

Environment Outlook for the Arab Region

Environment for Development and Human Well-being

Executive summary



This executive summary synthesizes the main findings of the Environment Outlook for the Arab Region: Environment for Development and Human Wellbeing (EOAR) report and was prepared by UNEP, LAS and CEDARE with:

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Arabian Gulf University (AGU), Bahrain
Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD), Syria
Kuwait Institute for Scientific Research (KISR), Kuwait
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Foreword

The world is facing many challenges, and climate change is among the most pressing. It is now an indisputable fact that needs to be dealt with and whose impacts must be managed. For this to happen, developed countries must follow through on their obligations not only to build close ties with developing countries, but also to enable the next generation to enjoy its right to life, especially since some people still regard environmental issues as a luxury only the wealthy can afford, rather than a vital aspect of life itself, intrinsically related to development and a motor for that development.



Environmental issues that are particularly challenging in the Arab region include water management, combating desertification, reducing pollution and rehabilitating degraded coastal areas. We also need to consider other emerging environmental threats such as the increased frequency and intensity of natural disasters.

In this framework, the Council of Arab Ministers Responsible for the Environment (CAMRE) was established in 1987. Since its inception, the Council has approved a number of directives for improving the quality of life and fostering development in the Arab region. It launched the Sustainable Development Initiative in the Arab region, the Arab Ministerial Declaration on Climate Change, and other initiatives to raise public awareness, encourage positive behaviour, strengthen environmental legislation and increase preparedness for natural disasters, especially those due to climate change.

The Council attributes particular importance to the need for the whole of the Arab region to adopt a sustainable lifestyle, and this entails developing, and then implementing, a unified environmental strategy. In its 17th session in 2005, the Council requested that the United Nations Environment Programme (UNEP) prepare a report on the environment outlook for the Arab region, in cooperation with the Council's technical secretariat; the collaborating centres, lead by the Centre for Environment and Development for the Arab Region and Europe (CEDARE); as well as Arab experts from academic institutions, NGOs, the media, regional organizations and other relevant United Nations bodies in the region.

For the last three years, these organizations have been developing the report you see before you. It aims to provide a comprehensive and rigorous scientific assessment of the current situation and what the future holds, reflecting the interaction between environment and society. The report reaffirms the key priorities that have informed policies and initiatives in the Arab region in the past 36 years. It also presents a holistic assessment of how environmental standards, trends and impacts contribute



to serving human welfare and achieving sustainable development. The report includes an analysis of future scenarios to assist decision-makers in taking decisions and developing policies for improving environmental management and making progress towards sustainable development in the region.

The report provides an assessment of the current state of the environment in the Arab region, the reasons leading to this state, and its consequences on the future of human beings. It analyses the impacts of pressures on the environment and how these have changed over the years. It considers the efforts exerted, and the successes achieved, by the Arab region in dealing with these issues. Finally, the report deals with trends for the future and steps to be taken to make it more sustainable. All of these issues are considered from the environmental perspective in an objective, balanced manner.

The report is divided into five main sections: Environment for Development and Human Well-being; State and Trends of the Environment: 1972- 2008; Environmental Change, Human Dimensions; The Outlook - Towards 2015 and Beyond; and Environment for Development: Our Common Future.

Arab leaders have been paying attention to the issues related to the environment and sustainable development. The recent Arab Economic, Social and Development Summit in Kuwait launched the emergency programme for Arab food security and established the foundations for a strategy for water security in the Arab region. It also approved Integrated Water Resource Management as a tool for achieving sustainable development in the Arab region. Within the same framework, the League of Arab States, through its secretariat; the technical secretariats of the ministerial councils; the various Arab federations and specialized organizations; Arab funding institutions; other national, regional and international institutions; the private sector; and civil society organizations, each in its field of work, provides council, support and capacity building in the fields of environment and sustainable development to all Arab countries. The League of Arab States works to promote coordination and cooperation between all parties in all fields to achieve sustainable development, which is the basis of economic and social development, while preserving the environment for future generations.

Amre Moussa

Secretary General, League of Arab States

Preface

The Environment Outlook for the Arab Region (EOAR), requested by the Council of Arab Ministers for Responsible for the Environment (CAMRE), is the first integrated and comprehensive environmental assessment for the region. The report underlines the challenges, trends and the opportunities at a time of rapid population growth: we are likely to see 586 million people living in the region by 2050, up from just over 334 million in 2008. Water scarcity is identified as perhaps the biggest challenge with per capita water availability having declined to just 1 000 m³ per inhabitant per year: this means that Arab countries are now among the most water-scarce in the world.



A further, over-arching challenge in terms of achieving the Millennium Development Goals (MDGs) is climate change which may increase the risk and frequency of natural disasters. Indeed the report suggests that the Arab region will be among the hardest hit by the potential direct and indirect impacts of climate change. These include loss of coastal zones, more severe droughts and desertification, water scarcity, increased groundwater salinity and a surge in epidemics and infectious diseases.

On the positive side, there has been tangible progress in the Arab region, especially since the 1990s, in a variety of areas, notable among these has been the creation of legislative frameworks for environment, the raising of environmental awareness and the region participating actively in the global environmental movement. There are also tremendous opportunities to strengthen the political framework to shape the emergence of a fruitful linkage between the environment, development and human well-being.

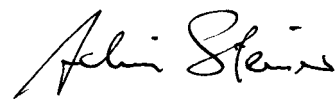
Such strengthening can also better lead to the better utilization of science to inform policy while assisting diversification of economic activity, and to change the development structure by integrating environment into national development plans-- including a Green Economy approach-- as part of a transition to a low carbon, more resource efficient path.

EOAR is an excellent example of cooperation between UNEP and Ministerial fora, such as the CAMRE, in terms of catalyzing concerted efforts to address environmental challenges at the regional and global level. I would like to thank the Secretariat of CAMRE for working closely with UNEP to bring this report to fruition.

I also would like to thank the Centre for Environment and Development for the Arab Region and Europe (CEDARE) for its important partnership role with UNEP in realizing the report. My thanks are also extended to other collaborating centres especially the Arabian Gulf University and the Arab Centre for the studies of Arid Zones and Dry Lands (ACSAD). I would also like to thank



the Norwegian government and the Abu Dhabi Global Environmental Data Initiative (AGEDI) for providing financial support and all the other partners, experts, reviewers and individuals who have contributed to the preparation of this report in one way or another.



Achim Steiner

United Nations Under-Secretary General and Executive
Director, United Nations Environment Programme

Prelude

The Environment Outlook for the Arab Region (EOAR) report can be seen as a large and transparent window from which we can contemplate the state of our Arab environment today. It also provides a glimpse of the future. It has been an honour for us to actively participate in the production of this pioneering report, in close cooperation with our valuable partners from the League of Arab States, the United Nations Environment Programme (UNEP), other regional and international organizations, and a world-class group of experts from the Arab region.

Many messages emerge from the report rooted, as they are, in our current needs and our legitimate expectations. Special focus is based on benefiting from constructive initiatives and success stories, since these are shining examples and a driving force in our Arab region. Our real edge invariably lies in achieving results together, in joint actions to enrich

our accomplishments - and there are many - and in dealing scientifically, practically and collectively with what lies ahead. This bears special significance since this region is blessed with human resources of inestimable value: civil society organizations with their broad influence and popular base; the private sector, a robust motor for development that is driving unprecedented changes in the world today; young people, our secured investment in the bank of the future; and women who are effective partners in decision making.

The slogan “environment for development and human well-being”, adopted by the report, reflects our deep commitment and sense of responsibility towards society and future generations. It also refers to the constructive efforts that continue to be exerted by governments and the Arab peoples to this end, through building qualified leaders, adopting modern technologies, and committing to internationally approved standards.

Likewise, I am pleased that the report addresses a number of concepts and key terms, which form the language of this age, ranging from green economy, green architecture, ecological footprint, renewable energy, sustainable



H.R.H. Prince Turki Bin Nasser Bin Abdulaziz

General President of Meteorology and Environmental Protection

Head of the Executive Office of the Council of Arab Ministers for the Environment

Chairman of the Board of Trustees, Centre for Environment and Development for the Arab Region and Europe (CEDARE)

The Environment Outlook for the Arab Region report was prepared in response to the request of the Council of Arab Ministers Responsible for the Environment (CAMRE) in its 17th session, headed by H.R.H. Prince Turki Bin Nasser Bin Abdulaziz, whose vision and support, in both intellect and action deserve great credit in the realization of this report.



consumption and production, peace and the environment, to environmental security. This report is also a comprehensive and contemporary vision of the most forceful/influential environmental problems that we face. This takes into consideration Arab priorities and common interests, and is based on Arab complementarity, emerging from diversity, and reflecting the vitality of this nation, within a framework of regional and international cooperation.

The interrelated environmental challenges faced by our region are massive. At the same time, they represent attractive opportunities for development. This is particularly important, since today, there is no longer a contradiction between environmental protection and economic development, since solving environmental problems will help remove many of the obstacles hindering development.

In today's "globalizing" world, which does not recognize borders or barriers, we are all partners in facing enormous and growing global challenges. We have to meet these challenges together through progressive thinking, scientific, technological and evidence-based knowledge, and strong determination and confidence. We have to reaffirm our commitment to a unified Arab vision for the environment, in line with global environmental thinking and action. At the same time, this vision must reflect the urgent needs of this vast and cherished homeland, which has blessed us with great wealth and enriched us with the glory of its ancient civilizations.

نادية مكرم عبيد

Nadia Makram Ebeid

Executive Director, Centre for Environment and
Development for the Arab Region and Europe
(CEDARE)

Key Messages



The Arab region is a bridge linking three continents (Africa, Asia and Europe), the crossroads where the first civilizations emerged and the cradle of prophets and divine messages. It is the place that reflects the genius of space and the nobility of time. Through its long history it has been a centre of creativity, coveted by many nations who have fought over its lands. It has suffered, yet still its environment is generous. Today it is suffering more than ever, due to increasing demand on natural resources and pressures that exceed the capacity of the resources to regenerate. This is in

spite of the considerable efforts of governments in the Arab region to pursue development that is environmentally sustainable, to balance economic development on the one hand with the need to maintain a healthy environment on the other, and to act according to sustainable development principles. Despite these efforts, however, social and economic development in the Arab communities has resulted in environmental problems. The environment and ecosystems of countries in the Arab region are in a state of disorder and this represents a threat to social stability and to the safety and well-being of their citizens. The following examples provide a glimpse of the current state of the environment in the Arab region.

Population growth is the greatest challenge for development and environmental sustainability in the Arab region. It must be brought in line with available resources and economic growth potential, so that progress made is not swallowed up by uncontrolled population growth. On the other hand, rational management of the available human resources could offer opportunities for development of the region. Currently, the structure of economic development in the region is not favourable to sustainable development. It is time to rethink economic activities, and to recognize environmental degradation as a cost that limits development opportunities, whereas taking care of the environment brings large economic returns, more than justifying investments in environment and its infrastructure.

- Water scarcity is a big challenge in the Arab region. There has been a worrying decline in per capita water availability: with only 1 000 cubic metres (m³) per inhabitant per year, Arab countries are now among most water-scarce in the world. Water resources suffer from demand pressures, irrational usage, increasing pollution and a dearth of policies and strategies for integrated water management. As a result, concerns for both water and food security in the long run are justified, particularly since water availability per inhabitant is expected to decrease to under 500 m³/year by the year 2025. Such low levels are considered abject water poverty, and 90 per cent of the region's population will live in countries suffering from water

scarcity. Ambitious strategies and action plans must be developed to conserve these valuable resources.

- Unsustainable management of land resources in the region, accompanied by excessive population growth and increased levels of economic and social activity, has led to significant changes in land-use patterns, which in turn makes their sustainability very difficult to accomplish. Cultivated land per inhabitant has decreased by 50 per cent in 2005 from 1980, and forests and grasslands have deteriorated at an alarming rate, rendering still more critical the food security situation. The dangers of drought and desertification still threaten the region.
- Coastal and marine ecosystems, with their resources of inestimable value, strain under pressures from human activities. Pollution, excessive urbanization and unsustainable tourism have irreparably damaged much of the region's coastline, while at sea, overfishing, oil spills and pollution from maritime transport have led to deterioration in fish stocks, the primary source of protein and income in some of the Arab countries. Again, food security is further undermined and coastal communities reliant on fishing face a real risk of impoverishment.
- Biodiversity in the Arab region is declining due to development pressures. In the past thirty years, overexploitation of ecosystems in the region has caused a loss of habitats, especially coastal and wetland habitats. This has caused a decline in numbers and variety in many species, and has changed their natural territorial distribution. There are currently 1 084 endangered species in Arab countries; 24 per cent of these are fish or marine life, 22 per cent are birds and mammals account for a further 20 per cent.
- Climate change represents an additional challenge to those already faced by Arab countries in their efforts to achieve the Millennium Development Goals (MDGs). Climate change could increase the risk and frequency of natural disasters, and we must be prepared for them, with appropriate adaptation and mitigation measures. The Arab region is predicted to be among the hardest hit by the potential direct and indirect impacts of climate change, including loss of coastal zones, more severe droughts and desertification, water scarcity, increased groundwater salinity, and a surge in epidemics and infectious diseases. Agricultural production will be badly affected, with a drop in arable land and vegetation cover and corresponding difficulties in securing food and water, jeopardizing vital economic interests and food security. Migration of people from affected areas to other centres will have social and security implications, and could lead to political crises. All of these factors impact negatively on economic and social stability and development, which cannot bode well for sustainable development.
- In many of the Arab countries, populations tend increasingly to concentrate in urban centres, in cities and metropolises. This has exacerbated differences between rural and urban, rich and poor, formal and informal settlements, and highlighted inequalities in investment allocation for infrastructure and social services. Many large Arab cities have seen expansion in suburban areas, the appearance of informal settlements, scattered poverty spots, environmental degradation and increased vulnerability to natural disasters. In most cases, these cities lack adequate mechanisms and tools for modern urban planning and management.
- There has been tangible progress in the Arab region, especially since the nineties, in different areas of environmental action, notably in creating legislative frameworks for environment, raising

environmental awareness, and participating actively in the global environmental movement. At the same time, however, the challenges of traditional environmental issues have increased and intensified, and new issues have emerged, such as biofuel and its relation to food security, and trafficking in genetically modified organisms and their products. Environmental problems must be resolved more swiftly so as to allow development to proceed unhindered and to deal efficiently with the global environmental agenda.

Most of the environmental problems in the region can be traced back to vulnerability due to human activities. There can be no doubt that a clear understanding of ecosystem potential and carrying capacity, and of the interactions between human activities and these ecosystems, contributes to improved policy responses, which in turn enhance environmental conditions and foster sustainable development. Ecosystem thresholds are difficult to determine. Exceeding these limits lowers their capacity to provide products and services, and overshooting them by a large margin can lead to their irreparable loss.

Development scenarios for the Arab region show clearly the repercussions on the environment and on human wellbeing of pursuing different development approaches. Only one, the 'renaissance' scenario, provides a method for harmonized governance of social, economic and environmental policies, the three pillars of sustainable development. This scenario offers a solution to the current issues of environmental sustainability in the region, including appropriate responses to emerging challenges. With an integrated approach to environmental resource management, the environment can become an engine to promote development. Building up a realistic picture of the environment, and locating human beings within it, ensures that development efforts can focus, as they should, on enhancing the lives of people. For this to happen, a series of measures is needed:

- Integration between environmental and development policies on the national and regional levels, striking a true balance between available resources and human activities. When formulating development policies and programmes, it is important to recognize the interplay between man and his environment and its impact on development, and to use an integrated approach to solving environmental problems.
- Policies aiming to integrate environment in development plans and in the main framework of economic and social development policies need to be adopted in order to achieve sustainable development.
- Mainstream use of environmental economics and the economic cost of resources within environmental policies to achieve sustainable development based on environmental sustainability first.
- More sustainable patterns of consumption and production and a gradual change to a green economy with more efficient resource usage and fewer carbon emissions.
- Adequate mechanisms, including legislation and simplified procedures, to allow the private sector and civil society to share the responsibility and perform their role in partnerships with the public sector to solve environmental problems and manage environmental resources.
- Awareness programmes, education and guidance to foster understanding of the importance of the

environment as a place to live and as a source of resources that is inexhaustible, if used wisely.

- Promote implementation of regional and multilateral environmental agreements, on the regional, national and local levels. Implementation mechanisms include adequate political support as well as financial and human resources to maximize success and control outputs.
- Investment in human resource development and improved policies and governance of environmental resources.
- Adopt policies for regional cooperation and economic, social and environmental integration (water, food security, regional seas, air pollution, waste management, natural disasters, etc.) to foster environmental sustainability and improve the living standards and well-being of people in the region.



Mohamed Fakihy

"Justice is the Foundation of Government"

Introduction

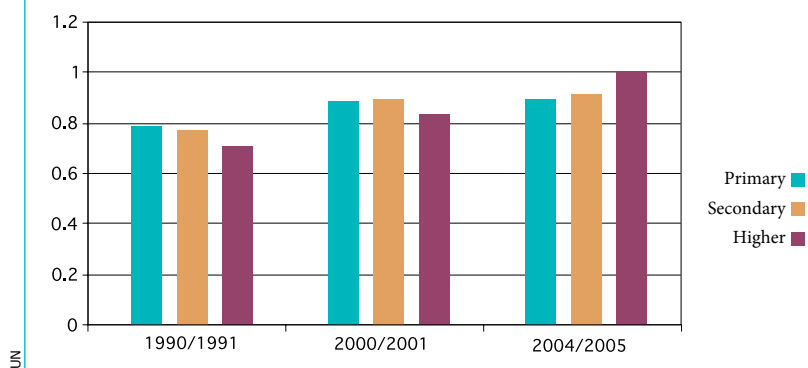
Formal international environmental policy began with the United Nations Conference on the Human Environment in Stockholm in 1972, which integrated environmental issues in the national agenda of many countries, including those of the Arab region.

Since then, environment has become a practical concept related to sustainable social and economic development. However, prolonged overexploitation of environmental resources has had a serious impact on the environment, resulting in deterioration of ecosystems and deepening the roots of environmental problems. Human welfare remains the goal, but it is increasingly more difficult to achieve.

1 Environment and Development

There is a close tie between environment and development. Balanced development leads to maintaining a healthy environment. Development that does not take into consideration the carrying capacity of ecosystems causes environmental degradation, which makes environment a burden on the economy. Conversely, a sound environment supports the economy. At 2.5 per cent to 4.8 per cent of GDP, the direct economic cost of environmental degradation in Arab countries is huge, in many cases exceeding the country's annual economic growth rate. Given the fragility of the ecosystems present in the region, coupled with development policies that have rarely taken into consideration the capacity of the local environment, and the continued use of obsolete manufacturing techniques, it is not surprising that environmental degradation costs in some Arab countries are 50 per cent higher in real terms than the average for developed countries. The population of the Arab region reached 334.5 million in 2008. While it is considered the most important social engine, high population growth brings with it many environmental issues. By 2050, 586 million people are expected to live in the region. If the population increase is managed rationally, it should provide opportunities for development in the region. These numbers are important when considering the current reality and the future horizons of sustainable development. Arab countries have made good progress with tangible results in the fields of human and social development, as many social indicators show, albeit with variations between countries in health and education. However, the majority of the population is still suffering from poverty, largely because poverty reduction interventions have weakened since the nineties. Poverty remains a challenge in achieving sustainable development

Gender parity index for education in the Arab region



in most countries. Unemployment is widespread, and at 13.7 per cent in 2007, more than twice the global average of 5.7 per cent. The region is home to the lowest rates of employment, adult illiteracy levels that reach 30 per cent, significant gender discrimination, wars and conflicts.

Despite poverty and unemployment, the Arab region has witnessed a lot of positive developments, including the adoption of the sustainable development concept. However implementation of sustainable development in the region has been hampered in most cases by the complexity of environmental issues, a sectoral management approach, inadequacies in institutional systems and weakness in resource management. Moreover, environmental institutions are new, and tend to be marginalized in the national political scene for the benefit of other, more high-powered ministries. Private sector, community & NGO participation

in environmental efforts is still poor.

For sustainable development to be achieved, a group of issues must be addressed: institutions charged with development should be restructured so as to fulfil their role more effectively; the social and economic dimensions of development should be addressed to diminish the negative impacts

of environmental degradation; new strategies and programmes aimed at development should adopt a multi-sector approach; and finally a new vision is needed to promote environment as a fundamental pillar for sustainable development, in practice as well as in theory. This vision will present the environment as an invaluable source of products and services that enhance quality of life. Like all resources, environmental products are finite, but promoting environmental sustainability, that is managing the environmental economy wisely, is at the root of a sound national and regional economy. Governments should strive for equity and justice in resource allocation, carefully assessing needs, defining problems, and increasing community participation. Sustained efforts and further investments are needed urgently to improve

The Eight Objectives of the Arab Countries' Sustainable Development Strategy

1. Spread peace and security, ease tension and reduce stocks of weaponry in the Middle East in an equitable way
2. Reduce rates of poverty and unemployment
3. Achieve a fair balance between population growth and the availability of natural resources in the region
4. Combat illiteracy, improve educational curricula and increase scientific research
5. Encourage and strengthen institutions for environment and development, encourage capacity building and environmental citizenship
6. Prevent degradation of natural resources and the environment, actively pursue the sustainable management of these resources to achieve water and food security, preserve ecological resources and combat desertification
7. Upgrade Arab production sectors and promote links between them, adopt cleaner production approaches to foster competitiveness of Arab products in the global market and better prepare for possible industrial and natural disasters
8. Support the private sector and civil society and give prominence to the role of women to guarantee their partnership in implementing sustainable development

governance, enhance decision and policy making, advance democracy and promote human rights. Investments predominantly concern infrastructure and human capital. A technological leap is needed particularly in the fields of education, scientific research and resource exploitation, also to permit full engagement with the international community. Finally, peace and security in the Arab region are prerequisites for sustainable development and for countries to be able to contribute effectively to the world economy and to management of the global environment.

Investments predominantly concern infrastructure and human capital. A technological leap is needed particularly in the fields of education, scientific research and resource exploitation, also to permit full engagement with the international community. Finally, peace and security in the Arab region are prerequisites for sustainable development and for countries to be able to contribute effectively to the world economy and to management of the global environment.

2 Water Resources

Fresh water is the most important natural resource in most Arab countries in terms of value and limitations. Water scarcity is considered the number one developmental, environmental, economic and social challenge in the Arab region. Total renewable water resources in the region are estimated at 262 900 million m³/year, 226



There is an urgent need to merge and integrate agricultural and water policies. These policies have to take many factors into consideration, the most important of which are water availability and scarcity, and the serious consequences of excessive water usage in agriculture and other sectors.

500 million m³ of which is surface water. Of this, over 66 per cent comes from rivers originating beyond the political boundaries of the Arab region. As for groundwater, an estimated 36 300 million m³ is renewable and 11 874 000 million m³ is fossil groundwater. Data on water scarcity and estimates of water reserves concur that most Arab countries suffered water scarcity already in 1990. Water is scarce here compared to other regions, and many Arab countries are among the most water-scarce nations in the world.

Average per capita share of internal renewable water resources is one of the lowest on the planet. Moreover, an estimated 83 million people currently do not have access to safe drinking water and around 96 million people lack basic sanitation. Most of these people live in low-income countries, or countries that are occupied or going through wars and civil conflicts. The total cost of providing water to half the population, an MDG, was estimated at US\$99 870 million, with a further US\$62 000 million

Examples of Integrated Water Resource Management Initiatives in the Arab countries

Rehabilitation of water services in Yemen:

Institutional reform has been carried out for water and sanitation services in Yemen with clearly defined roles and responsibilities. Previously, management of these services had been centralized, without the participation of local authorities and water users. To this end, the National Water Resources Authority is enforcing the Water Law of 2002 to develop, organize and rationalize water resources.



Enforcing water laws in Jordan:

The Ministry of Water Resources and Irrigation adopted a gradual approach, introducing a number of strict laws over the past 15 years, such as prohibiting digging of new wells in depleted groundwater basins and making surveys for groundwater usage. Such measures led to a decrease in extraction between 1993 and 1997.

Raising water awareness in schools and universities in Lebanon:

The United Nations Economic and Social Commission for Western Asia (UN-ESCWA) worked with the United Nations Educational, Scientific and Culture Organization's office in Cairo on two projects to celebrate the International Year of Freshwater in 2003. An art contest was held for primary school children all over Lebanon (age 6-12) in cooperation with the Educational and Social Council and a national newspaper.

for sanitation services. On current trends for population growth and economic development, and factoring in predicted decreases in rainfall and other negative impacts of climate change, experts estimate that the amount of water available per inhabitant in 2025 will halve to 500 m³/person/year.

Groundwater is a main source of water, in some Arab countries accounting for 80 per cent of total reserves. However, overexploitation and contamination from human activities has led to serious depletion and a continuous decline in groundwater levels. This is the case even in the Arab countries that are rich in surface water.

As well as overuse and increased salinity, water resources are threatened by pollution from agriculture, industry and municipal

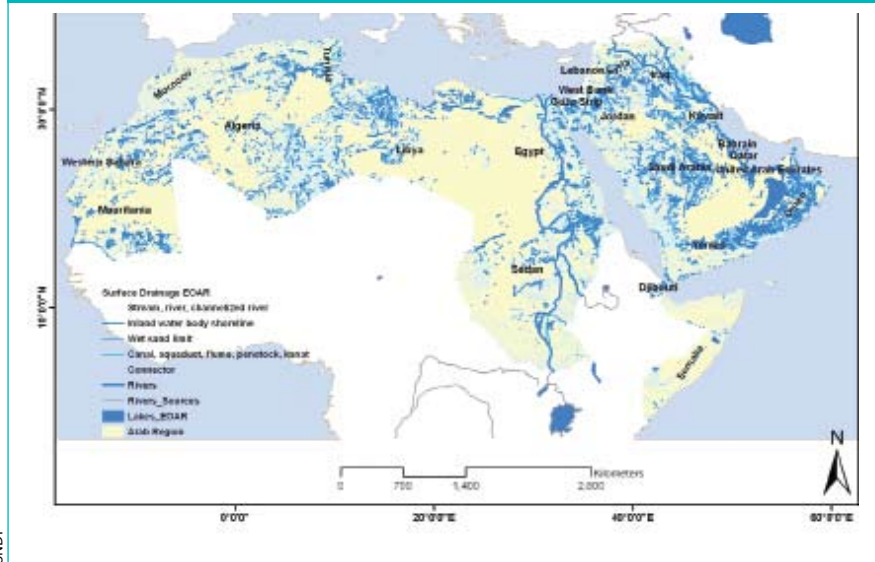
activities. Water resources deteriorated in this way are effectively taken out of the investment cycle, aggravating the deficit in water supply, and increasing the severity of water scarcity, with all that this entails for the health of the population and the region's fragile environment.

To counteract this steady decline in water resources, it has become necessary to turn to desalinated and treated water. However, technical knowledge is still limited and imported from overseas. The Gulf Cooperation Council (GCC) states are the top producers of desalinated seawater or groundwater, accounting for 79 per cent of the total usage in the Arab region. Treatment of sanitary drainage water is increasing and now stands at 10 000 million m³ annually.

Inefficient water management, increased water deficit and continued degradation of water quality have become a feature of Arab countries in recent decades. It would be a wise move to develop and implement strategies for a more socially and economically equitable use of water reserves, to transfer to economies less dependent on water, and to identify alternative water resources for use when non-renewable resources have been depleted.

Environmental, social and economic sustainability requires integrated water resource management to be adopted as a rational approach to face the threats to these vital resources. This approach takes into consideration a broad spectrum of social, economic and biological factors to ensure effective coordination and joint decision making. At the basis of integrated water resource management is cooperation and partnership between all levels, from individuals to institutions. It requires political commitment and high levels of social awareness of the concept and of the need importance food and water security in the long run. Interdependent national and regional policies supporting good governance of water resources is a crucial factor for success. In the framework of sustainable management of water resources, it has become necessary to reconsider Arab agricultural irrigation patterns, which consume 88 per cent of the total amount of water in the region.

Surface drainage in the Arab Region



Sustainable water resource management is a strategic option for dealing with water scarcity issues in the Arab region. Integrated Water Resource Management is considered a main pillar in achieving sustainable development and providing water for all economic and social development needs. The search for technical, economic and environmental options and solutions for water conservation is a responsibility shared equally by governments and communities

Flood irrigation is considered the most water-depleting method and is used in more than 80 per cent of irrigated land. Sprinkler systems, which are more water efficient, are used on 22.8 per cent of the land. Only 2.8 per cent of irrigated land uses drip irrigation techniques, the most efficient of all. Around 50 per cent of water is wasted in the agricultural sector due to primitive irrigation methods. Antiquated irrigation and agricultural methods must be upgraded for reasons of agricultural sustainability and food production, and also to face current and future water scarcity challenges.

A balanced approach is essential between supply and demand management, as is recognition of the intrinsic link between water security and food security. Since the agricultural sector consumes the lion's share of water resources, water policies need to be closely integrated with social and economic policies immediately. There can also be little doubt that management of shared water resources and issues to do with water under occupation are two huge challenges in the Arab region.



3

Land

The surface area of the Arab region is estimated at about 1 406 million hectares (ha), roughly 10.8 per cent of the world's land area. Dry and semi-dry areas account for about 90 per cent of the total area. It is divided into 33 per cent grasslands, 19.1 per cent deserts and 6.6 per cent forests, with arable land making up 14.1 per cent of the total.

In 2005, land devoted to agriculture in the Arab region was estimated at 5.1 per cent of the total area, compared to a global average of 11.9 per cent. Agricultural land per inhabitant is around 0.23 ha, not dissimilar from the worldwide average of 0.24 ha.

Statistics indicate that land use in the Arab region is changing rapidly and continuously due to excessive and unsustainable human activities, leading to a decline in forests and grasslands and an increase in desertification. Population growth over the last twenty-five years has caused the ratio of land to inhabitant to halve, from 8.2 ha per person in 1980 to 4.2 ha in 2007.

Human activities have caused degradation in about 68 per cent of land area. Grasslands per person decreased by 33 per cent between 1980 and 2005, and overgrazing and farming in grasslands has led to a dramatic fall in the number and density of plant species, increased soil erosion, and encroachment of sand dunes. Forest area per inhabitant dropped by 35 per cent in the same period, as a result of logging activities exceeding production capacities, a large number of devastating fires, overgrazing, poor resource management, and urban encroachment. Other contributing factors

include the liberalization of economic policy, unsustainable consumption patterns leading to increasing demand for agricultural commodities and forest and grassland products, and exerting strong pressures on natural resources. These factors have contributed to widening the food gap that now stands at 44 per cent for major grain crops, including fodder.

Declines in rainfall have reduced by a third the land where crops are produced solely with rain, 33 million ha of land, accounting for 70 per cent of the agricultural production in the region. There has been a parallel increase in land dependent on irrigation. Agriculture consumes 88 per cent of available water with irrigation efficiency not exceeding 50 per cent, a clear example of the irrational management of irrigation water.

Better approaches for water usage, adapted to areas of great water stress, are badly needed.



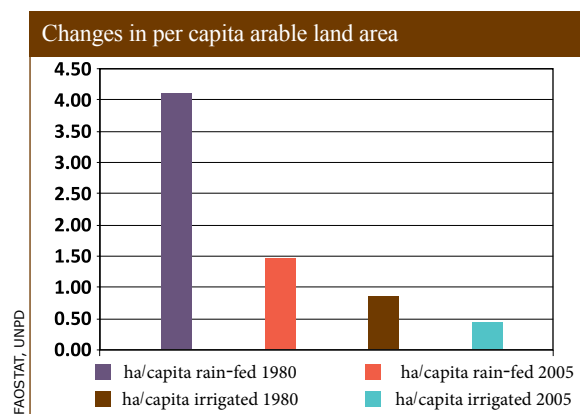
In Sudan, forestry resources declined from 91.5 million hectares in 1980 to 67.5 million hectares in 2005. However, its share of total forest resources in the Arab region increased from 68.5 per cent to 76.7 per cent over the same period because of even more alarming decreases in forestry resources in other countries.

Compounding the water issues, agricultural methods and land management are poor: agricultural land set aside because it is no longer productive has now reached 19 million ha, an indicator of deterioration in agricultural land conditions, largely caused by inappropriate farming techniques.

Overgrazing, over-intensive farming, inefficient irrigation and farming methods, increased animal husbandry, excessive collection of firewood, processes obstructing the growth of indigenous flora, water depletion and unplanned urbanization: all of these factors contribute to land degradation, which takes many forms. Salinity affects about 42 per cent of cultivated lands, wind erosion affects 33 per cent, water erosion 14 per cent, water logging 7 per cent, and reduced fertility and pollution 4 per cent. Soil crusting results in the deterioration of a further 1 per cent of cultivated lands, in addition to the effects of sand dune encroachment.

Strategic Impacts of Biofuel on the Arab Region

It is worth mentioning that many people in Arab circles, including specialists, warn against following the current trend of expanding biofuel crop cultivation at the expense of food crops, because of possible negative effects on food security and the increasing food gap in Arab countries. Those observers believe that Europe and other countries producing in excess of their food needs can justify this, whereas in Arab Countries food shortages and food imports are dominant features. Expanding cultivation of biofuel crops at the expense of food crops could keep Arab countries in a state of complete dependence on foreign imports to meet their food needs, with unfavourable consequences on independence and security. The Arab Ministerial Declaration on Climate Change, issued in Cairo in 2007, referred to the consequences of developed countries encouraging developing countries to cultivate crops for biofuel instead of food. It recommended biofuel production from organic waste.



Changes in arable land per capita in the Arab region between 1980 and 2005

The critical situation of food security in the Arab region, especially in drought years, illustrates the need to adopt an integrated, participatory, multi-user approach for land maintenance, based on knowledge and a profound understanding of land and agricultural production problems. It should be supported by realistic indicators to monitor the status of land resources and the pressures on them, and tools such as Social and Environmental Impact Assessment.

The greatest challenge facing Arab countries today is to sustain and enhance the use of natural resources to improve agricultural production and the living standards of the people. More productive alternatives must be found to current methods of agriculture, grazing and commodity production, in order to guarantee the sustainability of agriculture in the region. It is a responsibility shared by everybody, on all levels.

Agricultural production remains below capacity in the region. Surface irrigation methods are inefficient and need to be upgraded so that the water saved can be used to boost agricultural production and for other purposes. Irrigation



4

Coastal and Marine Environment

The Arab region is blessed with coastlines that stretch for over 22 000 km, embracing a wealth of ecosystems and sumptuous ecological diversity. These natural treasures also contribute significantly to economic growth. Like any other habitats, coasts are exposed to threats and pressures from human - and especially industrial - activities, notably oil exploration and processing, industries situated along the coast, and remnants of maritime transport. Pollution from maritime transportation poses a continuous threat to the seas in Arab region due to the amounts of oil transported across them: 60 per cent of world oil imports cross the Strait of Hormuz, for example. In many countries, coastal pollution is caused by activities associated with oil

exploration and industries discharging waste into the sea. Seawater desalination plants intensify the impacts of industrial pollution and are very numerous in the region: there are at least 68 seawater desalination plants on the coasts of the GCC, producing 43 per cent of the world's desalinated water. In recent years, fish mortality has been observed around some coasts in the region, as has eutrophication in the sea, in coastal areas, and in lakes connected to the sea. Coastal development, including continuous urban expansion, new ports, refineries and desalination plants, has further increased the risks of coastal and coastal lake pollution.

Human activities have led to the deterioration of many coastal lakes, dramatically reducing their surface area over the past decades. As a result, these ecosystems are no longer able to provide people with their services, the environment has been degraded and

The possible impact of sea level rise on the coast of the Kingdom of Bahrain

The Kingdom of Bahrain is an archipelago of small islands that could lose large areas of land due to a rise in sea level. More than 10 per cent (80 km²) of the total area of these islands lies at only 0.5 m above sea level. Two thirds of the population (that reached 650 604 people in 2001) live within 2 km of the coast. Consequently any rise in sea level above current levels is considered a tangible threat on Bahraini resources due to its natural low-lying geography and infilling activities implemented over recent years. Vital infrastructure such as roads, highways, factories and tourist facilities are located in these areas, as are many economic activities such as hotels, resorts and industrial zones.



The low-lying nature of the coastal zones in the Bahrain Islands, extensive land reclamation, and widespread industrial, commercial and housing activities, increase the vulnerability of Bahrain to climate change and sea level rise. However, the threat is largely ignored, mainly because of a shortage of relevant studies and lack of public awareness of the potential impacts of sea level rise. Meanwhile, there is currently no national plan evaluating the possible impacts of sea level rise.

Source: Al-Jeneid and Abido 2004, GCPMREW 2005

biodiversity has declined. Marine pollution poisons fish and renders the environment unsuitable for marine life. Overfishing represents a threat not just to fish stocks, but to human welfare, since marine resources are bountiful sources of food and income, if managed properly. Algal blooms and polluted coastal waters have contributed to the appearance of “dead zones” with thousands of fish dying and drifting ashore.

Overfishing is one of the major pressures affecting the sustainability of fish stocks. It is a complex phenomenon, with roots in physical and biological environmental factors, social systems, economic structures and the increasing demand for fish worldwide. Several

fish species, particularly coral reef fish, have declined dramatically in number in over the last three years, threatening national economies and coastal communities reliant on fishing as a source of income and on fish as a source of protein.

Corrective measures are needed urgently. Environmental maintenance and management is needed to protect these assets and optimize the investment in the long run, which means halting overfishing and the depletion of fish stocks. Trade and ship licensing agreements should be reviewed periodically to ensure maintenance of fish stocks. Overfishing can also be tackled by upgrading research centres and by preventing fishing during the hatching season of important species.



The oil spill due to the bombing of Jiyeh power station, Lebanon, caused an environmental disaster. Heavy fuel oil spilled into the Eastern Mediterranean after fuel storage tanks were bombed by the Israeli Air Force in 2006.

Controlling commercial fishing methods on the high seas and near coasts contributes to ensuring compliance with commercial and international agreements to promote sustainability of fish stocks. Coastal and marine pollution issues have to be addressed as they are another cause of the deterioration of fish resources in the Arab region and worldwide.

Most coastal zones in the Arab region have been developed, and lately new trends in the form of major coastal projects have appeared especially on the Red Sea and the coasts of the GCC states. The palm islands located on the Dubai coast in the United Arab Emirates are considered the largest man-made islands in the world. This development trend raises fears that high population density in these islands and in concentrated areas might lead to problems emerging along the coasts, including depletion

of groundwater, excessive urban development, large numbers of tourists, coastal water pollution, loss of coastal biodiversity and coastal erosion. Some of these problems, such as pollution, have cross-boundary impacts. The major threat to these areas is probably increased vulnerability to natural disasters, such as hurricanes and tsunamis, and increase in the sea level due to global warming. All of these have important social, economic and environmental ramifications.

Any rise in sea level is expected to affect many of the densely populated coastal zones. A one-meter rise in sea level would affect an estimated 3.2 per cent of the Arab region's population, compared to 1.28 per cent of the world population. Economic costs as a percentage of GDP would also be proportionally worse in the region: 1.49 per cent, compared to 1.30 per cent worldwide. It is essential to assess precisely the potential impacts of sea level rise from climate change, using practical evidence and developing possible scenarios. Careful assessment of risks related to climate change must include its potential impact on drought, deterioration of water quality, floods, desertification, soil and coastal erosion, changes in seawater temperature and salinity, and threat to biodiversity. From this assessment, appropriate adaptation responses can be developed. Special attention should be given to environmental impact assessment of major development projects established on the coasts.

Protection of coastal zones, including wetlands, and management of fresh water resources and watersheds in coastal zones are urgent issues that have to be seriously addressed. The Integrated Coastal Zone Management approach provides solutions for many of the issues facing coastal and marine environments.



5

Human Settlements

Human settlements in the Arab region span several millennia and indeed are thought to have witnessed the birth of civilization. Recently, large new settlements have been established and expanded especially in GCC states. In both cases, settlements in the region face many challenges, the most significant of which concern access to safe drinking water and sanitation services, and the gap between urban and rural populations access to these services. Given the scarcity of water resources in many Arab countries, MDG 7, to provide safe drinking water for all by 2015, represents a formidable challenge.

Providing clean water and adequate sanitation services entails removing pollutants from water sources before they reach the people, and treatment of wastewater before it reaches ecological systems. Without this there could be serious consequences on both public and ecosystem health.

Access to adequate sanitation services varies widely in the region: in ten countries over

98 per cent of the population has access to sanitation management systems, while in others access is limited to a very small minority of the population.

Steady population growth and improved living standards increase the rates of municipal solid waste generation. These rates vary from one country to another and from one city to another. On average, daily municipal solid waste generation per person is 0.5 kg, with higher rates in urban areas, over 1.5 kg, and lower rates, around 0.7 kg, in rural areas. Municipal solid waste in Arab countries increased from 4.5 million tonnes/year in 1970 to 25 million tonnes/year in 1995, and is expected to reach 200 million tonnes/year by 2020.

Such a steady increase in waste generation is beyond the capabilities of traditional waste management methods for collection, sorting and disposal by burning. In most countries such methods can no longer meet the growing needs of the community, nor maintain an appropriate



photo: Hany Abdin

level of cleanliness to prevent health hazards. Solid waste problems are complex, but success stories in this field, though few and scattered, can be found in Arab countries.

Air quality in many Arab countries, namely Algeria, Egypt, Iraq, Kuwait and Kingdom of Saudi Arabia, is much lower than other countries in the Arab region. Some pollutants exceed the national standards of air quality many times over. Air pollution costs in urban areas are estimated at 2 per cent of GDP, and health costs related to air pollution in closed areas are estimated at between 0.15 per cent and 0.45 per cent of GDP.

Floods, fires, earthquakes, landslides and storms, especially dust storms, are considered natural risks threatening Arab human settlements. Prolonged drought, with its devastating impacts on agricultural production and water resources, is a major threat to human settlement stability and sustainability. Poverty increases people's vulnerability to natural disasters, and this can

only be compounded as a result of climate change, especially in the many human coastal settlements in the region affected by the predicted rise in sea level.

Informal settlements pose a major challenge for the management of human settlements, since slums are home to a large number of the people in the Arab region. It is undoubtedly difficult to organize these areas, provide them with services, and address legal and administrative problems to enable people to benefit from available development opportunities and enjoy reasonable living standards. Although difficult, efforts in this direction will be positively reflected in the economy and the society.

Historically, the Arab region was the cradle of civilization and its cities were rich in monuments. Now many of these cities lack the essential infrastructure to save the monuments from increased groundwater levels, informal building, poor housing conditions, lack of basic social and physical structures, and abject poverty. These

difficulties challenge both central and local authorities, and impoverish the region's cultural heritage. Many countries have succeeded in reviving their historical cities, including Aleppo in Syria, and Sanaa in Yemen.

Management of human settlements is different from one country to another, but with few exceptions is based on traditional mechanisms for decision making, and internal institutional mechanisms for efficient coordination in the planning, decision and policy making processes are effectively absent. Furthermore, management systems in the region lack stable institutional frameworks for partnership in decision making and execution. In most cases they are a crisis management mechanism, whereas Arab cities today need precise urban planning and rigorous management.

In many major cities suburbs have expanded uncontrollably and pockets of poverty are widespread. Experience shows that an effective method for reversing migration from rural to urban areas is to develop provincial and secondary cities outside the capital, giving a more balanced system in urban areas that will positively impact quality of life and the use of natural resources.

In general terms and according to the United Nations Development Programme's human development indicators, living standards have improved in the Arab region. Gulf Cooperation Council (GCC) states are top of the list of Arab countries, and in the upper intermediate level worldwide. Living standards in middle-income countries have improved, but some low-income countries are still struggling.

Rehabilitation of the old city of Aleppo

Context: since the fifties the old city of Aleppo, one of the oldest inhabited cities in the world and a World Heritage Site, has been gradually falling into decay.

Target: enhance living conditions and job opportunities for the population of Aleppo. The comprehensive rehabilitation and development plan will help achieve this, preventing the deterioration of the old city and establishing a new dynamic development mechanism for those living in Aleppo.

Approach: residents of Aleppo receive small loans and free technical advice on home maintenance and renovation, rehabilitation of water and sanitation networks, and improvement of drinking water provision. In return, they perform maintenance on mains pipes below the houses, fixing leaks that weaken the foundations. Social services are also being established in cooperation with relevant authorities.

Results achieved: the city council formed a multi-disciplinary administrative team (Directorate of the Old City) to gradually carry out the rehabilitation. This led to renovation of 70 per cent of the old city's water and sanitation system, securing safe drinking water and reducing the risk of damage to buildings due to water leakage. The local population contributed enthusiastically at public hearings with suggestions for improvements, notably for a health centre and a nursery. Two healthcare units were set up to serve all citizens and a nursery was opened. Residents of the old city use small loans to restore their homes and have managed to renovate 20 per cent of the threatened buildings. The private sector has invested in development and housing schemes for local residents.

The Syrian Government considers this project a model for the maintenance of historic cities and modern management of urban development. For this reason, the Government has recommended the rehabilitation and development approach of Aleppo be adopted also for other Syrian cities.

Source: GTZ undated

6

Biodiversity

The Arab region enjoys unique biodiversity embracing many thousands of plants and animal species and a host of marine and terrestrial ecosystems. Human interaction with natural environments over centuries and millennia has yielded a unique combination of species and varieties of horticulture, field crops and livestock. More recently, however, biodiversity in the region has suffered, and still suffers, continuous degradation of its environment, with deterioration and loss of habitats, and the disappearance of some species.

Over the last hundred years, some species, especially mammals, have declined in number and their geographical spread has changed. Lower groundwater levels, drying out of wetlands and humid environments, construction of dams and overfishing have all played a major part in biodiversity degradation, both on land and in the sea. Marine, and especially coastal, environments, suffer from pollution and from

human attempts to adapt them for human use, by filling and dredging. These activities, together with overfishing, have led to a marked decrease in the number of aquatic species and in coral reefs. The number of endangered species has reached 1 084. Fish are worst affected, making up 24 per cent of the total, followed by birds, 22 per cent, then mammals and plants, 20 per cent each, with other living organisms accounting for the rest.

A total of 551 invasive species pose a new risk to biodiversity in the Arab region. These non-indigenous organisms represent a great danger to local plants and animals and natural ecosystems. Some, like palm weevils and water hyacinth, cause extensive damage. This issue has to be addressed, although clear understanding and local knowledge regarding it is lacking, as are financial and technical capacities to tackle it.

Biosafety has undoubtedly become a global concern and addressing it requires an integrated management approach. Arab countries will be better able cope with global developments by reinforcing institutional capacity building,

upgrading national laws and standards to address issues such as genetically modified organisms, their products and different uses.

The Arab region and culture has been concerned with biodiversity for some time, and countries have exerted great efforts in preserving it, including adherence to the Biological Diversity Agreement, the



Ahmed Saad

Cartagena Protocol on Biosafety, and other agreements related to conservation. Many countries have developed strategies to protect biodiversity, encourage sustainable investment in it, and promote the fair and equitable sharing of benefits derived from genetic resources. These and other efforts have produced many success stories, notably breeding programmes for rare species, protection initiatives for endangered species, and the establishment of natural protectorates. Countries are intensifying their efforts to meet commitments under the Convention on Biological Diversity (CBD) by 2010, including a significant reduction in the rate of biodiversity loss.

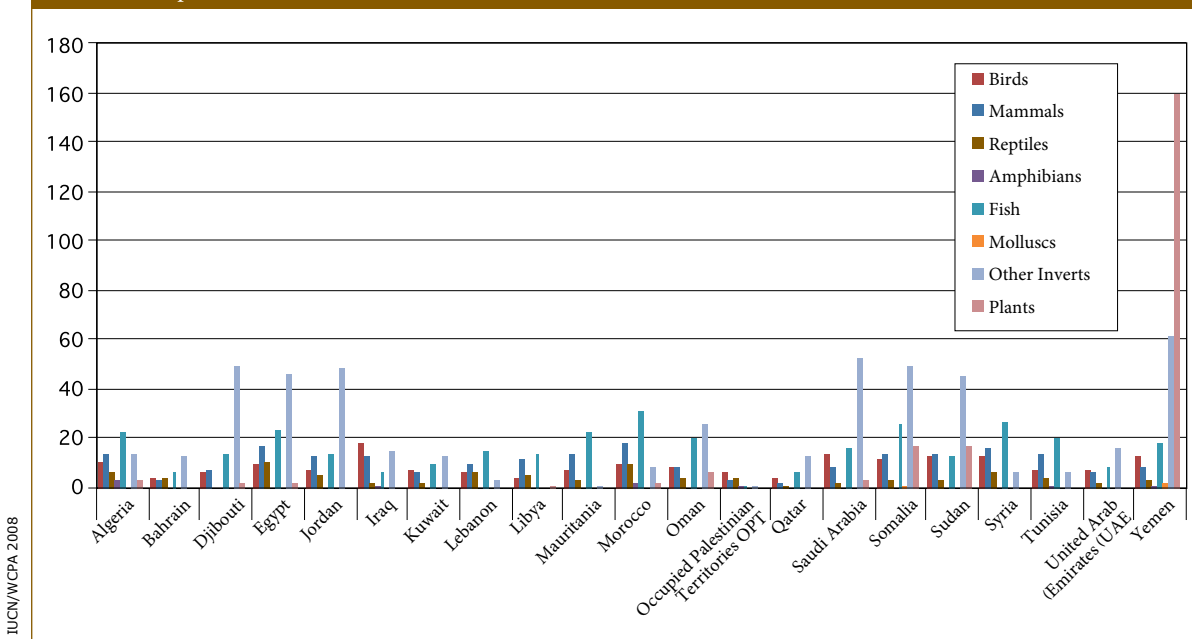


The Agreement further aims to implement programmes balancing biodiversity preservation and economic development at the national level, to integrate this diversity within national

planning processes to ensure sustainable development in biodiversity, and to foster an enabling environment where partnership between national institutions and individuals can improve management of biodiversity and ecosystem services.

Although concerted efforts have gone some way towards preserving biodiversity, many challenges remain. Successful execution of the CBD, following its action plans and meeting its objectives, especially beyond 2010, will require an integrated approach to reconcile biodiversity with economic development at the national

Threatened Species in Arab countries



The figure shows the number of threatened species in Arab Countries, from birds, mammals, reptiles, amphibians, fish, molluscs, other inverts and plants

level. Regional strategies and action plans, planned and executed with the assistance of Arab and international organizations working in the region, will complement and reinforce national efforts. In this context, a framework plan for the Arab countries should be developed, incorporating a broad vision reflecting concerns about biodiversity loss, and effective contributions for assessing and monitoring its state of health, promoting its preservation and using its resources sustainably. A realistic

framework approach should be adopted, based on lessons learnt and indicators to monitor progress towards achieving the objectives. The strategy should include the private sector and provide opportunities for biodiversity preservation initiatives, using ecosystem resources in a sustainable manner and sharing the resulting benefits. International policy frameworks to foster national and regional biodiversity programmes could be used in this context to great effect.

Al-Hema system: The traditional practice of rangeland use

Saudi Arabia has a long history of herding and grazing on its vast rangelands, which make up the largest proportion of rangelands in the region at 35.8 per cent.

Traditionally, herders managed the grazing of their herds under the tribal Al-Hema system. This system restricted the frequency, intensity and timing of grazing practices on the vegetation cover of the drier areas of rangeland, and successfully sustained the productivity of the rangeland. Usually, each tribe had its own communal grazing territory and when drought occurred tribes were allowed to share other tribes' grazing territories under specific conditions.

However, political and social changes disrupted the tribal Al-Hema system in the 1950s and provided unrestricted access to all grazing areas.

In 1980, the government had to change the financial incentives for herders into subsidized feed such as barley. The financial incentives and subsidies made it possible for herders to transport subsidized feed and water using the vehicles they were able to buy with subsidies to semi-permanent rural populations and livestock in more remote areas.

As a result, overgrazing and extensive wood cutting for fuel increased, causing severe degradation of the vegetation cover and biodiversity and increasing soil erosion. The Al-Hema system has since all but disappeared among herders, with the exception of many Bedouin communities who still prefer to use limited secure areas and employ the traditional grazing system.





عبد الرحيم العرجان

7

Atmosphere

Compounding the dust- and sandstorms blowing over the Arab region and their negative effects on human health and economic activity, Arab countries now face an increase in rates of air pollution caused by gases, particulates and aerosols of industrial origin. Major pollutants include greenhouse gases, soot and particulates from contaminated soil. The levels of these pollutants sometimes exceed the indicative limits set by the World Health Organization in some Arab cities. Population growth, urban expansion, public and private transport, and the growth of polluting industries have been contributing factors. These pollutants affect human health and well-being, as well as harming the agricultural and industrial sectors. Indoor pollution is another risk for many people in the region, where houses are often heated by burning fossil fuel or wood logs indoors.

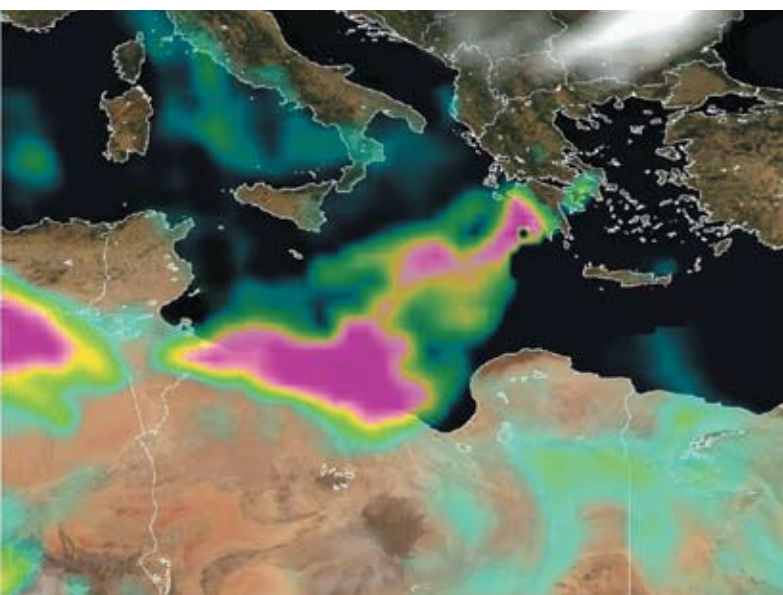
Air pollution can be reduced only with a variety of strategies and policies tackling the issue

from both supply and demand perspectives: improving energy production and efficiency, and rationalizing energy use in homes and workplaces and for transportation. Capacity building and awareness-raising will help guarantee atmospheric protection. Energy improvement and conservation programmes should be extended, as should research on solar energy and cleaner production initiatives. All of these will contribute to achieving more rational energy production and use, and a reduction in the emission of greenhouse gases into the atmosphere.

The energy sector in the Arab region has played a fundamental role in economic and social development, thanks to exports of petroleum and gas, and the jobs created by the industry. However, efficiency in energy production and consumption could be greatly improved. The Arab region possesses between 51 per cent and 57 per cent of global oil reserves and 30 per cent of gas reserves, and produces 23 per cent of the oil and around 8.7 per cent of the natural gas in the world.

Oil production and refining are considered one of the largest sources of global warming gas emissions. Carbon dioxide emissions in the GCC states alone is estimated at 2.4 per cent of world emissions, and the Arab countries together account for 4.7 per cent of total emissions. Some Arab countries are among the highest in the world for average carbon dioxide emissions per inhabitant, with annual rates of 61.49 tonnes/person in Qatar, 36.58 tonnes in Bahrain, and 33.73 tonnes in the Emirates. However, the average in Somalia is only 0.09 tonnes, followed by Comoros with 0.15 tonnes. The energy industry is not the only cause of global warming gases: other industries such as petrochemicals, oil refineries, fertilizers, chemicals, cement, iron and aluminium also contribute significantly.

Despite the relatively low overall contribution of the Arab region to greenhouse gas emissions, the scientific community predicts that it will be among the hardest hit by the impacts of climate change.



Satellite image showing the wind pushing forest fire smoke across the Mediterranean from Greece to North Africa in 2007

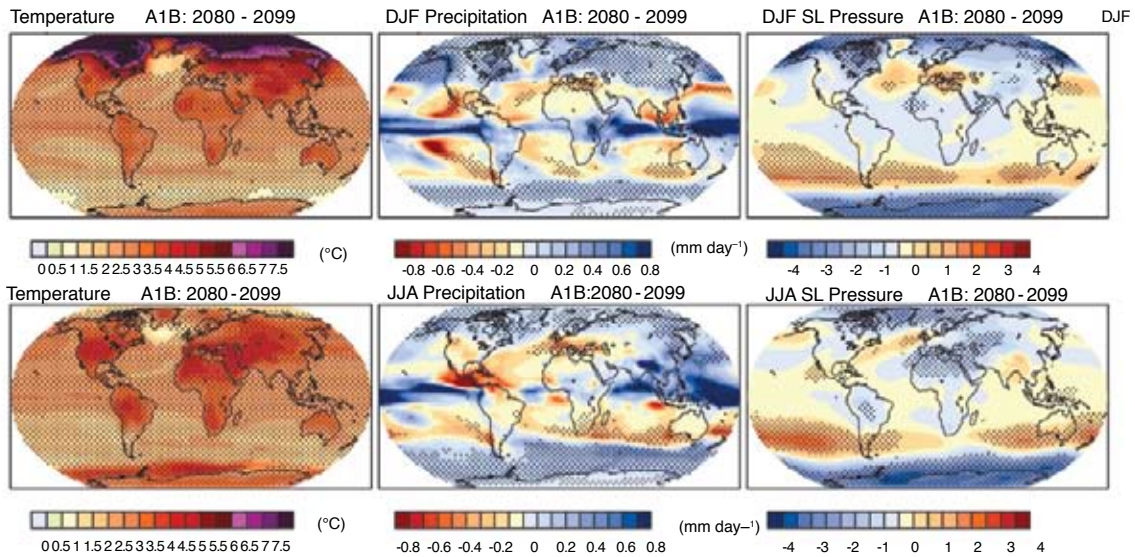
The Arab Ministerial Declaration on Climate Change

The Council of Arab Ministers Responsible for the Environment (CAMRE) adopted the declaration on climate change, which constitutes the basis for future action and reflects the Arab position in dealing with climate change issues, according to the following:

- The inclusion of policies to deal with climate change issues in all sectors.
- Adoption of national and regional action plans dealing with climate change issues in all sectors.
- Mitigation programmes shall focus on the production and use of cleaner fuels, improving the efficiency of energy use, diversifying energy sources, expanding the use of cleaner production techniques and environmental friendly technologies, and providing economic incentives to encourage more efficient products.
- Developing and disseminating measures, methodologies and tools that achieve economic diversity with the aim of increasing the elasticity of economic sectors vulnerable to climate change.
- Adaptation programs shall focus on providing the necessary infrastructure to reduce potential risks. This will include appropriate mechanisms for risks insurance, efficient management of natural resources, advanced monitoring, control and early warning systems, adequate preparedness to confront disasters caused by climate change, raising the level of public awareness, and, lastly, promoting partnerships.

They attribute the region's vulnerability to its geographical extension, its specific social and economic structures, a deteriorated resource base and the reliance of many national economies on activities that are vulnerable to climate change such as agriculture, water resources and fishery. Climate change is expected to threaten coastal zones, increase the frequency and intensity of drought, cause desertification and water resource scarcity, increase groundwater salinity

Title: Expected Changes in Rainfall Patterns



IPCC

and unleash an unprecedented spread of diseases and epidemics. Consequences on economic and social development will be severe, obstructing the march to sustainable development. Climate change adds a new dimension to the group of challenges facing the Arab countries in their efforts to meet the MDGs. It is a very serious danger and its potential impacts on the region should not be overlooked. Regional and national scientific assessments are needed to gauge to what extent social, economic and environmental systems will be affected by this phenomenon. Adaptation measures should be put in place immediately, without waiting for more capacity to be available.

Climate change is arguably the largest challenge facing the Arab region, since it will likely cause a marked reduction in rainfall and an increase in droughts, with associated negative impacts on the regeneration of water resources and the sustainability of agricultural production. The same order of priority must be given to climate change policies as to the

region's framework plans, and the two must be integrated. National and regional strategies to promote energy efficiency and rationalized use, youth employment and overall unemployment reduction, and poverty eradication need to take into consideration the probable future scenarios due to climate change, so as to reduce its social, economic and political consequences, and to remain within a sustainable development framework.

The Arab countries were generally very successful in disposing of chlorofluorocarbons (CFCs), which were causing erosion of the ozone layer. As of 2007, 85 per cent of total CFCs had been disposed of, with a reduction of 3.86 million tonnes in 2007, compared to 18 million tonnes in 1995. However, serious challenges remain as the Arab countries complete CFC disposal, manage the unwanted CFC stock, and work on halting consumption of all the substances listed in the annexes to the Montreal Protocol, which it is hoped will help reverse the depletion of the ozone layer.

8

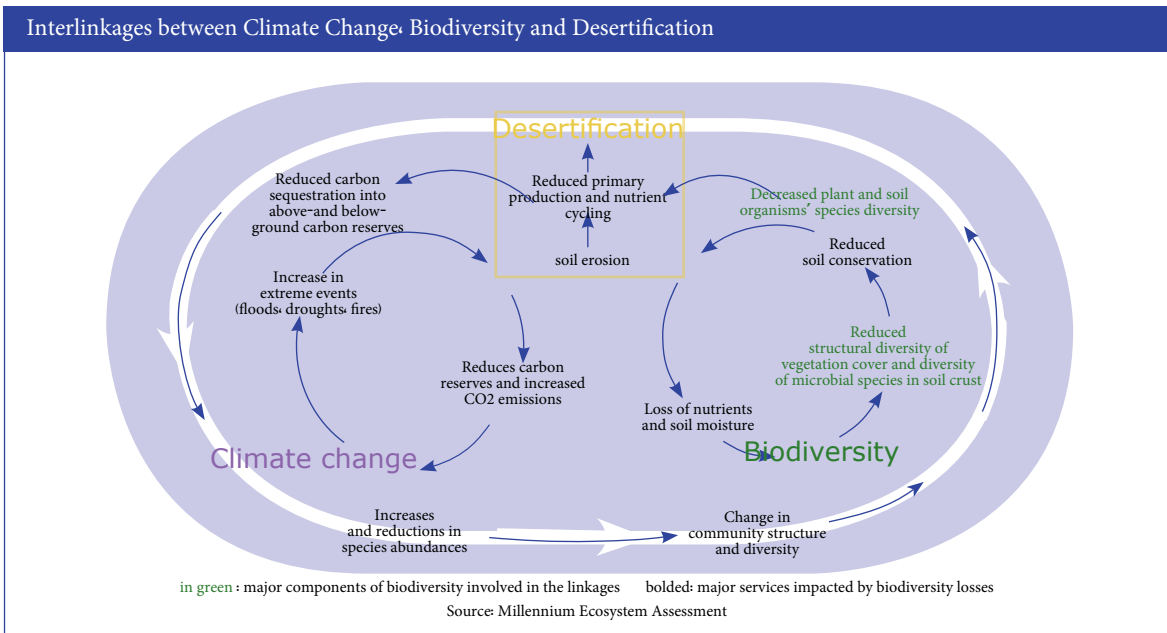
Man and Environment

Ecosystems and human communities, in the Arab region and in the rest of the world, are inseparable parts of the system we call Earth. Land, water, air, plants, animals and human beings are linked in a complex network of interactions. For instance, there is a link between demographic, economic and technological drivers, environmental changes and phenomena like climate change, air pollution, biodiversity loss, land degradation and desertification, reduced water quality and chemical pollution. Ecosystems, adaptive and adaptable under normal conditions, cannot absorb such rapid and unnatural changes. They are weakened and their capacity to provide environmental products and services declines, negatively affecting economies and human well-being.

To understand the correlation between impact, vulnerability and responses in environmental systems, an integrated approach to addressing



environmental issues in the region must be adopted, one that considers the multitude of dynamic links that exist in nature. Many of the environmental problems and challenges faced today can be directly or indirectly traced back to human activities. There are interactions between local and sub-regional ecosystems, and between these and social and biological processes leading to environmental change, which in turn affects economic aspects and human welfare. Depletion of resources and consequent changes in the environment have a negative impact on the region's economy. These impacts are exacerbated by



Religion, Culture and Consumption



Across the Arab region many of the traditional and indigenous laws associated with sound environmental practice and conservation, such as Hema, Falaj, rational consumption and water harvesting, have fallen into disuse. However, religious and 31 cultural norms and values in the Arab region should be drivers for better environmental management, more rational use, conservation of natural resources and pollution prevention, so that each individual may play his part in the protection and development of the environment and natural resources. Unfortunately, at the present time socio-cultural concerns and priorities are not addressed because of the lack of awareness and knowledge about the interlinkages between the environment and human well-being

factors such as climate change, continuous population growth, demographic changes and mismanagement. Taking stock of these interactions and their impacts, identifying environmental challenges and ways to address them, and using tools from environmental economics will provide opportunities for improved policies responses, economic and social restructuring, regional cooperation and sustainable partnerships. This type of regional policy initiative requires cooperation between established institutional and governmental structures, NGOs and the private sector in the region.

For an integrated sustainable development approach to be successfully implemented, replacing dysfunctional sectorial policies, the governments of the Arab region have to define multilateral environmental agreements, and support their implementation at the local level. This will be achieved by developing rigorous implementation measures, giving a firm commitment to reporting, training, education and public awareness activities, and finding ways to overcome problems to do with data and information sharing.



Satellite image illustrating urban expansion in Gaza, Occupied Palestinian Territories, between 1987 and 2002

The public must also be able to give its contribution, and needs to be empowered do this. National capacities should be strengthened to improve public participation in the development and implementation of policies and measures designed to promote a sustainable approach and address the interactions between man and his environment.



Youssef Sabry

9

Challenges and Opportunities

The Arab region has achieved less rapid development than the international average of medium- and low-income developing countries. Youth unemployment rates and urban population growth rates are very high in the Arab communities. Poverty is another major challenge. Statistics indicate a very minor reduction in the poverty ratio from 19.6 per cent (1990-1995) to 18.2 per cent (2000-2004) in 11 countries, accounting for two-thirds of the total population. Thus, efforts in all countries have to be intensified if the MDGs are to be met by 2015.

Natural disasters are a challenge that countries must be prepared for. Studies show that six countries (Jordan, Tunisia, Algeria, Syria, Djibouti and Morocco) are very vulnerable to economic threats resulting from various types of natural disaster. They estimate that the most serious of these could cause damages to the tune of 30 per cent of GDP and affect

30 per cent of the population. Threats from climate change are omnipresent in the Arab region, one of the most vulnerable areas in the world to its impacts, including damage by floods in coastal zones, and desertification and drought in other areas. Climate change is likely to exacerbate issues that are already challenging, such as inadequate agricultural production, water scarcity, high groundwater salinity, and the spread of infectious diseases. A clearer understanding of the relation between environmental degradation, vulnerability and disaster occurrence will undoubtedly assist in developing integrated approaches to reduce risks and protect human lives. At the same time, it is important to note that a healthy environment is resilient: it can be affected by a natural disaster and recover from it.

According to World Meteorological Organization reports, more than 80 per cent of natural disasters are caused by weather and climatic events, with coastal zones being the most vulnerable. The United Nations Human Settlements Programme The State of African Cities 2008: A Framework for Addressing Urban

challenges in Africa report confirms that 18 per cent of coastal zone inhabitants in Northern Africa live in areas below sea level, including the cities of Alexandria, Algiers, Casablanca and Tunisia. These are considered the most vulnerable areas.

The Global Assessment of Disaster Risk Reduction (2009) highlights Egypt, Djibouti and Bahrain as the countries most vulnerable to the risks of sea level rise. In Egypt, for example, around 10 million people live in the coastal zones

between Alexandria and Port Said. Sea level rise could lead to the displacement of many millions of people and damage amounting to over ten thousand million US dollars. In Djibouti, around 50 per cent of the population lives at sea level, and three-quarters of Bahrainis live in low-lying coastal areas.

In the period between 1980 and 2008, earthquakes in the Arab region affected 1.3 million people and caused damage reaching US\$11 000 million. The Registry of Hydro-

Impact of Climate Change in Arab Countries According to National Communications

Egypt: production of staple crops (wheat, corn) is likely to see a substantial decrease due to climate change, which is also expected to cause erosion in the delta shoreline, seawater incursions into water tables and deterioration of some ecosystems. Likely sea level rise is estimated at between 1 and 5 meters in the next hundred years, causing up to 30 per cent of the city of Alexandria to be submerged, with not less than two million people displaced and 195 000 jobs lost. The resulting economic loss is estimated at US\$35 000 million, if no action is taken, with Agriculture, Industry and Tourism respectively the sectors worst hit.

Morocco: by the year 2020, temperature is expected to increase by between 0.6 and 1.1C, average rainfall is predicted to drop by 4 per cent and droughts are likely to increase in frequency and severity. This will lead to a decline in water resources of roughly 15 per cent. Agricultural production is likely to fall by 50 per cent in drought years and 10 per cent in ones with average rainfall. Increased irrigation needs are estimated at between 7 and 12 per cent.

Saudi Arabia: summer temperatures are expected to rise between 2.2 and 2.7C in northwestern areas, and between 0.2 and 0.4C in the south and southwest. This increase will cause agricultural production to drop by between 5 and 25 per cent in all areas. Additionally, sea level rise of 0.5 meters expected by 2100 will lead to the loss of 2 663 ha of sandy shores.

Sudan: temperatures are expected to rise significantly by 2060, between 1.5 and 3.1 C depending on the season, and rainfall is likely to decline by 6 mm/month in the rainy season. Such changes would have severe implications for agriculture, water resources and public health. Climate scenarios in North Kordofan indicate an increase in surface temperature of 1.5 C between 2030 and 2060, and a decline in rainfall of around 5 per cent, resulting in a drop in sorghum production of 70 per cent.





Rim Borhan

Metrological Risks documents the past 30 years of droughts and desertification caused by water scarcity, impacting 28 million people in the Arab region. Floods and storms have displaced hundreds of thousands of people in Yemen and Oman, and devastated thousands of homes in Algeria and Morocco.

Internal and external conflicts and disputes over boundaries are a major challenge in the Arab region, and have negative ramifications for environment, development and natural resources.

Dubai e-Government

The Dubai e-Government Program was a phased programme that aimed to transform government operations. After its launch in 2001, Dubai e-Government worked with different governmental administrations to provide public services through various innovative electronic channels. The programme met its goal of providing 90 per cent of all government services online and facilitating 50 per cent of government transactions through direct, online communication

Improving the quality of health services is a top priority in the region. As a result of improvements made to date, infant mortality rates have been cut by a third in the last three decades. Conversely, the spread of infectious diseases and increased rates of non-infectious illnesses are pushing health care expenditure up. According to World Bank data, cancers

and coronary heart diseases account for 45 per cent of diseases in the Middle East and North Africa (MENA) region and will be responsible for 56 per cent of mortality rates by 2020.

Service provision for disease prevention, such as wastewater treatment, sanitation and access to safe drinking water, has not yet reached the desired levels in the Arab region. The region is below the world average and efforts should be intensified to increase provision of vital public services such as wastewater treatment, and ensure full public access to sanitation services and safe drinking water. Progress has been made on healthcare in Arab countries, but a number of obstacles remain, including high healthcare costs, increases in road accidents, the emergence of new infectious diseases, and wide variations in the quality of healthcare services between Arab countries and within the countries themselves.

The region's natural resources offer a number of opportunities to be exploited, if these

resources are used rationally and sustainably, and if environmental aspects are integrated into the decision making process. Establishing a friendly environment for investment is essential for opening up development opportunities. Measures to support and take advantage of a business-friendly environment include simplifying incorporation and other procedures, economic reform programmes, mechanisms for achieving widespread social security cover, insurance networks and social funds for development to protect poor and marginalized categories. Principles of good governance should be embraced and used in decision making to ensure informed planning and better allocation of investment.

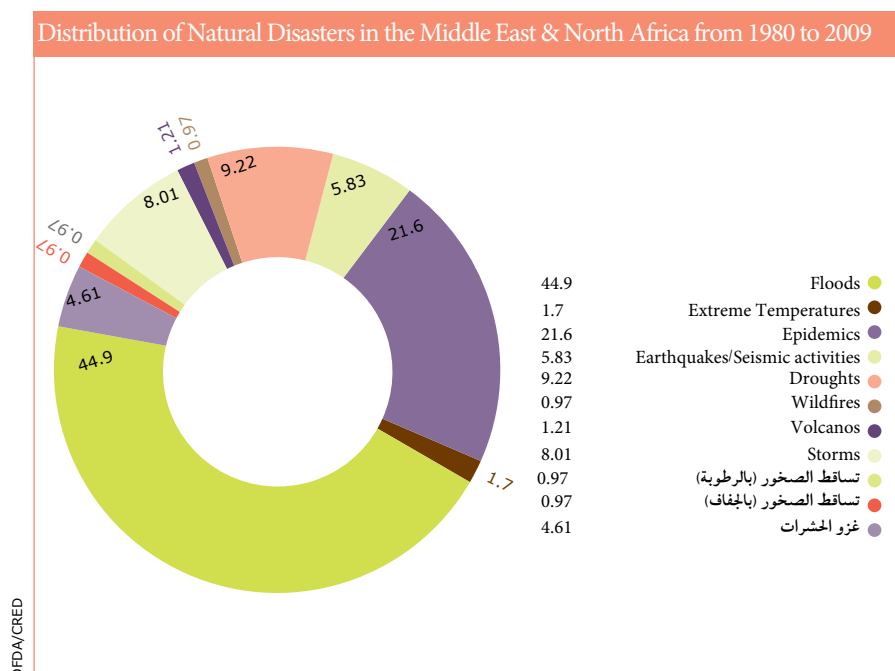
There is no doubt that gender equality is a key requirement for rapid societal and economic development. Continued discrimination and marginalization of women diminish their role in the development process. Aspiring to gender equality requires a clear understanding of how society, the economy and politics

impact men and women differently. Parity of opportunities for education and in the workplace will help foster equality. It is necessary to invest in young people, to support their capabilities and enable their effective contribution through appropriate investment allocation.

Urban migration is often due to unequal distribution of resources and investment between cities and rural areas. Understanding the links between urban and rural areas, and redressing the balance to provide deprived areas with adequate infrastructure and social and health services, will ensure more equitable, balanced and sustainable development of the whole nation.

Mechanisms are needed for modern technology transfer, and existing technology should be upgraded. Most importantly, technologies should enable inhabitants of the region. Preserving cultural heritage and social values, promoting local communities, and

building capacity are opportunities that have to be seized. Finally, decision making processes based on principles of good governance - transparency, participation, integration and sovereignty of laws - are a guarantee for sustainable development in the region.



10

Emerging Environmental Issues

Emerging environmental issues are escalations in trends or existing conditions that are changing, or current environmental phenomena that are often misunderstood. They include new research, scientific discoveries or technological innovations reflecting man's ongoing struggle for sustainable coexistence with and within his environment. New thinking and recent discoveries might be very useful for supporting sustainability in the Arab region if given more attention by the relevant institutions.

Renewable energy alternatives to fossil fuel have captured the world's attention as a solution to the energy crisis, and a way to reduce greenhouse gas emissions and thus the potential impacts of climate change. Biological fuel, made from cultivated crops,

is one form of renewable energy considered and increasingly adopted throughout the world. This is a worrying issue for Arab countries as it is related to food and water security, could upset balances in ecosystems and could be a threat to a number of Arab countries whose development is based on oil exports. The Arab region's formal position argues against the planting biological fuel crops, rather than food crops, although it supports the production of biological fuel using agricultural waste.

Environmental indicators have an important role to play in improving decision making, and a number of indicators have been developed especially for measuring sustainability. One of these is the environmental sustainability indicator, which measures the efforts exerted by countries to preserve valuable environmental resources in the long run. Another is the environmental performance indicator measuring tangible results.

The ecological footprint indicator shows human consumption of environmental resources (demand) and the carrying capacity of the ecosystems (supply), while the carbon footprint calculates the carbon "cost" of human impacts on the environment. More attention needs to be given to studying and applying these indicators, to help evaluate environmental conditions and trends in the Arab countries. Indicators rely on accurate data from monitoring operations and systems for archiving the data. They are then used as an input for sustainable management of natural resources.

Among the more significant new trends in sustainable development are the issues of sustainable consumption and cleaner production.

Tunisia National Eco-label Scheme

The scheme has been in operation in Tunisia since 2004. It was initiated by the International Centre of Environmental Technologies of Tunisia (CITET). The Tunisia Eco-label Scheme provides:

- ISO Type I eco-label (voluntary scheme)
- Technical studies and contributions from national and international experts
- The development of legal, regulatory, and institutional frameworks, as well as criteria
- Promotion of the proper development of goods relevant to EU markets, in order to meet that market's stringent requirements
- Incentives for manufacturers to produce goods with fewer pollutants



UNEP-DTIE/ROA 2007



The League of Arab States is active in promoting these concepts in the region as one way to counter increasingly unsustainable consumption patterns. Many Arab countries have established cleaner production centres aiming to integrate sustainable consumption and production principles in local industries. However, more collaborative efforts are needed to roll out sustainable production and consumption to all industrial sectors.

The increased demand for food and fabrics, in a context of water scarcity and poor food production, has brought biotechnology and genetic engineering approaches to the attention of many Arab countries. However, such approaches are not without risks to human health, biodiversity and the environment. Such risks must be taken into consideration before biotechnology and genetically modified organisms are released for general use.

Trade and production of biotechnology products in the Arab countries is very limited and techniques remain confined to scientific research and laboratories. Arab countries have issued legislation on genetically modified organisms and most countries have signed the Cartagena Protocol on Biosafety, which introduces safety mechanisms for transporting and using genetically modified organisms because of their potentially harmful impacts on biodiversity preservation and sustainability.

Sustainable chemistry is a new hybrid of chemistry, still very much in its infancy in the Arab region, that focuses on reducing or eliminating the use and synthesis of hazardous chemical substances, potentially replacing many toxic industrial operations with safe ones. As such, it could play a major role in the safe handling of organic chemicals, and in the management of chemical and electronic waste in Arab countries.



11

The Future Today

Scenarios are different paths that can be taken for development. We have explored four such scenarios for the Arab region based on current social, technical, economic and political conditions, considering four different packages of policy options to determine their impact on the environment and human well-being. Each one has a specific focus depending on the area that is perceived as being top priority: the Markets First (Souq) scenario, pushing for economic growth; the Policy First (Islah) scenario, prioritizing social reform; the Security First (Inkifa') scenario, which focuses on security; and the Sustainability First (Nahda) scenario that puts sustainability first in the order of priorities.

Market-based approaches can stimulate performance and yield benefits in terms

of resource use efficiency and upgraded technology, but concentrating solely on economic growth will leave the region facing social and environmental pressures that, as recent experience has shown with the world financial crisis, the markets' self-correction mechanisms cannot deal with adequately. Such pressures, if exacerbated, might slow or even stop economic growth.

In the Policy First scenario, governments would interfere strongly in markets to achieve social justice. Legislative measures would be adopted for environmental protection, and, in the best case scenario, would halt environmental degradation and improve human welfare. However, investment policies would continue to exert environmental pressures.

In the Security First scenario, perceived by researchers as an extreme form of the market scenario, security is paramount to avoid any interference, and no attempt is made to resolve national and regional tensions. In the end,

The GEO 4 Scenarios at a Glance

The scenarios presented here explore the implications for the environment and human well-being of alternative assumptions about who is making the key decisions, how these decisions are made, and why certain decisions are made. Elements of each scenario can be seen in the present and each of the four scenarios will almost certainly contain aspects of the others. The nature and the names of the scenarios, though, are characterized by the theme that dominates the particular future envisioned, or what comes first.

Policy First: the government sector, with active private and civil sector support, implements strong policies intended to improve the environment and human well-being for all, while still emphasizing economic development.



A view of the future? You shall...you shall not...a policy dominated world?

Sustainability First: the civil, government and private sectors work collaboratively to improve the environment and human well-being for all, with a strong emphasis on equity.



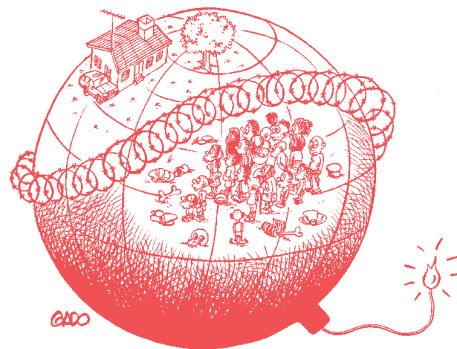
A view of the future? Together we can sustain the earth!

Markets First: the private sector, with active government sector support, pursues maximum economic growth, trusting this to be the best path toward the improvement of the environment and human well-being for all.



A view of the future? A market sell-out?

Security First: the government sector and certain private sector actors compete for control in an effort to improve, or at least maintain, human well-being for select groups.



A view of the future? Haves... have-nots... security in a divided world?

regional development would suffer, and the gap between rich and poor would widen, leading inevitably to social and economic disintegration. In this scenario, human welfare, the environment and natural resources are sacrificed in the interests of security.

In the Sustainability First scenario, improving good governance and strong links between social, economic and environmental policies provides a sustainable solution to meet development challenges

in the region. Integration, cooperation and dialogue on the national, regional and inter-regional levels, replace tension and armed conflicts. Economic gains might be moderate compared to other scenarios, yet human life and environment in the Arab region stands to gain immensely.

Regional Scenarios

Scenario	Arabic Title	Meaning
Market First	Souq	Marketplace
Policy First	Islah	Reform
Security First	Inkifaa'	Seclusion
Sustainability First	Nahda	Renaissance

The most important lessons provided by these scenarios are the importance of investment in human resource development, improved governance and enhanced cooperation and integration between Arab countries as critical success factors for the long and complex path towards sustainability and the desired political, economic and social renaissance in the Arab region.



12 Policy Options

The Arab region is facing many challenges and pressures that threaten the sustainability of its natural resources, weaken potential economic and social development opportunities and make the region more vulnerable to massive economic, social and environmental degradation. Inadequate policies to tackle population growth and environmental management have led to a snowballing of environmental problems, one reinforcing the other. Some environmental policies have been successful, particularly those addressing specific issues such as municipal waste and drinking water. However, where the issues are more complex with many overlapping factors, as is the case for biodiversity conservation, desertification and urban air pollution, efforts have mostly been limited to mitigating their

effects and relieving suffering. We have not yet begun to tackle some environmental issues, including use of bio-fuels and large-scale trafficking of genetically modified organisms. Weakness in policies can be attributed to the relative immaturity of environmental institutions in the Arab region, and to the huge responsibilities they bear, with limited power and tight budgets. This is compounded by a shortage of legislative and economic instruments, low levels of knowledge, a lack of integrated policies for technology transfer, weak community participation and limited environmental awareness.

A strategic methodology is called for, one that aims to enhance the living standards of every Arab citizen and halt the spiralling environmental problems, by improving environmental efficiency, attacking the root causes of environmental problems, changing production and consumption patterns, halting depletion and degradation of natural resources, fostering participatory approaches and promoting environmental best practices. For this, Arab countries will need to follow a more advanced planning methodology that has room for widespread participation and can incorporate tools for implementing environmental policies and harmonizing them.

The principal focus has to be on adopting an evidence-based approach and designing policies that cause deep structural change at all levels, placing environment on an equal footing with the other pillars of sustainable development, social and economic, and mainstreaming environment in all decision making processes related to development. Successful implementation is as important as design for this new environmental policy framework, and enabling conditions

and supporting measures, including new and renewable sources of funding, are vital to this endeavour.

Although challenges do exist and environmental policies to address some issues have been lacking, sustainable development is not a farfetched goal: it can realistically be achieved on all levels by adopting best practice governance approaches for environment, including curbing population growth and harmonizing economic policies with prevailing environmental conditions. Arab countries can bridge the gaps in environmental policies and systems of governance by careful allocation of resources, investment in capacity building, more generous spending on environmental issues, building on results achieved to date, adopting good practices and learning from the experience of others. It is also important to incorporate environmental education into all fields of work and at all social levels, contribute effectively to the global environment agenda, and adopt state of the art standards and systems that have been proven to contribute to sustainable development.

Arab Development Aid

Between 2000 and 2003, the Gulf Cooperation Council (GCC) countries provided around US\$13 700 million of development aid. Saudi Arabia is the largest donor, contributing 58 per cent of all aid. In 2003, development funding amounted to US\$2 800 million, or 1.3 per cent of national GDP, which stood at US\$3 100 000 million. In the same year Kuwait and the Emirates contributed US\$82 and 130 million respectively. In 2002, Qatar's official development aid amounted to around 0.7 per cent of its GDP. Therefore, GCC development funding now exceeds that of many major industrialized countries.

UN-ESCWA