

Environmental Sustainability in the Arab World

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Arab states face profound sustainability challenges that will influence their ability to achieve lasting economic, social, and environmental goals. This chapter analyzes the most important environmental sustainability trends in the region, discusses their long-term implications, and suggests strategies for improving performance. While there are some signs of progress and reasons for hope, in general the Arab states are lagging behind in many important environmental areas. Unless measures are undertaken to address the challenges of environmental sustainability, major problems—with serious economic and social consequences—are likely in the future. In addition to the problem of water scarcity, which is endemic to much of the region, there are alarming trends concerning air pollution, greenhouse gas emissions, population growth, and urbanization. Our analysis makes it especially clear that the Arab states lag behind the rest of the world in the core domestic institutions that make basic environmental governance possible, and in their contributions to global processes of shared environmental management.

The analysis in this chapter draws heavily on the 2002 Environmental Sustainability Index (ESI) and the collection of data and indicators created for the ESI (World Economic Forum [WEF] et al. 2002a). The ESI quantifies various dimensions of environmental sustainability, benchmarks national conditions and progress, and facilitates empirical assessment of environment-economy tradeoffs. At the most aggregate level, the ESI is best thought of as a

measure of the ability of a society to preserve critical environmental conditions several generations into the future (Esty and Cornelius 2002; Levy 2002). At a more disaggregated level it permits cross-national comparisons on a number of the most critical environmental aspects of sustainability. The ESI also highlights relative environmental performance and provides a mechanism for identifying “best practices,” and thus opportunities, for improved pollution control and natural resource management.

The 142 countries in the 2002 ESI include sixteen of the twenty-two Arab League members. Bahrain, Comoros, Djibouti, Qatar, the West Bank and Gaza, and Yemen were omitted.¹ Each of these countries fell short of the required variable coverage. In addition, Bahrain and Comoros fell below both the population and area limits of the ESI, and Djibouti and Qatar fell below the population threshold.

Background

As the world community focuses on sustainable development objectives in the context of the World Summit on Sustainable Development in Johannesburg, with considerable emphasis being placed on quantifiable metrics of performance, the Arab world finds itself far behind on many aspects of environmental sustainability.

Environmental sustainability has been understood as a fundamental aspect of development for some time, going back at least as far as the Brundtland Commission Report (World Commission on Environment and Development 1987). At the international level, environmental performance is now an uncontroversial component of the Millennium Development Goals, representing the latest in a long series of global consensus documents urging such a focus. At the private-sector level, firms, investors, and consumers now routinely consider environmental issues to have a far higher priority than they did in the past, recognizing the impact that environmental performance may have on financial performance.

Quantifying environmental performance has been difficult, though recent advances now make it possible to offer useful comparative metrics (Esty 2002). The ESI is only one such measure. Other cross-national measures include the “Wellbeing Index” (Prescott-Allen 2001) and the Index of the Consultative Group on Sustainable Development Indicators (CGSDI) (2002). Despite their different assumptions and emphases, all three of these recent measurement

efforts agree that Arab states are in significant environmental trouble compared to the rest of the world. Arab states are, on average, 11 points lower than other countries on Prescott-Allen's "Environmental Wellbeing Index" (which ranges from 20 to 72) and 178 points lower than other countries on the CGSDI Environmental Index (which ranges from 87 to 763). For its part, the ESI ranks the average Arab country slightly more than 10 points below other countries (the ESI ranges from 24 to 74). Each of these differences is statistically significant (at the 0.002 level or greater). It is also striking that for each of these indicators the lowest worldwide scores are found in Arab countries.

Table 1. Arab Countries in Comparison to Rest of World, Three Sustainability Indicators

	ESI		Wellbeing Index		Consultative Group Overall Index	
	Arab countries	Rest of world	Arab countries	Rest of world	Arab countries	Rest of world
Minimum	24	32	25	27	218	238
Maximum	52	74	41	64	476	740
Average	41	51	32	43	412	495

Sources: Environmental Sustainability Index 2002; Prescott-Allen 2001; CGSDI 2002

These differences are independent of the level of income per capita. Thus, even when differences in per capita income are controlled for, Arab states still have significantly sub-par levels of environmental sustainability across each of these three aggregate sustainability indicators. This pattern holds whether one takes the more narrow environmental formulations of these indexes or the broader formulations that combine human and environmental aspects of sustainability.

Of course, the Arab world faces some unique challenges based on the geography and climate of the region. The indices surveyed above may not fully reflect these circumstances.² But one can only conclude that there is a distinctive Arab pattern to dynamics of environmental sustainability and that this pattern reveals a number of critical issues that deserve attention. In the following sections we analyze this pattern in more detail.

Situational Constraints

Because Arab states lie predominantly in extremely arid regions, and because water is such a fundamental aspect to environmental sustainability, it is logical

to suspect that the low sustainability scores found in Arab states are a function of location. When we test this proposition empirically we find that, at the highest level of aggregation, the degree to which a country is arid does correlate significantly with sustainability measures, controlling for per capita income and population density.³ However, even when this measure of aridness is included as a control in the analysis, scores of Arab states remain significantly below other states. Geography, therefore, appears to matter, but not enough to account for the systematic under-performance observed among Arab states. This reality clearly emerges in Table 2. Only five Arab countries score above their peers (defined according to per capita income levels), and then by very small increments. The rest score below their peers, some quite severely.

Table 2. ESI Scores and Desert Extent of Arab League Members

Country	ESI	Peer-Group ESI	Percent of Territory Desert
Algeria	49.4	48.2	86.4
Egypt	48.8	48.2	92.3
Iraq	33.2	48.2	76.4
Jordan	51.7	48.2	76.4
Kuwait	23.9	54.5	100.0
Lebanon	43.8	48.2	0.0
Libya	39.3	53.5	95.9
Mauritania	38.9	47.3	63.7
Morocco	49.1	48.2	51.2
Oman	40.2	53.5	91.7
Saudi Arabia	34.2	53.5	100.0
Somalia	37.1	44.2	19.0
Sudan	44.7	47.3	29.2
Syrian AR	43.6	48.2	29.1
Tunisia	50.8	48.2	39.8
U.A.E.	25.7	54.5	100.0

Sources: Environmental Sustainability Index 2002; SEDAC's Population, Landscape, and Climate Estimates (PLACE) Data Set

Note: ESI scores are presented as percentiles, which in theory range from 0 to 100; in practice global ESI scores range from 23.9 to 73.9. Peer group ESI is the average ESI score for countries within the same GDP per capita quintile.

It is important to keep in mind that the purpose of the ESI and other efforts to quantify environmental sustainability is to facilitate more effective decision-making. Assigning blame or praise is not the goal. Thus, even if it is true that geographic constraints account for some part of Arab countries' low scores, what matters (from the perspective of supporting more effective decision-making) is better understanding the

nature of the challenges facing each country and the opportunities available within each country to better address these issues.

When one goes through the exercise of assessing the more specific nature of the challenges and the readiness to cope with them, a number of striking facts emerge. Arab countries score below average on seventeen of the ESI's twenty indicators, as summarized in the following table.

Table 3. Arab League ESI Indicator Scores as Compared to Rest of World

Indicator	Average Arab League Member Score	Average Rest of World Score
Air quality	-0.28	0.04
Water quantity ***	-0.58	0.07
Water quality ***	-0.54	0.07
Biodiversity	-0.12	0.01
Terrestrial systems **	0.54	-0.07
Reducing air pollution	-0.14	0.02
Reducing water stress ***	-0.76	0.12
Reducing ecosystem stress ***	0.54	-0.07
Reducing waste & consumption pressures	-0.14	0.14
Reducing population growth **	-0.63	0.08
Basic human sustenance	0.22	-0.03
Environmental health	-0.06	0.01
Science and technology	-0.23	-0.19
Capacity for debate ***	-0.43	0.05
Environmental governance ***	-0.61	-0.02
Private sector responsiveness	-0.28	-0.12
Eco-efficiency **	-0.52	0.07
Participation in international cooperative efforts *	-0.33	0.02
Reducing Greenhouse Gas Emissions *	-0.44	0.06
Reducing Transboundary Environmental Pressures	0.03	0.04

Source: Environmental Sustainability Index 2002

*** = statistically significant at 0.001 level or greater.

** = statistically significant at 0.01 level or greater.

* = statistically significant at 0.05 level or greater.

Note: These indicator scores are presented as the average of standardized "z-scores," which range from about -3 to about +3.

The Arab states are, in general, far below average on measures of environmental systems (the quality of air and water, for example) and on measures of social and institutional capacity and global stewardship. By contrast, they score above average on preserving

land from human influence and in reducing human vulnerability to environmental harms. The above-average performance in reducing human vulnerability is especially notable.

This broad picture is on balance consistent with other regional assessments. In both 1997 and 2000, the United Nations Environment Program (UNEP) Global State of the Environment Report identified water, contamination and waste, land degradation, and coastal degradation as the most critical problems in west Asia, and classified air pollution and habitat fragmentation as less severe (UNEP 1997, 2000). Similarly, the Arab Declaration to the World Summit on Sustainable Development drew special attention to problems associated with population growth, water scarcity, and limitations in social and governmental capacity (United Nations Economic and Social Council 2001). The Abu Dhabi Declaration of 2001 emphasized water shortages, land degradation, inefficient resource use, urbanization problems, and coastal degradation (Global News Wire 2001a).

In the media, the discussion of environmental issues is less balanced than these expert assessments. Issues of water and of biodiversity and habitat conservation receive almost all the attention. The following table summarizes the relative frequency of broad categories of environmental concern in the region as reflected in the regional press:

Table 4. Relative Frequency of Mention of Environmental Issues in Gulf News, 2001–2002

Issue	Number of Mentions	Proportion of Total
Biodiversity and Habitat Conservation	346	48.2%
Water	310	43.2%
Air Pollution	39	5.4%
Climate Change	23	3.2%

Source: Lexis-Nexis Academic Universe was used to identify *Gulf News* articles.

Note: Analysis was performed during June 2002, covering period 1 January 2001 through 31 May 2002. Some double counting resulted from press reports that mentioned multiple terms.

Critical Issues

To provide a more detailed understanding of the region's environmental situation, we discuss below some of the most critical challenges facing the Arab world.

Water

Water shortages are serious in many Arab countries. With 10 percent of the world's land, the Arab region controls only 1.2 percent of the global water reserves and relies on imports from outside the region for 60 percent of its needs.⁴ By 2025, the shortage is expected to reach 30 billion cubic meters (Gulf News May 2002).

For the measure of water stress used in the ESI (the percent of territory in which water consumption exceeds availability by 40 percent or more), the average Arab state had a value of 71 percent as compared to 20 percent for other states. African members of the Arab League countries fare better on water issues than do the Arabian Peninsula and West Asian countries.

Table 5. Water Indicators

Country	Water Quantity	Water Quality	Reducing Water Stress
Algeria	-1.04	-0.18	-0.18
Egypt	-0.27	-0.55	-0.82
Iraq	-0.08	-0.66	-0.47
Jordan	-0.70	-0.53	-0.45
Kuwait	-1.09	-1.10	-2.79
Lebanon	-1.07	-0.79	-1.48
Libya	-0.66	-0.75	-0.61
Mauritania	0.14	-0.53	0.59
Morocco	-1.07	-0.69	-0.27
Oman	-1.06	-0.05	-1.54
Saudi	-1.08	-0.56	-0.59
Somalia	-0.08	-0.25	0.26
Sudan	-0.01	-0.75	0.45
Syrian AR	-0.18	-0.40	-0.76
Tunisia	-0.64	0.05	-0.62
U.A.E.	-0.36	-0.92	-2.87
Arab average	-0.58	-0.54	-0.76
World average	0.00	0.00	0.11

Source: Environmental Sustainability Index 2002

See Annex 1 for variable details. Units are averages of z-scores across multiple variables.

For countries where water inflows and groundwater resources are far below levels needed to support basic human needs and economic growth, greater desalination capacity is required. Some countries are already investing in ambitious infrastructure development along these lines, but there are signs that demand is exceeding supply (Middle East Economic Digest 2001). More troubling is the acknowledged failure to integrate planning for meeting water needs

with other aspects of social and resource planning. The 2002 Arab Development Report draws attention to the weak conservation and reuse programs; the failure to come to grips with tradeoffs among agriculture, industrial, and human water needs; and the lackluster attention paid to the challenges of managing transboundary freshwater resources (United Nations Development Program [UNDP] 2002). Regional assessments increasingly raise concerns about the ability of the region to meet freshwater needs over the coming decades in the absence of effective integrated planning (*Middle East Economic Digest* 2001).

These interdependencies lead us to think that the countries with the most severe long-term vulnerability from water problems are those that have highest water scarcity, most rapid population growth, and lowest levels of governmental capacity. Among Arab League members, Iraq, Libya, and the Syrian AR have especially worrisome combinations of these three factors.

Air pollution

Air pollution receives far less attention among Arab countries than issues of water scarcity, although it now receives more attention than it used to. Our ability to quantify air quality problems and to understand opportunities for progress is limited by the extremely poor state of global air quality monitoring. Given the limited data on ambient concentrations, we can more reliably compare Arab countries in terms of emissions of air pollutants, which are relatively well quantified. On this score, the Arab countries generally exhibit higher levels of emissions than other countries, particularly of oxides of nitrogen and volatile organic compounds. We anticipate the most severe problems where emissions and vehicle densities are highest, governmental response capacity is lowest, and growth is fastest. Accordingly, Libya, Kuwait, and Egypt are especially likely to experience ever more serious air pollution problems in the coming decades in the absence of significant change.

Wildlife, habitat, and biodiversity conservation

Wildlife conservation is the most frequently discussed environmental sustainability issue among Arab states. Arab states are stewards to unique landscapes and rare species—they account for 35 percent of the world's desert biome,⁵ for example—and this has clearly generated a special sense of responsibility among elites in the region. A number of Arab countries take wildlife stewardship seriously and have launched programs to protect species and habitat.⁶

The ESI indicators pertaining to anthropogenic impact on the land show very strong scores for Arab states. Satisfaction with this apparent success must be tempered by the realization that settlement patterns in desert areas may naturally lead to relatively low human impact. Nevertheless, the habitat restoration and wildlife conservation programs that have been implemented have been impressive and deserve praise. We do not anticipate major problems in this area over the next two or three decades.⁷

The great importance assigned to wildlife conservation by Arab leaders could be seen, however, as out of sync with the region's priorities as identified by environmental experts. With the exception of coastal environments, which major regional assessments agree deserve greater attention, regional expert assessments do not draw special attention to issues of wildlife and habitat preservation. The 2001 Abu Dhabi Declaration on the Future of the Arab Environment Program, for example, conspicuously ignores wildlife conservation and instead draws quite explicit attention to other more pressing issues as follows:

[The] major environmental problems of priority faced by the Arab countries at the beginning of the twenty-first century are:

- severe shortage of water resources, both in quantity and quality;
- limitation of available lands and deterioration of available land resources;
- unsustainable consumption of natural resources;
- rapid rates of urbanization and associated problems;
- deterioration of coastal and marine areas.

For wildlife and habitat protection to receive almost as much attention in the press as freshwater issues, and almost ten times as much as either air pollution or climate change (as reflected in Table 4), may reflect an imbalance in priorities. It will be important for Arab societies to have an open and informed debate about the relative importance of wildlife conservation versus other issues in the coming years.

Table 6. Wildlife, Habitat, and Biodiversity Conservation Indicators (in Percent)

Country	Percentage of mammals endangered	Percentage of Birds Endangered	Percentage of Territory with Very Low Human Influence	Percentage of Territory with Very High Human Influence	Percentage of CITES-reporting Requirements Met	Percentage of Territory Protected
Algeria	14.1	3.1	80.4	0.5	60.0	2.4
Egypt	12.2	4.6	70.1	2.4	19.0	0.1
Iraq	12.3	6.4	3.7	1.2	0.0	0.0
Jordan	11.3	5.7	2.1	1.0	35.0	3.1
Kuwait	4.8	28.0	0.1	7.0	0.0	1.0
Lebanon	10.5	4.5	0.0	14.5	0.0	0.5
Libya	11.8	1.1	80.4	0.1	0.0	0.1
Mauritania	16.4	0.7	79.5	0.0	0.0	0.5
Morocco	15.2	4.3	17.5	1.5	60.9	0.7
Oman	16.1	9.3	54.0	0.8	0.0	12.5
Saudi Arabia	9.1	9.7	44.3	0.4	0.0	29.6
Somalia	11.1	2.4	17.7	0.1	7.7	0.3
Sudan	9.0	0.9	41.4	0.2	56.3	4.9
Syrian AR	6.3	3.9	0.1	2.0	0.0	0.0
Tunisia	14.1	2.9	26.2	4.3	100.0	0.3
U.A.E.	12.0	11.9	0.2	2.6	66.7	0.0
Arab average	11.7	6.2	32.3	2.4	25.4	3.5
World average	13.0	4.2	18.6	7.1	57.0	8.4

CITES is the Convention on International Trade in Endangered Species
Source: Environmental Sustainability Index 2002

Climate change

For some scholars and policymakers, a country's approach to climate change is the acid test of its approach to sustainability. In a world in which billions face present-day crises concerning food, water, shelter, and fuel, we believe that such a singular focus cannot be justified. Nevertheless, one can make a strong case that the nations of the Arab world are slighting the problem of climate change. The lack of focus on greenhouse gas emissions may, over the coming decades, appear to be short sighted.

Table 7. Climate Change Indicators

Country	CO ₂ Emissions per Capita*	CO ₂ Emissions per Unit GDP**	Energy Consumption per GDP***	Renewable Energy as Percent of Total Energy****
Algeria	1.0	2.0	8.6	0.2
Egypt	0.4	1.5	9.4	7.8
Iraq	1.0	3.2	20.6	0.5
Jordan	0.6	2.2	11.5	0.1
Kuwait	5.1	2.9	15.3	0.0
Lebanon	1.4	2.4	12.2	3.1
Libya	1.9	2.8	12.2	0.0
Mauritania	0.3	2.0	11.5	0.6
Morocco	0.3	0.9	4.3	3.7
Oman	2.3	2.3	13.6	0.0
Saudi Arabia	3.8	3.6	19.9	0.0
Somalia	0.0	0.1	3.3	0.0
Sudan	0.0	0.2	4.8	14.4
Syrian AR	0.9	2.7	15.8	9.7
Tunisia	0.7	1.2	5.2	0.3
U.A.E.	10.2	4.9	23.0	0.0
Arab average	1.6	2.2	11.9	2.5
World average	1.1	1.5	9.1	16.6

Source: Environmental Sustainability Index 2002

*Metric tons of carbon per person

**Metric tons per US\$ GDP

***Billion BTU/US\$ million GDP

****Renewable energy production as a percent of total energy consumption

For each of the core climate change indicators, the Arab League average exceeds world averages. And these averages mask dramatic extremes within the Arab world. The United Arab Emirates has almost double the per capita carbon dioxide emissions of the United States, for example; and Kuwait's emissions are only slightly less than those of the United States. If it were not for the extremely low-emission countries such as Somalia and Sudan, the Arab average on greenhouse gas emissions would be far higher.

Arab League members are not playing a leading role in the world community's response to climate change. Only three have signed or ratified the Kyoto Protocol, although eighteen of twenty-two have ratified the Climate Change Convention (United Nations Framework Convention on Climate Convention 2001, 2002). The reluctance to participate in the Kyoto Protocol is especially striking, since Kyoto requires no specific action on the part of Arab states. Moreover, very few Arab states have made concrete greenhouse gas reduction targets outside the framework of the Kyoto Protocol, although even countries that have backed away from the Kyoto approach, such as the United States, have taken that step.

Taking into account the energy-related issues involved, the lack of focus among Arab states on the climate change problem—and even hostility in some quarters—may not be surprising. It seems clear, however, that over multiple decades such opposition is not sustainable. We expect that Arab states that find productive ways to contribute to more effective management of the global climate change problem will be better positioned competitively and with regard to environmental well-being. As Sheik Hamdan bin Zayed Al Nahyan of the United Arab Emirates put it, “The stakes are high for us, and high for our planet” (Global News Wire, February 2002).

Driving Forces

Many of the data points collected for the purposes of creating the ESI cut across multiple environmental domains because they contribute to a range of environmental sustainability challenges. Chief among these multidimensional issues are population and consumption.

Arab League countries have among the highest population growth rates in the world. Part of the rise in population can be attributed to declining infant mortality and increased lifespans—both of which reflect successful investments in nutrition and healthcare. But regardless of the reason, fertility rates remain high, and as a result the pressure on environmental systems remains serious.

As many regional assessments have observed,⁸ these population growth rates pose extraordinary challenges for Arab governments. In the words of the 2001 Abu Dhabi Declaration, “the relentless increase in population is a major long-term threat” (Gulf News 5 February 2001). High fertility rates contribute to countries having disproportionately high youth

Table 8. Population Indicators

Country	Total Fertility Rate*	Projected Change in Population by 2050 (%)
Algeria	3.1	66.2
Bahrain	2.8	300.4
Comoros	6.8	207.9
Djibouti	6.1	67.1
Egypt	3.5	64.3
Iraq	5.3	127.1
Jordan	3.6	128.5
Kuwait	4.2	180.7
Lebanon	2.5	35.4
Libya	3.9	106.4
Mauritania	6.0	207.9
Morocco	3.4	66.0
Oman	6.1	218.0
Qatar	3.9	45.3
Saudi Arabia	5.7	185.4
Somalia	7.3	240.5
Sudan	4.9	99.9
Syrian AR	4.1	105.9
Tunisia	2.3	46.5
U.A.E.	3.5	53.6
West Bank and Gaza	5.9	239.4
Yemen	7.2	295.0
Arab country average	4.6	140.3
World average	3.4	66.2

Source: 2002 ESI; original data from Population Reference Bureau, 2001 World Population Data Sheet

*Total fertility rate: number of children born per woman

populations, which puts a burden on social services and heightens the need for employment growth as youth seek to enter the work force. High total growth rates (which take into account migration) present challenges for managing development across numerous dimensions. One recent global study concluded that high rates of population growth significantly dampen prospects for lasting economic development (Birdsall et al. 2001).

Rapid urbanization is also endemic throughout the region. The United Nations Population Division reports that on average, urban areas in the Arab world are growing a percentage point faster than in the rest of the world. Some of the poorest countries, such as Comoros, Mauritania, and Somalia, have rates of urbanization in excess of 4 percent per year, which puts tremendous strains on urban water supplies and sanitation. Cairo, the

Table 9. Ecological Footprint per Capita

Country	Ecological Footprint per Capita
Algeria	1.8
Egypt	1.7
Iraq	1.7
Jordan	1.7
Kuwait	10.1
Lebanon	3.2
Libya	4.4
Mauritania	1.2
Morocco	1.6
Oman	3.4
Saudi Arabia	6.2
Somalia	1.0
Sudan	1.1
Syrian AR	2.6
Tunisia	2.3
U.A.E.	10.1
Arab county average	3.4
World average	3.1

Source: World Wide Fund for Nature, Living Planet Report 2000

largest Arab city with a population of 10.6 million, has significant air quality and sanitation problems. Casablanca, a city of 3.3 million, properly disposes of only 10 percent of household waste through sanitary landfills and incineration. Sana'a (Yemen), with 1.2 million people, effectively has no sanitary waste disposal facilities (Global Urban Indicators Database 2 1998). The proportion of household wastes that are processed range from only 3 percent in Damascus to 83 percent in Tunisia. Once again, despite the salience of the issue, Arab countries are largely absent from international processes aimed at improving urban environmental quality, such as the International Center for Local Environmental Initiatives' (ICLEI) Local Agenda 21 Campaign.

Consumption pressures are also high across the region, especially in the oil-producing states. Arab states have weak recycling and resource conservation programs, in part because energy has been so inexpensive for many of them. The measure in the ESI that best captures overall consumption pressures is the per capita Ecological Footprint, calculated by the Redefining Progress Institute and World Wide Fund for Nature. The Ecological Footprint is a measure of the implicit land area required to support a country's levels of natural resource consumption. Although the Arab states as a whole have a Footprint measure close to the world average, a few states are

markedly above this average. As conclusions from many regional assessments indicate, such resource profligacy is not likely to be sustainable in the long term. Even if energy is inexpensive in the region, it comes with a significant set of spillovers in the way of water and air pollution and pressures on climate change. Countries that fail to find effective strategies to use natural resources more efficiently are likely to face more significant sustainability challenges than they would otherwise. Moreover, low resource productivity detracts from competitiveness (Porter and van der Linde 1995).

Global Engagement

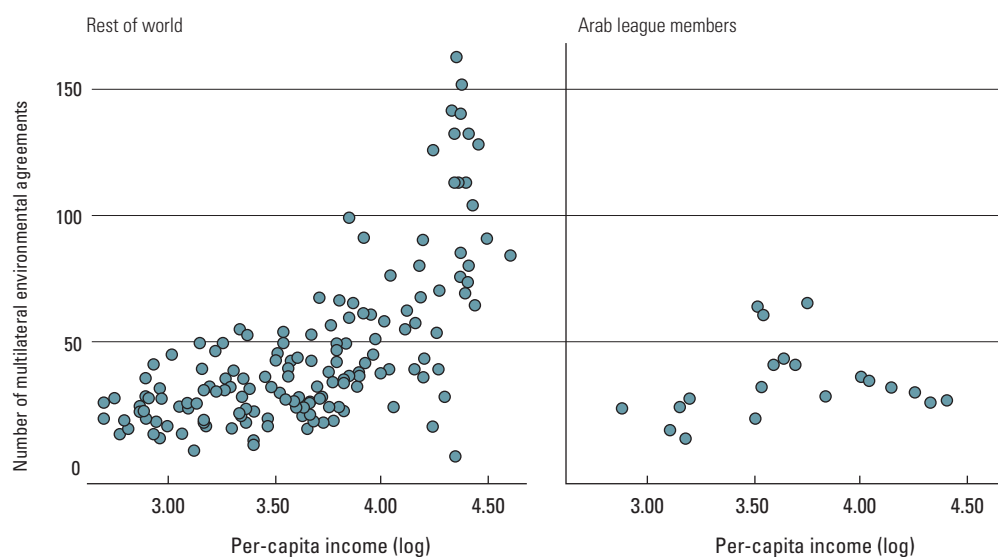
Achieving lasting improvement in the most fundamental aspects of environmental sustainability will almost assuredly require greater engagement in global processes of environmental management. There are very few purely local environmental problems. We live in an era of profound global connections that require interconnected processes of governance. Yet it is precisely on measures of global engagement that Arab League members have especially low ranks.

The sixteen Arab League members represented in the ESI are absent from significantly more of the global data sets that make up the ESI than other countries. On average they are missing from 31 percent of the ESI's global data inputs, as compared to 22 percent among other countries. Only one Arab state participates in the Global Environmental Monitoring System's air quality program, for example, and only four participate in its water quality program.

The average Arab League member is a party to only thirty multilateral environmental agreements, as compared to an average of thirty-nine for other countries.⁹ This difference is much more profound when one takes into account differences in per capita incomes. In general, as per capita income rises, participation in

environmental agreement also rises, reflecting both a greater interest in global environmental management and greater capacity to participate in international initiatives. Yet among Arab League members this relationship does not hold. The wealthiest Arab countries do not participate any more actively than the poorest. When they do become parties to multilateral environmental agreements, Arab countries are significantly more likely to do so after the treaty has already entered into force (on average 62 percent of the time) than other countries (on average 54 percent of the time). Again, this difference is accentuated when differences in income are taken into account. What this suggests is that Arab League members are significantly less likely to be among the leaders in negotiating multilateral environmental agreements.

Figure 1. Multilateral Environmental Agreements



Source: 2002 Environmental Treaties and Resource Indicators (ENTRI)

Not a single Arab League member contributes payments to the Global Environmental Facility (GEF). This is true even for those members whose per capita income is equal to or higher than many other large GEF contributors.

This pattern of environmental disengagement is paralleled within the private sector of the Arab world. A corporation based in an Arab League member state is 65 percent less likely to obtain ISO 14001 (environmental management) certification than corporations based elsewhere. Arab-based corporations are 85 percent less likely to join the World Business Council on Sustainable Development (WBCSD). While ISO 14001 and the WBCSD are admittedly not the only routes to corporate environmental progress, the large

gap reflects a fundamental difference in the degree of engagement between Arab commercial enterprises and their counterparts elsewhere.

Environmental Governance

Managing the challenges of environmental sustainability over the long run requires an ability to monitor and assess complicated dynamics, balance competing social priorities, set realistic and useful goals, and implement measures effectively and flexibly. All of this makes an institutional commitment to environmental governance extremely important. Collectively, the world's governments are searching for mechanisms that will achieve these functions. Creating regulatory systems and the other institutional structures that support sound environmental decision-making requires great effort. In this regard there are no shortcuts or magic bullets. Yet there are some generalizations that support a conclusion that the need for reform among Arab countries is acute.

As these indicators show, Arab League members lag world averages on most measures of environmental governance. The area of scientific and technical

capacity is a partial exception, with many Arab countries possessing significant capacity. For other capacity measures, however, the record is consistently more problematic. In general, Arab countries are relatively closed to effective public debate about environmental problems, their governments are prone to the kind of distortions (such as subsidies and corruption) that make efficient resource management more difficult, and their industries are not actively engaged in environmental innovation.

We know that these patterns of capacity and governance have a strong influence on environmental outcomes (Esty and Porter 2002). In an analysis of quantitative measures of environmental performance that took into account cross-national differences in air and water pollution, land protection, and greenhouse gas emissions, as well as rates of change in these measures, we found that measures of environmental capacity and governance had a far stronger correlation with environmental outcomes than any other measure, including per capita income (WEF 2002b). Countries that invest in social, commercial, and public sector capacities, and that deploy their abilities to address the complex problems of sustainability, benefit from more effective environmental outcomes.

Although there is some risk of embedding a Western bias in measures of capacity and governance, we find it quite striking that regional assessments carried out among Arab states are increasingly reaching very similar conclusions. The 2001 Abu Dhabi Declaration referred to the need to expand the involvement of civil society in governance, for example. More starkly, in the 2002 Arab Human Development Report it was concluded that:

The way forward involves tackling human capabilities and knowledge. It also involves promoting systems of good governance, those that promote, support and sustain human well-being, based on expanding human capabilities, choices, opportunities and freedoms (economic and social as well as political).

The most important of state institutions is that of representation and legislation which provides the basic link between the governance regime and the people. Liberating human capabilities in Arab countries requires comprehensive political representation in effective legislatures based on free, honest, efficient and regular elections. Reforming public administration is also a central and urgent task for Arab countries. Governments need to perform their functions as

Table 10. ESI Governance Indicators

Country	Scientific and Technical Capacity	Capacity for Public Debate	Environmental Governance	Private Sector Innovation
Algeria	-0.53	-0.57	-0.93	0.02
Egypt	-0.48	-0.91	-0.29	-0.12
Iraq	-0.32	-0.85	-1.31	-0.41
Jordan	0.37	0.41	-0.33	0.14
Kuwait	0.10	0.04	-0.65	-0.41
Lebanon	0.42	0.55	-0.59	-0.27
Libya	0.42	-0.59	-1.03	-0.41
Mauritania	-1.51	-0.19	-0.47	-0.41
Morocco	0.26	-0.55	-0.14	-0.38
Oman	0.45	-0.37	-0.28	-0.35
Saudi Arabia	0.09	-0.74	0.05	-0.40
Somalia	-1.10	-0.55	-0.71	-0.41
Sudan	-1.58	-1.04	-0.88	-0.41
Syrian AR	-0.39	-0.94	-0.81	-0.38
Tunisia	-0.50	-0.38	-0.53	-0.38
U.A.E.	0.57	-0.21	-0.80	0.09
Arab country average	-0.23	-0.43	-0.61	-0.28
World average	-0.19	0.00	-0.09	-0.14

Source: Environmental Sustainability Index 2002

providers of public services and enforcers of contracts, in an effective, efficient and transparent manner. Public sector institutions need to be reformed to encourage private sector investment and growth, to curb monopolies and to end graft and cronyism

Conclusions

Arab countries face serious threats to their environmental sustainability. There are strong reasons to believe that if these threats are not effectively managed, broad social and economic harm will result. Likewise, there is reason to believe that countries that do effectively manage these challenges will reap benefits including improved competitiveness (Esty and Porter 2001). The 2002 Arab Human Development Report draws explicit linkages between human development and the environment. The evidence presented in this chapter lends further support to the significance of this relationship.

There is no single blueprint for environmental progress. Although some countries perform better than others, all face issues that need to be addressed forthrightly. The most broad-reaching deficiencies in the Arab world have to do with systems of environmental capacity and governance. We see no foundation for thinking that Arab countries will be able to manage the challenges they face in the way of water scarcity, pollution levels, climate change, and population growth in the absence of major institutional reform. But the Arab world also has great strengths. Many countries have resources and capacities that make better environmental performance a very real possibility—if a commitment to greater environmental sustainability is made.

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Endnotes

1. The ESI does not contain data on all countries; countries that were very small in size or population, or that were not well-represented in major global data sets, were omitted.
2. Efforts are underway to develop a set of regional indicators that might help to create a more rounded picture of the environmental scene in the Arab world.
3. The measure of aridity used was "percent of area classified within the biome 'desert and xeric shrubs' in the Population, Landscape, and Climate and Estimates (PLACE) data set, version 1.1. <<http://beta.sedac.ciesin.columbia.edu/plue/nagd/place.html>>.
4. Turkey and Ethiopia are the most important exporters of water to the Arab world.
5. Calculated using PLACE data set (endnote 3), which contains variables measuring the extent of each country's territory occupied by the world's biomes.
6. See, for example, Environmental Research and Wildlife Development Agency, "Environmental Strategic Plan for the Emirate of Abu Dhabi 2000–2004," which documents significant successes in habitat restoration and species conservation.
7. However, an occasional controversy is inevitable even where the overall pattern is strong, as the recent dispute between the Convention on International Trade in Endangered Species and the United Arab Emirates (which has been resolved successfully) illustrates.
8. "The Arab Declaration to the World Summit on Sustainable Development (WSSD) Johannesburg, South Africa," . The Arab Ministers Responsible for Development, Planning, and Environment, in their meeting held at the League of Arab States in Cairo, on 24 October 2001 (8th Shaaban 1422 Hijri) in preparation for the WSSD.
9. The data reported in this paragraph were calculated using the Environmental Treaties and Resource Indicators database, Center for International Earth Science Information Network, revised beta version, July 2002. <<http://sedac.columbia.edu/entri/>> (2002).

Annex 1: Data Sources

Except where otherwise noted, the data used in this chapter come from the 2002 Environmental Sustainability Index. Complete documentation and data sets are available for download at <http://www.ciesin.columbia.edu/indicators/ESI/>. The following table lists the variables included.

Table 11. ESI Building Blocks

Component	Indicator	Variable
Environmental Systems	Air quality	Urban SO ₂ concentration
		Urban NO ₂ concentration
		Urban TSP concentration
	Water quantity	Internal renewable water per capita
		Per capita water inflow from other countries
	Water quality	Dissolved oxygen concentration
		Phosphorus concentration
		Suspended solids
		Electrical conductivity
	Biodiversity	Proportion of mammals threatened (%)
		Proportion of breeding birds threatened (%)
	Land	Proportion of land area having very low anthropogenic impact (%)
Proportion of land area having high anthropogenic impact (%)		
Reducing Stresses	Reducing air pollution	NO _x emissions per populated land area
		SO ₂ emissions per populated land area
		VOCs emissions per populated land area
		Coal consumption per populated land area
		Vehicles per populated land area
	Reducing water stress	Fertilizer consumption per hectare of arable land
		Pesticide use per hectare of crop land
		Industrial organic pollutants per available fresh water
		Proportion of country's territory under severe water stress (%)
	Reducing ecosystem stresses	Change in forest cover 1990–2000 (%)
		Proportion of territory experiencing acidification exceedence (%)
	Reducing waste and consumption pressures	Ecological footprint per capita
		Radioactive waste
	Reducing population growth	Total fertility rate
		Change in projected population between 2001 and 2050 (%)
Reducing Human Vulnerability	Basic human sustenance	Proportion of undernourished in total population
		Proportion of population with access to improved drinking-water supply (%)
	Environmental health	Child death rate from respiratory diseases
		Death rate from intestinal infectious diseases
		Age 5 and younger mortality rate

Source: Environmental Sustainability Index 2002

Table 11. ESI Building Blocks (continued)

Component	Indicator	Variable
Social and Institutional Capacity	Science and technology	Technology achievement index
		Technology Innovation Index
		Mean years of education
	Capacity for debate	IUCN member organizations per million population
		Civil and political liberties
		Democratic institutions
		Proportion of ESI variables in publicly available data sets (%)
	Environmental governance	WEF Survey Questions on Environmental governance
		Land area under protected status (%)
		Number of sectoral EIA guidelines
		FSC accredited forest area (as a % of total forest area)
		Control of corruption
		Price distortions (ratio of gasoline price to international average)
		Subsidies for energy or materials usage
	Private sector responsiveness	Number of ISO14001 certified companies per million US\$ GDP
		Dow Jones Sustainability Group Index
		Average InnoVest EcoValue rating of firms
		World Business Council for Sustainable Development members
		Private sector environmental innovation
	Eco-efficiency	Energy efficiency (total energy consumption per unit GDP)
Renewable energy production (as a % of total energy consumption)		
Global Stewardship	Participation in international collaborative efforts	Number of memberships in environmental intergovernmental orgs.
		Proportion of CITES reporting requirements met (%)
		Levels of participation in the Vienna Convention/Montreal Protocol
		Levels of participation in the Climate Change Convention
		Montreal protocol multilateral fund participation
		Global environmental facility participation
		Compliance with Environmental Agreements
	Greenhouse gas emissions	Carbon lifestyle efficiency (CO2 emissions per capita)
		Carbon economic efficiency (CO2 emissions per US\$ GDP)
	Reducing transboundary environmental pressures	CFC consumption (total times per capita)
		SO2 exports
		Total marine fish catch
		Seafood consumption per capita

Source: Environmental Sustainability Index 2002