Information: *Hazardous wastes:* Information Management System network on hazardous wastes is the main source for information. *Solid wastes:* Information

about solid wastes is available at the Cleaning authority in Cairo and at the different Governorates.

Research and Technologies: No information available.

Financing: *Hazardous wastes:* Privatization of the management of hazardous waste is providing the necessary financial resources. *Solid wastes:* State budget is covering part of the solid waste management process. The privatization of solid waste management, which is currently taking place, should cover the costs of the SWM.

Cooperation: *Hazardous wastes:* The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal was ratified in 1993. An industrial hazardous waste management plan and implementation Programme is being prepared. In cooperation with Denmark, Egypt will implement a pilot and demonstration projects for the treatment and safe disposal of hazardous wastes, as well as with a pilot project for hospital waste management in Cairo. Switzerland will support the development of a hazardous substance, material information and handling system. EEAA has extended support to the establishment of the Regional Training Centre for Hazardous Waste Management and Trans-boundary Transport located at the Centre for Environmental hazardous Mitigation in Cairo University. *Solid waste:* Cooperation with international bodies is taking place to transfer technologies for waste management.

3.N. 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: Egypt has 46,022 scientists, engineers and technicians engaged in research and experimental development. To improve long term scientific capacity, a number of steps have been taken. These include building awareness and preparedness for emergencies at the local level (APELL); creation of the Environmental Information and Monitoring Programme (EIMP); institutional support to the Egyptian Environmental Affairs Agencies Environmental Information Center, and the Organizational Support Program (OSP) to EEAA (Egyptian Environmental Affairs Agency).

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

3.O. National Mechanisms and International for Capacity-Building in Developing Countries:

Decision-Making: The Ministry of Planning and International Cooperation and the Ministry of Foreign Affairs communicate with different countries on issues related to international cooperation in different fields. The Egyptian Environmental Affairs Agency under the Ministry of Environment also has its international cooperation unit which works closely with Ministry of Foreign Affairs regarding international issues.

Programmes and Projects: Several projects and programmes are being implemented with different international bodies as a result of international and bilateral agreements. Most of the projects focus on capacity building and technical assistance in the areas where local capacity is missing or short.

Status: Egypt is actively seeking to strengthen international cooperation and partnership. An agreement has been signed with the European Union to work with Egypt on capacity building in different areas as well as improving technical capacity. Another agreement was signed with the World Bank, which addresses social and human resources development aspects through the development of a National Social Support Programme for low-income families.

The Egyptian Fund for Technical Cooperation with Africa assisted many African states in building capacity in different professions. More than 6345 Egyptian experts visited different African nations where they usually spend 5 years to transfer knowledge to the host country. The experts were mainly in areas such as: medical care, education, industry, petroleum, agriculture, law and information technology. The Fund is bearing the expenses of those experts and until now, US$ 160 million were spent. In addition to the long term missions that the Fund sponsors, it also provides technical assistance and training in short missions in areas such as: diplomacy, agriculture, water resources, medical lectures, surgery, civil aviation, security, tourism, fisheries, industry and technology development.

Capacity-Building, Education, Training and Awareness-Raising: Training events organized by The Egyptian Fund for Technical Cooperation with Africa reached 220 and the number of trainees were 5032 in different professions. Recently, the Egyptian Fund started the cooperation with international organizations and donors to provide assistance to African nations. Within the Ministry of Foreign Affairs, the Egyptian Fund for Technical

Cooperation with Africa is cooperating with the African states to find solutions for current development challenges.
The Japanese International Cooperation Agency, the Norwegian Agency for Development, the UNDP and the FAO are among those international bodies working in the tertiary cooperation programmes with Egypt and African States.

Information: Information about international cooperation is available at the Ministry of Foreign Affairs.

Research and Technologies: No information available.

Financing: Since Egypt has improved its economy to a fairly good extent; the international cooperation is taking
the shape of mutually funded projects rather than 100% non-refundable loans.

Cooperation: Cooperation with the international community is based on strong relationship and credibility of the Government of Egypt in implementing the development and capacity building projects.

3.p. International Institutional Arrangements:

This issue deals mainly with activities undertaken by the UN System

3.Q. International Legal Instruments and Mechanisms:

Egypt is a Signatory of many agreements and conventions in the field of environmental protection. The following are some selected, “post-Rio” conventions/agreements that Egypt has signed, ratified or entered into

enforcement classified by environmental category. Information on other conventions/agreements is available at the Ministry of Foreign Affairs and the Ministry of State for Environmental Affairs.

Biodiversity

- Convention on Biological Diversity, ratified in 1994.
- Agreement on the Establishment of the Near East Plant Protection Organization, ratified in 1995.

Climate Change

- United Nations Framework Convention on Climate Change, ratified in 1994.
- Kyoto Protocol on Climate Change signed in 1999.

Desertification

- United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, ratified in 1995.

Law of the Sea

- Agreement Relating to the Implementation of part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, signed in 1995

Marine Pollution

- 1996 Protocol Relating to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, signed in 1996.
- Amendment to the Protocol for the Protection of the Mediterranean Sea Against Pollution from Land Based Sources, signed in 1996.
- Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (Jeddah Convention) adopted 1982, in force 1990.

Hazardous Substances and Waste

- Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal, signed in 1996.
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, ratified in 1993.
- Amendment to the Basil Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, signed in 1995.

Oil Pollution

- Protocol of 1992 to Amend the International Convention on Civil Liability for Oil Pollution Damage, 1969, ratified in 1995.
- International Convention on Oil Pollution Preparedness, Response and Cooperation, entered into force in 1996.

Ozone Layer

- Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, ratified in 1993 (London) and 1994 (Copenhagen)

Areas and Biodi ersity

- Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean, signed in 1995.

3. R. Information for Decision-Making:

Decision-Making: The Cabinet of Ministers has established a specific entity that is responsible to collect and analyze information that will support the decision-making process in all government entities. The Information for Decision-Support Centre was established for this specific purpose.

Programmes and Projects: Under the government policy of transparency and provision of information for supporting development decisions, the IDSC is currently implementing 3 main projects in the field of Information Technology. Those are:

Human Resources Development Programme: The objectives of this programmes are to produce cutting-edge IT professionals, leverage the country's comparative advantage in brain-ware and to support the IT industry by providing fresh resources with leading edge technologies.

Decision Support Sectors: The objectives of this programme are to study and analyze major social and economic issues accordingly, provide policy makers with the necessary recommendations that assist in the decision making process and provide necessary information for the policy makers at all standards and helping the executive leadership in all Managerial Support.

Information Society Building Programme: The objective of this programme is to develop a national information system for human resources to help support the decision making process in coordination with other institutional agencies in Egypt and to enhance the work performance in both the governmental sector and the public enterprise sector.

The Environmental Information and Monitoring Programme (EIMP) and the Environmental Information System Project assist GOE decision-makers to formulate and implement timely and appropriate environmental policies, legislation and programs. The Egyptian Environmental Information System (EEIS) produces timely and accurate environmental status reports, used to inform the Cabinet, others in Government and the public. The EEIS is also used to assist in developing environmental projects and policy options, and in monitoring and enforcing compliance with environmental regulation. The Environmental Information and Monitoring Programme consist of five individual projects, namely: institutional support, coastal water monitoring, air pollution monitoring, database on pollution sources, and reference lab.

Status: Planned and implemented programmes have resulted in the following achievements:

- 1.465 IDSC (Governorates information and decision support centres). Established.
- 79 Information systems.
- 1 Governorate home page.
- 213 Internet access point existing at the Governorates
- 45 IT and Computer Science training centres.
- 300,000 Trained person by the training centres.
- 9,100 Trained person representing total workforce in the GIDSC.
- 53 Twenty First century Kids club.

The Ministry of State for Environmental Affairs (MSEA) and its executive agency (EEAA) have made big efforts in the field of environmental information, which led to:

- increasing the capacity and capability of the MSEA and EEAA to make sound decisions regarding environmental protection and management through the implementation of an environmental information system.
- Increasing and enhancing the availability and accessibility of environmental data and information to the MSEA and EEAA from national; government organizations and academic institutions.
- Establishing a sustainable linkage between the MSEA/EEAA and other organizations involved with the environment.
- Developing an Intranet and Internet web sites to connect the MSEA/EEAA a as a National Environmental Information Centre to a variety of stakeholders that will facilitate long-term access and exchange of environmental information.
- Development and implementation of priority initiatives as defined by MSEA to include: hazardous substances management, industrial pollution, contingency planning, impact assessment, environmental indicators, international conventions and protocols and State of the Environment Reporting.

- Establishment of a common environmental database, a meta-base, and data dictionaries to facilitate access and use of the environmental information by the MSEA/EEAA and for external users.
- The development of methodologies and analysis techniques for environmental information that will support the formulation of policy options and decision-making within MSEA/EEAA.
- An operational library and documentation center to support the MSEA/EEAA requirements that would include capability for environmental resource documentation, books, journals, multi-media production, and public awareness and communication functions.
- The implementation of collaborative working agreements between MSEA/EEAA and various government agencies for joint utilization and exchange of environmental information.
- Development of corporate work plan to include human, financial and technical; resource requirements, ensuring the long-term sustainability through the implementation of procedures for acquisition of environmental information, quality standards and maintenance of environmental information.

In recognition of the importance of establishing an information and management system for the identification, registration, categorization and management of hazardous chemicals, MSEA/EEAA developed a comprehensive system for hazardous substances. Efforts were directed towards the collection of data from different sources, which include producers, users, importers, and distributors of chemicals.

The information dissemination component comprises the installation of a computerized network between EEAA and the partner authorities.

Another system was established which aimed to develop a modern national network for ambient air quality, coastal water monitor ing and database of pollution sources. Data are collected using on-line monitors and a variety of sampling equipment. A total of 40 sites covering all Egypt have been selected

through several site visits and site studies. An additional of 10 –20 sites will be used for simplified passive sampling.

Capacity-Building, Education, Training and Awareness-Raising: The Information technology Institute is producing highly trained professionals in the information technology field. It also organizes training courses for the different Government bodies to be able to utilize information for decision making.

Information: Main sources of information on Egypt's development plans are:

- Central Authority for Population Mobilization And Statistics. (CAPMAS)
- Egypt State of Information Service (www.sis.gov.eg)
- Information for Decision Support Centre (www.idsc.gov.eg)

Research and Technologies: All tools and software for Information Technology are being utilized and implemented.

Financing: Financial support for the IDSC is through the state budget.

Cooperation: Cooperation between IDSC and leading universities in IT is ongoing. Some projects are jointly implemented with international intuitions.

From the previous preview of some of our Egyptian Ministries linked by Environment (in somehow), we can simply realize that:-

Responsibilities for issues involving the Egyptian Environment Affairs Agency (EEAA), and the Ministries of hold international cooperation: Foreign Affairs; and Finance. The Egyptian Environment Affairs Agency has an active ongoing cooperation Programme with many donor agencies (e.g. DANIDA Projects on organization support, environment education and training, environmental information and monitoring, ODA, USAID, etc.). Donors provide assistance in priority areas designated in the Environmental Action Plan of Egypt and the Egyptian National Environmental Strategies. Donors provide assistance in priority areas designated in the Environmental Action Plan of Egypt and the Egyptian National Environmental Strategies. The general policy of Egypt for international cooperation in the field of the environment centers on the following main issues:

§ Coordinating the different donor agencies in order to achieve the maximum benefit and avoid duplication of efforts;

§ Ensuring the presence of the element of sustainability in all projects and programmes;

§ Steering cooperation with developed nations to areas where they possess comparative advantages;

§ Maximizing the utilization of indigenous capabilities especially in areas where there are abundant highly qualified national experts;

§ Emphasizing the importance of experience and technology transfer particularly in areas where Egypt may still be considered a newcomer, such as Hazardous Waste Management and Environmental Impact Assessment (EIA);

§ Encouraging capacity building efforts as being an essential component in all cooperation programmes;

§ Developing partnerships and new cooperation patterns that would benefit all parties involved, such as the Gore-Mubarak Partnership between USAID and Egypt, and the Egypt Environmental Initiatives Fund established in cooperation with the Canadian International Development Agency (CIDA) whereby new

innovative participatory relations are established between NGOs and the private sector; and

§ Cooperating with other developing countries in order to benefit from shared experiences, including the initiation of experts' exchange programmes and training courses in the different areas of specialization where the developing country may have a comparative advantage.

According for all these requirements, and strategic plans; No one can deny the vital important for WATER and an Action for Sustainable Water.

Chapter IV

Jump in! Get your feet wet! Make a splash!
Together we can make a difference.

No matter who we are, where we are, and what we do, we are all dependent on water. We need it every day, in so many ways. We need it to stay healthy; we need it for growing food, for transportation, irrigation and industry. We need it for animals and plants, for changing colours and seasons.

2003 is a year of opportunity. It is a year for us to focus our attention on protecting and respecting our water resources, as individuals, communities, countries, and as a global family of concerned citizens [9].

So lets Gather our hands all to build our new Era

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[9] UN ,

Annex i

Table 3.1
Four Perspectives on Population Impacts on the Environment [10]

Adapted from Jolly, 1993

Description	Perspective on Population Growth	Strengths	Weaknesses
Neoclassical Economics			
Economic inefficiencies and market distortions lead to environmental degradation. ***Key:*** allow markets to function properly to solve resource misuse.	Population growth is a neutral variable.	• Relies on prices to send signals to people regarding appropriate resource use. • Emphasizes how humans can use technology and ingenuity to substitute for natural resources	• Ignores wealth distribution effects on people's ability to make choices. • Hard to determine the "proper" cost of using resources. • Downplays the limits in substituting human-made for natural resources.
Natural Science			
A fixed level of natural resources and a growing population lead to environmental degradation. ***Key:*** control population to solve resource misuse.	Population gowth is main driver of environmental degradation.	• Provides carrying capacity concept – brings environment into the analysis. • Emphasizes the importance of scale, of finding an "optimal" population size.	• Downplays human ability to adapt to environmental conditions and to innovate. • Hard to measure carying capacity.

[10] The population-Environment Connection

Description	Perspective on Population Growth	Strengths	Weaknesses
Political Economy/Dependency Theory			
Unequal distribution of resources and/or poverty are causes for both population growth and environmental degradation. ***Key:*** change political systems and alleviate poverty to solve resource misuse.	Population growth and environmental degradation are both outcomes of other forces.	• Focuses on both economic and political systems in which people act. • Shows how more "technical" information may not lead to sustainable practices if social/institutional systems are dysfunctional.	• Discounts carrying capacity or other attributes of environmental context. • Ignores how rapid population growth can exacerbate access to resources even given an equitable system. • Assumes poverty and fertility are linked; recent evidence indicates that fertility can decline without poverty change.
Combination Theory			
Ultimate causes of environmental degradation include poverty, social relations (warfare), distortionary economic and political policies, and polluting technologies. ***Key:*** change economic and/or political systems to resolve resource misuse.	Population growth is an exacerbating factor – not an ultimate cause – of environmental degradation.	• Allows all factors to be considered in analyzing the cause of environmental degradation. • Provides a phased approach to solving resource misuse.	• Gives little guidance on where exactly to look for "root" problems.

Annex ii

Egypt

-(Egypt Country Profile)-

Geopolitical Profile [11]

Strategically located at the busy intersection between Europe, the north-east corner of Africa and western Asia, Egypt has a total land area of about 1 million square kilometers. The country borders Libya in the west, Sudan in the south, and the Gaza strip and Israel in the Northeast. Its coastline is about 2,950 km: 1,000 km on the Mediterranean and 1,950 km on the Red Sea and the Gulf of Aqaba.

The River Nile is Egypt's major source of water. It takes most of its waters from the Blue Nile which rises in the Ethiopian Highlands and unites in Sudan with the White Nile before flowing down to Cairo through the narrow Nile valley for about

[11] UNDP

1,200-km. It then divides into the Rosetta and Damietta branches, which make their way into the Mediterranean, forming Egypt's fertile Delta which has a maximum width of 250 km.

As the Nile is Egypt's source of life, the importance of Egypt's geo-political relations with the other eight riparian countries of the Nile cannot be ignored. As part of its water security strategy, Egypt has built the High Dam at Aswan which, despite its side effects, has proved to be vital for the country.

The majority of Egypt’s 65 million inhabitants are concentrated into about 5% of the country’s land area. This is mostly agrarian land, which is concentrated in the narrow Nile Valley and Delta. The high population density puts a heavy burden on Egypt's infrastructure and services, and has caused massive migration to Cairo and Alexandria, resulting in urban overcrowding.

This explains why Egypt has "turned to its deserts" for expansion, despite the heavy costs involved and the impact on its limited water resources. The most recent of such projects is the "Toshka" mega initiative which aims to reclaim 420,000 hectares in Southern Egypt, by diverting Nile waters from the Toshka overflow basin through a 360-km long canal into the desert. The ultimate goal is to develop arable land for agriculture, create jobs and establish human settlements.

Political System

The Constitution of the Arab Republic of Egypt, adopted in 1971 and amended in 1980, established a democratic system and outlined the role of the public authorities. The Executive power is vested in the Head of State, the President of the Republic, who is nominated by a two-thirds majority of the People's Assembly, and then elected by popular referendum for a six-year term. The President may be re-elected for other subsequent terms. The President

formulates and supervises the implementation of general state policy. He also acts as Supreme Commander of the Armed Forces. The current Head of State is Mohamed Hosny Mubarak, who was re-elected for a fourth six-year term in October 1999.

The Government is the supreme executive and administrative body of the State. It consists of the Council of Ministers, headed by the Prime Minister, who supervises the work of the government. The People's Assembly is the legislative branch of the State. It approves the general policy of the cabinet, new laws, the budget and the development plan. According to the Constitution, the People's Assembly is composed of 444 directly elected members and 10 members appointed by the President, who serve for a term of five years. The Shura Council is Egypt's consultative body, which provides advice and consultation, and proposes new laws and regulations to the People's Assembly.

Judicial authority is exercised through four categories of courts: the Supreme Constitutional Court, which is the highest judicial body, the Court of Cassation, the seven Courts of Appeal in the various Governorates, and the Summary Tribunals in the districts.

The political structure is based on a multi-party system. There are currently 14 active political parties representing various stands across the political spectrum. The National Democratic Party currently holds the majority of seats in the People's Assembly.

Administratively, Egypt is divided into 26 Governorates, each headed by a Governor who is appointed by the President. Within their districts, local government units establish and manage all public utilities, provide services, and designate industrial areas. Local popular councils are elected bodies that work closely with local government administrative units at various levels.

Economic Profile

Egypt's economy mainly relies on four sources of income: tourism, remittances from Egyptians working abroad, revenues from the Suez Canal and oil.

World Bank data suggest that almost 50% of Egypt's GDP in 2000 was generated by the service sector. Tourism which accounted for 4% of GDP in 2000 and is overall the country's largest revenue earner, employing of 2.2 million people, was severely affected by the terrorist attacks on the United States in September 2001.

According to official sources, Egypt's real economic growth has declined from approximately 5% to 2.1% per annum. Independent assessments indicate that GDP growth for 2001/02 will only be 1.5%, which will not be enough to absorb Egypt's growing labour force. However, with inflation rates going down to 4% from a level of 21.9%, family consumption is growing at a per annum rate of 4.5%

Since the 1990s the shift to a free market economy and the adoption of economic reforms and structural adjustment has produced mixed results. Stabilization programmes have been successful, and a series of IMF stand-by agreements along with massive external debt relief helped Egypt improve its macroeconomic performance during the 1990s. Meanwhile fiscal balance, foreign reserves, and external debt have improved compared to the late 1980s.

By mid-1998, however, the pace of structural reform slackened, and lower combined hard currency earnings resulted in pressure on the Egyptian pound, resulting in its devaluation against the US dollar (in May 2002, 1USD=4.60 LE). The impact of such devaluation on the purchasing power of the ordinary Egyptian is yet to be measured.

The streamlining and modernization of Egypt's civil service, through civil sector reform and privatization programmes is ongoing. Layoffs are partly responsible

for the relatively high rate of unemployment, despite national efforts at job creation. The private sector is still not large enough to absorb new entrants into the labor force.

Key Development Indicators		1990	2000	2015
Population Size (in thousands)		51,900	63,771	83,501
Population Growth Rate	Total	1999 – 2000	2000-2015	
		2.06%		1.80%
	Male	2.04%		1.76%
	Female	2.08%		1.83%
Population below poverty line (%)	Total	25%	20%	13%
	Urban	20%	18%	15%
	Rural	29%	21%	9%
GNP/per capita (US Dollars)		$639	$1390	$2517
Ratio of girls to boys in primary education		81%	85%	99%
Life Expectancy	Male	62 years	67 years	72 years
	MaleFemale	66 years	71 years	77 years
Infant mortality rate / 1,000 live births)		68	44	8
Under 5 mortality rate /1,000 live births)		85	54	17
Proportion of children (<5) underweight		10%	4%	0%
Population with access to safe water		73%	87%	100%

Source: Central Agency for Public Mobilisation and Statistics (CAPMAS)

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