

## INTRODUCTION

# GREEN ECONOMY IN A CHANGING ARAB WORLD

2011 Report of the Arab Forum for Environment and Development (AFED)

Throughout human history, nature has been treated as a supplier of infinite natural resources. Activities were assessed purely in financial terms, without economic valuation of non-cash benefits and without taking into account environmental and social considerations. There was an implicit assumption that natural and human-made capitals were substitutable, that nature's ability to supply humans with life support benefits was boundless, and that nature had an unlimited capacity to absorb the waste generated by economic activities. Experience has shown otherwise, as evidenced by the deteriorating environmental conditions worldwide.

An alternative paradigm of viewing the interaction between human activities, social conditions, and the environment is the green economy. In contrast to mainstream economic planning, which deals with the environment in isolation, the green economy aligns the macroeconomic policies of the state with environmental and social policy goals. It is an approach based on integrating economic development, environmental sustainability, and social equality. The green economy assigns a value to natural capital, allowing externalities of human activities to be incorporated into decision-making processes, in the hope of achieving economic development without exceeding the ecological limits of ecosystems or undermining social conditions.

The Arab Forum for Environment and Development (AFED) believes that although ecosystems have inherent values that must be protected, arguments for preserving the integrity of the earth's ecosystems are not solely about protecting the planet's forests, oceans, and climate only for nature's sake. Rather, these arguments are also about seeking to improve the economic and social conditions of current and future human generations. Freshwater shortages, degradation of topsoil, and toxics in the air should not be viewed as unintended consequences or by-products of economic growth that can be tolerated and absorbed. Such thinking will afford nations only more time to buy. If not addressed prudently, these environmental damages will over time have rapidly increasing aggregate impacts that may lead to systemic strain on resources, economies, and health. They may even trigger social disruption and political turmoil. These are unsustainable costs to any society.

Livelihoods and economies have always been dependent on the resources and services made available by nature's endowments. Further deterioration of natural and environmental assets by human activities will undermine the long-term productive capacity of these ecosystems--oceans, soils, and lakes--on which economies rely for many essential needs including clean water, food, fiber, and medicines. Therefore, there is a need to live by a more balanced model and according to an agenda that caters to economic, social, and environmental progress equally. All three spheres are interdependent and efforts to accelerate economic growth in ways that weaken environmental or social conditions will eventually be seriously undermined by aggregate impacts and strains.

## SHORTFALLS IN ARAB ECONOMIES

Arab development agendas suffer from persistent shortfalls across a range of dimensions. Poverty continues to afflict about 65 million Arabs, according to the Arab Human Development Report 2009. The report found that the share of the population under the upper national poverty line was about 29% in Lebanon and Syria, 41% in Egypt, and 59.5% in Yemen. Rural populations bear the brunt of income poverty and the resultant economic insecurity.

Employment conditions in Arab countries offer another disturbing measurement of economic insecurity. The average rate of unemployment in Arab countries stood at 14.8% in 2009. Youth unemployment rates averaged 27.3% in 2007, accounting for more than 70% of unemployment in Egypt, Jordan, Mauritania, and Yemen. The percentage of those 15 years of age or younger within the total Arab population was 35.5% in 2005. It is estimated, therefore, that Arab countries will need to create 51 million new jobs by 2020 just to accommodate new entrants into the work labor force (while keeping current unemployment rates the same). These figures cast doubt on the ability of Arab economies, as currently structured, to expand and create employment opportunities for the large number of job seekers over the next decade.

The acute unemployment and persisting poverty in some Arab countries point to the failure of the Arab development model of the past four decades. How else do we explain that 45 million people lack access to clean water or safe sanitation or that 60 million people lack access to affordable energy services, relying instead on non-commercial fuels like wood, dung, and agricultural residues – to meet their daily heating and cooking needs? The challenge remains as valid now as it was in the 1970s, 1980s, and 1990s: Why have Arab economies not been able to provide robust employment opportunities for job seekers, many of them educated? Why have Arab economies not been able to meet the basic needs of millions of people?

The answer lies in the inability or unwillingness of Arab states since the 1970s to diversify their economies. Although oil and gas revenues have unquestionably contributed to rapid economic and social development in Arab countries, Arab economies have remained over the course of the past four decades vulnerable to global oil price volatilities. The boom and bust cycles in the global oil markets, particularly in the 1970s, 1980s, and 1990s, have subjected Arab countries to severe economic shocks, the results of which were manifested in negative economic growth (Kuwait and Jordan), high levels of debt (Egypt, Morocco), and the halving of GDP (Saudi Arabia). In fact, the Arab Human Development Report (AHDR) 2009, asserts that “for nearly two and a half decades after 1980, the region witnessed hardly any economic growth”, and that “World Bank data show that real GDP per capita in the Arab countries grew by a mere 6.4 per cent over the entire 24 year period from 1980 to 2004 (i.e. by less than 0.5 per cent annually).”

The failure of Arab states to promote economic diversification through agricultural and industrial development lies behind their inability to create real employment opportunities. The AHDR concludes that “overall, the Arab countries were less industrialized in 2007 than in 1970, almost four decades previously.” Arab governments’ policy choices that resulted in long-standing neglect of agriculture, rural development, and manufacturing, are those same policies that have created consumptive and import-based economies.

Today, buoyed by the 2002-2008 rise in oil prices, the Arab oil-producing countries are relentlessly pursuing investments in energy-intensive industries such as petrochemicals, aluminum, cement, and steel. Arab states are also promoting the extraction of raw materials including phosphates, copper, gold, and iron. As commodity products earmarked for export markets, earned income from these investments will remain vulnerable to highly volatile global commodity price fluctuations and boom and bust cycles. In addition, because they are capital intensive, these commodity industries require high initial investments but generate low levels of employment. This approach leaves Arab economies more vulnerable while failing to create a significant number of jobs.

The high income from these activities has contributed to the development of mega real-estate projects in almost all major cities of the Arab world, including those cities in war zones or under occupation. Office towers, mixed-use resort-commercial centers, and even entire cities built from scratch are the dominant forms of real-estate developments. The fast pace of conception and construction of these cities combined with the incentives for overconsumption (via energy and water subsidies), raises many questions about the long-term implications of these investments, economically, socially, and environmentally.

Arab development agendas have so far not addressed the food and water security needs in the region. The management of freshwater resources has always been dominated by a culture of over-exploiting water supplies to placate rising demand, while ignoring the management of this demand. As a result, it is feared that the per capita freshwater share will be so diminished by 2015 as to become a limitation to economic development, human health and wellbeing, and perhaps even becoming life-threatening in some Arab countries. Moreover, access to water resources is contested in many parts of the Arab world, resulting in many instances in unequal access by large corporate users, wealthy investors, and others in entrenched power positions. It has proven difficult to mobilize sufficient support for vital policy reforms, in particular as these entrenched interests benefit significantly from and thus actively preserve the status quo.

Food security poses another major threat. Most Arab countries rely on food imports to offset the increasing deficit in food supply, and consequently run large trade deficits in agricultural commodities. Arab countries are the largest net importers of cereals in the world, with Egypt being the world's biggest wheat importer. As a result, most countries in the region are highly vulnerable to increases in food prices, such as those in recent years. The net import bill for main food commodities was estimated to be \$30 billion in 2008, including about \$18.3 billion for cereals. In constant 2008 prices and a growth rate of net imports equal to the projected growth in Arab population of about 1.6% per annum over the period 2010-2030, the net import bill for the main food commodities and cereals, will reach about \$96 billion and \$25 billion, respectively, in 2030. For cereals alone, the cumulative cost of net imports over the period 2010-2030 will be over \$450 billion.

In addition to the strain on public finances, Arab countries are vulnerable to export bans by other countries. For example, Egypt was left scrambling to replace more than 500,000 tons in wheat purchases after Russia imposed a nearly 11-month grain export ban in August 2010, as a drought decimated its crops. The inability of Arab countries to become self-sufficient in essential food commodities is also attributed to the adoption of policies that replaced the cultivation of cereals, which are likely to be affordable by the majority of the population, with feed (to raise

meats) and vegetables, commodities that are affordable by only the rich. It has been estimated that Egypt grows more food to raise animals than for humans to consume.

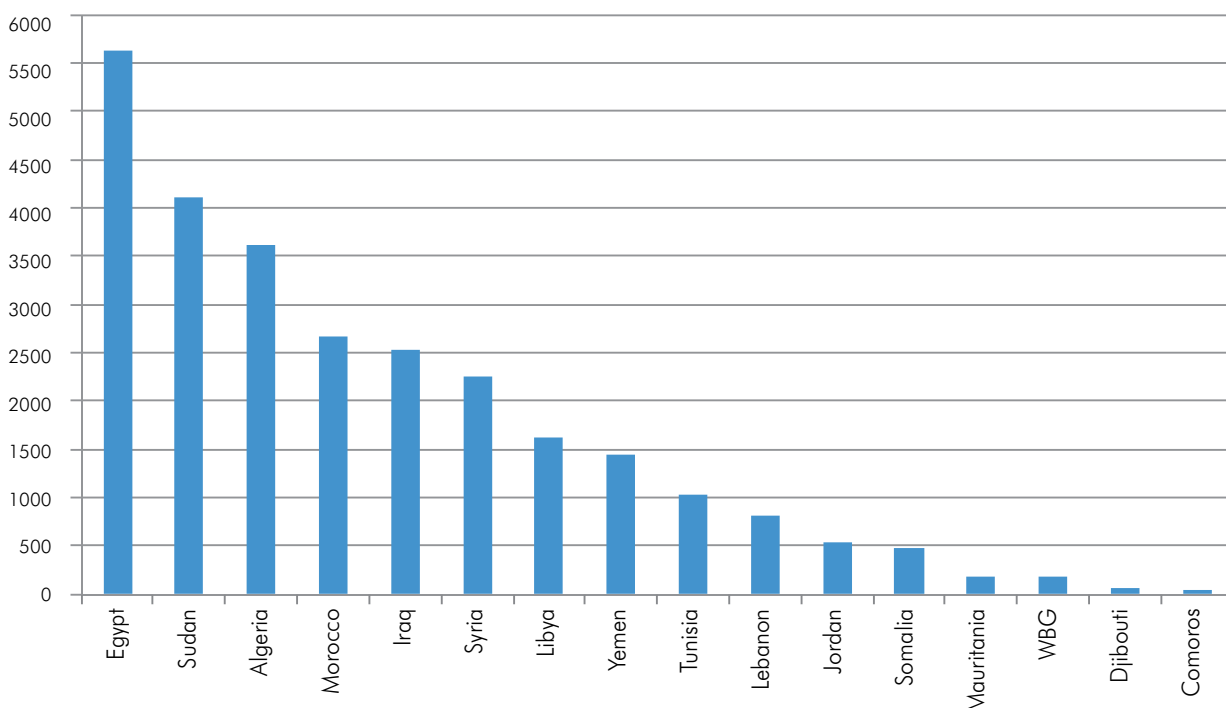
Compounding the issues of poverty on one side and food and water security on the other is climate change. The 2009 AFED report on the effects of climate change on Arab countries concluded that the impact of climate change in the region would significantly aggravate the risks of water and food shortages, threatening many livelihoods, particularly those with limited capacities to adapt. Despite stern warnings about impending threats to agricultural productivity and water availability caused by climate change, Arab governments have yet to formulate coherent strategies of mitigation and adaptation.

The economic development paradigms adopted by Arab states have contributed to impoverishment of the environment, reflected in the progressive deterioration in the qualities of air, water, and soil. For example, the release of toxic emissions by power plants, vehicles or industrial plants into the air causes harm to those exposed to air pollution. The dumping of wastewater into rivers or lakes may make freshwater unusable. Unsustainable agricultural methods and overgrazing cause soil degradation and undermine land productivity over time. Overexploitation of renewable water resources beyond their regeneration limit will cause fast depletion and deprive future generations of resource use. These types of environmental degradations impose real economic costs and distort the wellbeing of people and communities.

An assessment of the cost of degradation in 16 Arab countries associated with three environmental categories has been prepared for the Arab Economic Forum. The study addresses the health care costs linked to inadequate potable water, sanitation and hygiene, and to outdoor air pollution as well as the land degradation costs caused by agricultural crop cultivation. According to the assessment study, the annual cost of environmental degradation in these 16 countries was US\$27 billion in 2008. The cost estimates for each country are indicated in Figure 1. The annual cost in the ten countries covered in the study with the highest GDP per capita (Algeria, Egypt, Iraq, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia, West Bank and Gaza) was on average equivalent to 3.1% of GDP, and equivalent to 8.7% of GDP in the other six countries (Comoros, Djibouti, Mauritania, Somalia, Sudan, Yemen). Of the 16 Arab countries studied, the highest annual costs were observed in Egypt at US\$5.6 billion, Sudan at US\$4.1 billion, and Algeria at US\$3.6 billion. The cost assessments of environmental degradation presented here are limited to three environmental categories, and do not include costs of rangeland, forest, and freshwater degradation, groundwater over-extraction, coastal and fishery degradation, inadequate waste management, desertification, potential losses in biodiversity and quality of protected areas, and the impacts of global climate change. Moreover, the costs of environmental degradation are sometimes incalculable. For instance, fertile topsoil, clean air, and a stable climate have no substitutes or engineered alternatives that are sustainable and economically affordable.

While monetary figures indicate the magnitude of the environmental damages imposed, and provide a measured tool of which environmental category should be prioritized, the inflicted harm must also be examined from a different angle. The poor, marginalized communities, and women and children often bear a greater burden of these costs, manifested in high child diarrheal mortality rates and child malnutrition resulting from inadequate access to clean water, sanitation,

FIGURE 1

**ESTIMATED ANNUAL (2008) COST OF ENVIRONMENTAL DEGRADATION IN THREE ENVIRONMENTAL CATEGORIES (US\$ MILLION)**

Source: Larsen, B. 2010. Cost Assessment of Environmental Degradation in the Middle East and North Africa Region - selected issues. Prepared for the Economic Research Forum, Cairo.

and hygiene. The inability of members of these groups to meet their most basic needs in health raises questions for Arab governments about social inequality and income disparities.

The shortfalls of Arab economies articulated above illustrate the negative repercussions of the “brown” economy model adopted by Arab countries. A development paradigm based on GDP growth, while contributing to social marginalization and resource depletion carries too high a risk for the wellbeing and stability of Arab societies.

### **THE ROLE OF AN ARAB GREEN ECONOMY**

The long-standing belief that sustainable wellbeing can be achieved by raising GDP growth while neglecting or undermining sociopolitical and environmental progress needs to be fundamentally reconsidered and amended. The transformation AFED advocates for Arab countries needs to position economic development, environmental sustainability, and social equality as three equally indispensable dimensions to achieving human wellbeing. This forms the basis of the green economy.

As such, the green economy is about articulating values on how we define progress and prosperity. It is also about prescribing an approach for development guided by these values. The green economy is in essence an approach where economic expansion is promoted, the biosphere is protected, and social equality is

guaranteed simultaneously, with no progress along one dimension coming at the cost of deterioration in other dimensions. This framework entails that economic investments be promoted conditioned on the sustainable use of resources within earth's ecological limits, while enabling livelihood security and economic opportunity for all.

Furthermore, the green economy is characterized by attention to the vast potential to maximize resource productivity (particularly of energy and water) and reduce waste generation. In a green economy, investments are directed to the sustainable management of natural resources to maximize their economic and environmental productivity, and their capacity to create green jobs and support the poor. To enable these efficiency and productivity gains, the green economy must eliminate subsidies (particularly to fuel, electricity, and water) and other distortive incentives. Subsidies encourage overconsumption, typically do not adequately reach the poor, cause damage to environmental resources, and undermine green investments. Broad subsidies should be replaced with targeted subsidies to those who are most in need for assistance. The public funds saved can be reallocated to finance green infrastructure projects and various green incentive programs. In a green economy, participatory governance of natural resources is adopted inclusive of all stakeholders, particularly those groups with weak institutional power. This would ensure accountability and transparency in how natural resources are managed. These green economy characteristics are particularly relevant to addressing the shortfalls of current Arab economies and the policy gaps of the past four decades.

Public policy will play a key role in enabling green economy goals and enshrining its core values in policy and practice. Making progress towards an Arab green economy will require a fundamental review and realignment of current Arab public policies. In undertaking such a review, environmental and social goals must be accorded the same level of priority granted to economic goals. The new approach should ensure that short-term economic results do not ignore long-term social and environmental policy goals.

Today, Arab countries are undergoing seminal transitions politically and demographically. Over the period 2002-2008, Arab countries have experienced rapid rates of economic growth. However, those at the bottom of the economic pyramid have not felt the effects of this latest economic boon. The political uprisings made clear the popular demand for change. These trends provide Arab governments with an opportune time to respond to these changes by offering a new agenda for development that resonates with the demands of the people of the region. Arab governments should redirect their energies and vast resources towards making a transition to a green economy.

Making a transition to an Arab green economy entails pursuing sustainable development or "green" investments in those sectors (e.g. agriculture, energy efficiency, renewable power, waste management) that have been noticeably neglected by Arab governments, as well as transforming to a sustainable or green basis those sectors (water, transportation, tourism, industry, buildings) that have been developed unsustainably as part of the brown economy.

A green development agenda for Arab countries will generate economic dividends, while improving environmental and social conditions. In addition to meeting the demand for change, an Arab green economy will address the

shortfalls of past Arab economic performance, from poverty and unemployment to food and water security threats.

The Arab green economy will demand investments anchored in physical assets including public transportation infrastructure, regional railway lines, waste-to-energy plants, renewable power plants, energy efficiency, and distributed solar energy systems in rural areas that lack grid connections. These green investments are all locally based with a captive market serving a rising population, ensuring stable dividends in the long-term while being partially sheltered from global market ups and downs. Moreover, these and other forms of green investments in clean production will generate significant and well-paying employment opportunities.

In addition, investments in natural resource sectors such as agriculture and associated value-adding industries and services are potentially vast. Investments in agricultural productivity as well as irrigation efficiency improvements are particularly needed. The production of biofuels derived from agricultural wastes is an idea that requires investments in research and development, but if risks can be hedged, the financial rewards could be high. Investments in agriculture will contribute to rural development and higher incomes, and provide the needed economic opportunities to farmers to get out of debt and poverty. Moreover, investing in sustainable agriculture and irrigation efficiency are key ingredients to achieving food and water security. Particular attention should be given to sustainable agricultural practices that contribute to soil conservation.

The second area in which an Arab green economy may address brown economy shortfalls is in making the economy more efficient over the long term, which would enhance economic productivity, lower costs, and reduce per unit of GDP waste, pollution, and the use of materials and energy. Creating a market for efficiency products and services will stimulate investments in research and new products and the creation of jobs.

Finally, the Arab green economy will contribute a new vision for a different social and political order for millions of people in Arab countries. The specifics of this new vision will take shape through the actions of millions of Arabs during this transitional period. The current uprisings in a number of Arab countries have revealed that improved sociopolitical conditions including social justice, social equality, and economic and social empowerment are integral to development. The uprisings have also revealed the extent to which the brown Arab economy has contributed to the concentration of power, wealth, and decision-making in the hands of a few, causing deprivation and marginalization.

## **ARAB GREEN ECONOMY: OPPORTUNITIES AND CHALLENGES**

To meet the demands of a truly sustainable development agenda, Arab governments need to develop long-term strategies that address the economic, social, and environmental challenges facing the region. This report was prepared by the Arab Forum for Environment and Development (AFED) to initiate and communicate a plan for a green economic development agenda. It is directed to Arab policy makers as well as to the Arab public. This report articulates the set of public policy options for making a transition to a green economy in eight sectors: agriculture, energy, water, cities and buildings, transportation, industry, waste management, and tourism. The report presents findings about

the performance of each sector under current policies and outlines the enabling conditions for green strategies and their potential benefits on economic, social, and environmental conditions.

This section presents a summary of the implications of current policies on the performance of each sector, followed by suggested policy recommendations.

### **Agriculture**

Decades of distortive state policies, negligence, and misdirected investments have driven agriculture in the Arab region to its current precarious state. Agricultural strategies by Arab governments have lacked the integrated approach needed to promote development and alleviate poverty in rural areas, where institutional structures and organizations are weak and effective extension services are lacking. As a result, small farmers remain marginalized and indebted. Foreign aid by international financing and development institutions has benefited large landholders, state agents, and multinationals, further marginalizing small and poor farmers.

Most water irrigation systems in Arab countries are inefficient. Agriculture already uses over 85% of available natural freshwater resources with an efficiency of less than 50%, reaching as low as 30% in many Arab countries. With domestic and industrial water demand rising, the allocation of water will only become more contested in coming decades. Agricultural policies and practices in Arab countries have often disregarded the protection of natural resources and ecosystems, leading to soil erosion, land degradation, salinization, water pollution, and depleted aquifers. Such externalities are exerting increased pressure on limited agricultural resources, with short and medium-term benefits achieved at the expense of long-term agricultural sustainability. As a result, crop productivity, especially of cereals, grain legumes, and fodder crops, is at a very low level in the Arab region.

A more sustainable approach is needed for utilizing the limited land and scarce water resources, built on a mix of policy reforms and best agricultural practices. Subsidy and land reforms need to be introduced. The empowerment of farmers and agricultural workers needs to be at the core of broader social and economic development strategies. The concentration of land in relatively few holdings and the problem of landless agricultural families need to be addressed. Appropriate policies are needed to maintain the sustainability of surface and ground water resources and to ensure their efficient utilization in irrigation, with emphasis on water productivity rather than yield maximization per unit of land. The application of an appropriate structure for incentives and regulations can be instrumental in raising irrigation efficiency, which in turn leads to increasing water and crop productivity and reduces negative impacts on the environment.

These policy reforms can have significant ramifications on Arab food and water security. It is estimated that raising cereal productivity from its low level of 1,700 kg per hectare in six Arab countries (Algeria, Egypt, Iraq, Morocco, Sudan, and Syria) to the world average of 3,700 kg per hectare, coupled with an improved irrigation efficiency of about 70%, would yield significant benefits. Overall cereal production in these countries would increase by 50 million tons, enough to offset the current 20 million tons shortage and even generate a surplus of about 30

million tons and 12 million tons in 2030 and 2050, respectively. If Sudan alone were able to raise cereal productivity from its current level of 567 kg per hectare to that of the world average, it would increase its cereal production by 28 million tons, enough to more than meet the estimated 2030 cereal production shortage of 20 million tons.

The dominance of rain-fed agriculture in the Arab region makes it imperative to undertake actions to promote the productivity of rain-fed crops. This objective can be achieved if suitable quality inputs become available and are used in appropriate quantities. Research is an indispensable core activity for arriving at the optimal mix of inputs and discovering drought-resistant cultivars and salt-tolerant crops. New eco-agricultural methods, protective of soils, land, and water, such as organic and conservation farming methods, should be promoted and supported.

Globally, the market for organic produce has grown from US\$15 billion in 1999 to US\$55 billion in 2009. Organic agriculture provides more than 30% more jobs per hectare than traditional forms of agriculture. Promoting sustainable agriculture in Arab countries will generate new jobs and incomes for rural populations, while creating a market niche for Arab agricultural products in international markets.

In general, investing in rural economic development cannot be underestimated. Over the past two decades, the share of the labor force in the agricultural sector in the Arab region has declined from 44% to 29%. Revitalizing the agricultural sector will thus increase its share in the labor force, improve living standards, and limit rural to urban migration. Increasing the share of workers in the agriculture sector to 40% in the Arab region would generate more than 10 million jobs in the sector (from 27.5 to 37.8 million), based on 2010 estimated Arab population figures. Given that 76% of the poor in the Arab region live in rural areas, the prospect of providing economic and social lift to rural and agricultural communities will contribute to promoting equity and stability.

Adopting the various strategies highlighted above have the potential to offer significant and tangible benefits to Arab countries. For example, shifting to sustainable agricultural practices are expected to result in savings to Arab countries of between 5-6% of GDP as a result of increased water productivity, improved public health, and protected environmental resources. Based on 2010 Arab countries' GDP figures, the savings will amount to US\$114 billion.\* In addition, revitalizing the agricultural sector through adequate investments and research and development should result in at least a 30% reduction in imports over the next five years, thus contributing to increased food security. This would result in at least US\$45 billion savings for the region over a five-year period.\*\*

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## NOTES

\* This figure is based on the estimated cost of environmental degradation provided by the World Bank for Morocco in 2000, which did not factor in other benefits and savings such as positive health impacts, increased potential for accessing external markets, reduced rural to urban migration, and increased employment opportunities.

\*\* Based on 2008 cost of imports of food for the region estimated at US\$29.9 billion, and without factoring in increase in food demand due to population growth, and increase in food prices.

## **Water**

The state of water resources is nearing a crisis in most Arab countries, driven by misguided short-term outlooks and political inertia when it comes to introducing reforms. As a result, the Arab world is expected to face the prospect of severe water scarcity as early as 2015, where the per capita water share per year will be less than 500 cubic meters. This is less than one-tenth of the global average of over 6,000 cubic meters. An annual per capita water share below 1,000 cubic meters is considered to pose a significant constraint to economic development, health and wellbeing; below 500 cubic meters, water scarcity becomes a threat to life.

In Arab countries today, more than 45 million people, or 10% of the total population, lack access to clean water and safe sanitation. Government public budgets are already constrained and can hardly sustain efficient levels of water services to current populations, which are growing at 2-3% annually. This growth is adding pressure to already crowded and inadequately serviced cities. The political economy of low water tariffs and water subsidies in Arab countries has contributed to the overuse of scarce water resources. Due to such distorted incentives, an ethic of moderate use and rational consumption of water is critically lacking, an alarming fact given the water scarcity in the region.

Arab states have often encouraged the over-exploitation of groundwater resources to placate farmers, industrialists, and developers. Non-renewable water aquifers are disappearing fast, while renewable groundwater resources are being over-exploited beyond safe yield levels. While these practices may provide a respite in the short term, the sustainable health of these freshwater resources will be diminished in the long term; future generations will pay the cost of these unsustainable practices. In addition, water pollution is a serious challenge in the region, attributed to the use of high levels of chemicals in agriculture as well as to increasing inflows of inadequately treated domestic and industrial waste into water bodies. The lack of sanitation facilities for large segments of the population contributes to water pollution by raw sewage.

The annual health care cost associated with the lack of clean water and sanitary conditions in 16 Arab countries was found to be approximately US\$8.5 billion in 2008, equivalent to 2.7% of the countries combined GDP. Increasingly, a large proportion of families' income is now being used to purchase drinking water. The costs of water-borne diseases continue to mount. The increased incidence of these illnesses contributes to absenteeism from work and school and to lost productivity.

Addressing the challenges of the water sector in Arab countries must begin with introducing institutional, legal, and policy reforms that affect water use, regulation, and governance. Arab states need to shift the focus from large-scale investments in supply side projects and instead concentrate on demand side policies that control and regulate water access, promote irrigation and water use efficiency, and prevent water pollution. For example, economic incentives can be established to reward efficient water use while enforceable penalties can be instituted for violations. Water demand management has demonstrated the ability to yield significant benefits, by improving efficiency, cutting losses, and protecting water from overuse and pollution, while often proving to be more cost-effective than conventional supply management measures.

The water crisis will require policy action across multiple dimensions. Land tenure reforms, water subsidies, water rights, regulatory frameworks, fair water allocation, watershed management, public participation, social empowerment, and democratic governance are all necessary pieces of the overall policy reform effort. Additionally, empowering women's groups, the poor, and farmers to have a voice in participatory decision making is needed, to ensure that their views, as traditionally voiceless stakeholders, are taken into account.

It is estimated that Arab countries will need to allocate at least 1.5% of their GDP annually to investments in clean sanitation, water infrastructure, innovative water efficiency, and recycling technologies in order to meet the expected rise in water demand. Based on 2010 GDP figures, this amounts to US\$28 billion annually.

Wastewater reclamation and grey water recycling are promising strategies for making use of marginal water. Building codes should make grey water recycling mandatory for new residential and commercial construction projects. A strategy for wastewater recycling should commit to strong institutional coordination and planning to ensure that wastewater is properly treated and appropriately reused according to requirements for protecting health and the environment.

### **Energy**

Energy security in all Arab countries has become a major concern caused by rapidly increasing demand and the lack of diversification. The Arab energy system today is heavily dependent on fossil fuels to meet domestic demand, with oil and natural gas accounting for nearly 98.2% of total energy consumption in 2009. Almost all Arab economies are significantly vulnerable to the volatility of the global oil market. For oil-importing countries, reducing the size of the energy import bill continues to be a high priority, due in no small part to energy's significant burden on public finances.

Management of the local energy sector in many Arab countries is characterized by distortive policies, which bring about negative spillover effects. Collectively, Arab governments currently spend US\$135 billion on energy subsidies annually, a figure that accounts for about 7% of Arab countries' 2010 GDP. Energy subsidies tend to promote substantial wasteful consumption, send wrong signals to consumers and suppliers, undermine the economic viability of energy efficiency and renewable energy investments, aggravate environmental pollution and greenhouse gas (GHG) emissions, and pose a rapidly increasing burden on government finances. Moreover, subsidies typically disproportionately benefit the more affluent segments of Arab societies as the poor are smaller per capita consumers of energy.

Despite large-scale investments and subsidies in Arab energy infrastructure in recent decades, wide disparities exist in access to affordable modern energy services between different countries, and between urban and rural populations within the same country. Nearly 60 million Arabs lack access to affordable energy services, limiting their opportunities for economic development and improved living standards. In countries such as Sudan and Yemen, almost one-fifth of the population relies on non-commercial fuels like wood, dung, and agricultural residues, to meet their daily heating and cooking needs; the figure lies between 5-10% in Algeria, Egypt, Morocco, and Syria. These are not insignificant segments of the population. The indoor air pollution caused by these practices inflicts particular

harm to the health of women and children, who usually attend to cooking and other household chores.

Although levels of carbon emissions by Arab countries are among the lowest in the world, contributing only about 5% of the global total, the rate of increase in greenhouse gas (GHG) emissions is one of the fastest. This rate of growth was 4.5% from 1990 to 2003, which was surpassed only by South Asia which had growth of 4.9% during the same period. Moreover, the levels of CO<sub>2</sub> emissions per capita and per unit of GDP in some Arab countries are among the highest in the world. Qatar, Bahrain, the United Arab Emirates, Kuwait, Saudi Arabia, and Oman were among the top 20 CO<sub>2</sub> emitters per capita in 2006. Jordan, Saudi Arabia, and Syria were among the top 20 CO<sub>2</sub> emitters per unit of GDP in 2006. The 2008 average per capita electricity consumption in Arab countries (5,343 kWh) was double the world average (2,782 kWh), with the figure being particularly high in United Arab Emirates and Kuwait, whose per capital consumption was about 6 times that of the world average in 2008.

These figures indicate that Arab economies are spectacularly inefficient. Driven by urbanization, industrialization, population growth, and life style changes, the demand for energy in Arab countries is rising rapidly. Yet long-term national strategies to scale up energy efficiency are absent and the installed capacity of renewable energy sources, such as solar energy, remains negligible. Per illustration, Arab investments in renewable power sources make up less than 2% of global investments in renewable energy.

The environmental impacts of the fossil fuel-based Arab energy system threaten the socioeconomic development gains of the past few decades and contribute to local, regional and global ecosystem degradation. The burning of fossil fuels has caused the levels of air quality to deteriorate severely in urban centers such as Cairo, Damascus, and Sana'a, to mention a few. Air pollution levels in many Arab cities exceed World Health Organization standards, causing increased incidence of respiratory and cardiovascular illnesses and premature death.

The consequences of greenhouse gas emissions on Arab countries cannot be ignored, even though Arab countries' contribution to GHG emissions is only 5%. Desertification, predicted variations in precipitation, sea level rise, and more frequent droughts are particular concerns for the region, with likely impacts including decreased agricultural productivity, water scarcity, and the spread of diseases. Arab countries have a great stake in global agreements on the mitigation of GHG emissions. The negative impact of climate change on the region is expected to be substantial when translated in financial terms. According to the World Bank, the cost of environmental degradation attributed to climate change is estimated at 2.1% of GDP for Tunisia and 4.8% for Egypt. Taking the average (3.5%) of these two figures to represent the cost to the entire region, environmental degradation attributed to climate change will cost Arab countries US\$65.7 billion annually.

Against this background, only a policy shift towards sustained investments in energy efficiency and in renewable power sources can provide the underpinning necessary to drive the change to an economically and environmentally more sustainable energy sector. Based on global investment projections in the energy sector over the next decade, and assuming that Arab countries will capture 20% of global projected energy demand, the level of Arab investment in energy is

estimated to be US\$200 billion annually. A strategic long-term shift in Arab countries to renewable sources of energy by 50% will require US\$100 billion of investments annually.

A gradual shift to renewable energy sources can be mandated by introducing renewable energy portfolio standards combined with incentives such as feed-in tariffs and tax exemptions to the early adopters. Energy efficiency investments targeting buildings, manufacturing, and transportation can be spurred through a mix of regulatory standards and economic incentives. Building codes that set minimum requirements for energy-efficiency have demonstrated to be effective in reducing energy use and carbon emissions over the lifetime of the building. To rein in demand growth for transport fuel, Arab governments must mandate by law vehicle fuel economy standards, particularly given the rapidly growing vehicle fleet size and the large share of energy consumption by the transportation sector in Arab countries. Regulatory authorities in Arab countries should also mandate efficiency performance standards for electric appliances, equipment, and lighting in homes, commercial buildings, and industrial facilities.

Savings resulting from energy efficiency measures in the Arab region can potentially be very significant. Taking the 2008 average per capita consumption of electricity (5,343 kWh) in Arab countries as a baseline, a reduction to the world average per capita consumption of 2,782 kWh through the energy efficiency measures described earlier would generate electricity consumption savings of about 900,000 billion kWh. Based on an average unit cost of electricity of US\$0.081 per kWh from natural gas, the monetary savings to the economies of Arab countries would reach US\$73 billion annually.

In addition to lowering the energy bills for end-consumers (or the cost of subsidies), there are other significant indirect benefits. The peak electric demand levels will be lower, which will reduce the need to build costly new power plants to meet this demand, yielding billions of dollars in cost savings. Other benefits include improving the long-term reliability and stability of the electric grid and other sub-systems of the energy infrastructure system and reducing the emissions of toxic air pollutants and of greenhouse gases.

Along with introducing efficiency standards, the gradual phase-out of fossil fuel consumption subsidies is fundamental to shaping the long-term evolution of the energy system. The savings from reducing or removing government subsidies can be re-allocated as financial incentives to spur investments in energy efficiency and renewable sources of energy. A 25% reduction in energy subsidies would free up over US\$100 billion over a three-year period.

Investing in renewable energy and in energy efficiency measures across different sectors has been demonstrated to generate employment opportunities. Studies indicate that the renewable energy sector generates more jobs than conventional energy. The total labor force in the Arab region in 2009 was estimated at 94.6 million, out of which about 3% were employed in the energy sector. An investment of US\$100 billion annually in renewable energy alone is expected to create about 565,000 new jobs over ten years.

Contemplating the future of the Arab energy system leaves us to examine Arab governments' desire and ability to invest in nuclear power. The ability of Arab countries to manage the entire lifecycle of nuclear power is highly questionable.

Critical safety and technical issues such as nuclear waste storage and disposal remain to be resolved. Moreover, the technical capacities to build, operate and maintain nuclear power plants in Arab countries is extremely weak, which raises potential energy security and dependency concerns over the heavy reliance on expatriate labor. Coupled with the restrictions to import enriched uranium from other countries, nuclear energy might not be a viable policy option for long-term energy supply or security in the Arab region. Priority should be given to investing in renewable sources of energy, such as solar and wind, energy efficiency, and cleaner use of locally available energy sources. Such investments bring with them significantly reduced safety concerns, can be developed with local human and technological capabilities, and will have a greater impact on economic development through job creation. As far as the use of nuclear power, Arab governments should commission public studies about the costs and benefits of investing in energy efficiency and renewable sources of energy on one hand, and nuclear power on the other hand. Moreover, Arab governments should facilitate public input about the future of nuclear power in Arab countries.

### **Industry**

Despite their dependence on oil and gas resources to generate revenues and promote industrialization, many Arab countries have not yet developed coherent carbon-management strategies that could reduce energy consumption and carbon emissions and meet long-term conservation goals for future generations. Carbon-intensive industries, such as oil and gas, chemicals and utilities, taken as a sector, are the most significant human-made contributors to GHG emissions. Arab governments have not taken a proactive approach to GHG emissions reduction, although the benefits go beyond short-term economic gains. The lack of low-carbon industrial strategies is emblematic of Arab governments' failure so far to balance short-term economic growth with long-term economically and environmentally sustainable development.

Investing in carbon-reduction programs and projects in Arab countries can contribute to turning the growing global pressure around climate change into an economic opportunity. Arab countries should develop low-carbon industrial development strategies motivated by the opportunity to become energy efficient economies. This would have the effect of enhancing local industrial competitiveness, income diversification, and new job creation. In addition to mitigating GHG emissions, air quality stands to be improved.

Developing national and regional low-carbon strategies requires targeting energy-intensive sectors, where significant and cost-effective impacts can be gained. One of the most important measures to reduce emissions is deploying the most efficient production technologies in new plants and retrofitting energy efficiency equipment in existing plants where it is economically viable. The reduction in energy requirements per ton of product can be on the order of 30%. For example, energy efficiency enhancements in cement manufacturing can reduce energy consumption per ton of cement by 20% to 40%, leading to an advantage to the producer through lower energy costs.

Other initiatives that contribute to improving the efficiency of manufacturing processes include the use of efficient motors, efficient heating and cooling systems, and renewable energy sources. It is important that Arab governments support such initiatives with adequate financial incentives, particularly given the low prices of

electricity that prevail in most countries. The cost of supplying these incentives will be more than offset by the cost savings through a reduction in peak load electricity generation requirements.

The share of the industrial sector in electric power consumption in Arab countries stands at about 500,000 billion kWh. A 30% reduction in energy requirements due to more efficient industrial processes is estimated to result in a saving of 150,000 billion kWh annually, which translates to approximately US\$12.3 billion.

To upgrade existing industries, a number of measures can be used to stimulate the local market for energy-efficient products by providing the right incentives for private sector players. Governments can impose minimum energy and water efficiency standards that products must meet if they are to be sold in the country. Alternatively, utilities can offer rebates to industrial enterprises buying new equipment that fulfill certain minimum efficiency standards, or replace old, inefficient equipment for a nominal fee. Raising electricity tariffs or re-structuring them in such a way as to make overconsumption more expensive, can make the business case for buying new, more efficient equipment much more attractive.

To create and grow new low-carbon industries, Arab governments are required to develop national industrial policy strategies to support the private sector. The industrial policy should provide an appropriate institutional setting, develop a favorable policy and regulatory framework for low-carbon industries, and promote research and development (R&D) capabilities.

Contrary to popular belief, addressing GHG emissions can be profitable. Energy efficiency measures, central to many GHG emissions management initiatives, generate direct cost savings by reducing fuel consumption. In many cases, energy efficiency measures pay for themselves, with payback periods of less than three years.

### **Transportation**

The transportation sector in Arab countries suffers from deficiencies and poor performance. This is primarily driven by public institutions' capacity gaps to develop adequate intervention strategies, allocate investments effectively, and improve regulatory capabilities. As a result, the capacity of the transportation sector to provide reliable, affordable, and safe transportation services has for the most part not materialized. Although the demand for transportation services in Arab countries has been rising, efficient public transport systems remain underdeveloped, leading to excessive reliance on private cars. For instance, annual growth rates of 7-10% in vehicle fleet size have been observed in Jordan, a pattern similar to those in other Arab countries. Despite investments in road transport networks and infrastructure in recent decades, the performance of the sector continues to be undermined by serious traffic congestion in urban centers, poor air quality in many cities, land degradation, and high rates of greenhouse gas emissions.

Uncontrolled growth and poor planning in Arab cities have been responsible for urban sprawl, longer travel distances, and increased vehicle use. The construction of more highways has led to the loss of agricultural land around the urban centers such as Amman and Cairo. Regional transport networks suffer from inefficiency and delays. Fatalities and injuries from road transport in a number of Arab countries remain high compared with other regions of the

world, causing suffering, lost incomes, and high health care costs, all of which translate to economic losses.

The Arab transport sector is a large and inefficient consumer of energy, accounting for 32% of the total energy consumption and 22% of the total greenhouse gas emissions in Arab countries. In addition, poor fuel quality and an ageing vehicle fleet contribute significantly to the poor air quality observed in a number of Arab cities. Greenhouse gas emissions and air pollution are identified as the most alarming implications of current transportation policies and infrastructure development. For example, the total cost of damages from air pollution in Jordan averaged \$161 million in 2006, or 1.15% of GDP. The health care costs of air pollution (not all of it caused by transportation) have been estimated to be US\$10.9 billion in 2008 for 16 Arab countries, equivalent to 1.2% of their combined GDP.

These transportation trends impede efforts in Arab countries to create jobs, promote rural socioeconomic development, and improve regional integration. Arab cities are increasingly choked by traffic congestion, poor air quality, noise pollution, and poor visibility, which do not bode well for the wellbeing of their inhabitants or for the cities' economic competitiveness. The lack of adequate mass public transport in many Arab cities deprives many communities access to economic centers and social services. These trends lead to significant losses in economic productivity, on the order of a 3-10% loss to a country's GDP. The lack of adequate public transport also perpetuates social inequality and exclusion.

Government policy interventions affecting transportation planning, financing, regulations, and vehicle technologies can provide the underpinning necessary to drive the change to a sustainable or green transportation sector. The target of these policies should be the provision of dependable, affordable, and safe transportation services that are energy efficient, while minimizing pollution, congestion, and unmanaged urban sprawl.

Of the policy interventions that have been demonstrated to have relatively low cost but high economic, social, and environmental dividends over a short period of time are investing in mass public transit and introducing mandated vehicle fuel efficiency standards. A green approach to transportation planning should limit the continuous supply of more vehicles and highway construction to meet rising demand, and focus alternatively on managing transportation demand by promoting public transit and providing incentives to increase vehicle occupancy and reduce the number of kilometers travelled. Practices and measures that influence travel behavior and decrease dependence on cars have more lasting effects and are more cost-effective than investments sunk into road building and highway expansion that often remain short-term fixes.

The capacity and performance of public transportation institutions should be improved to enable the introduction of effective intervention strategies. Financial resources should be directed at expanding public transport systems and other demand management practices, improving accessibility to rural regions and marginalized groups, and deploying green transportation technologies.

It is critical to invest in public transport, be it an underground or a surface metro system, trains, buses or waterway transport systems whenever possible. The financial

savings to public budgets can be significant, while contributing to socioeconomic development, reduced GHG emissions, and improved air quality.

A projected target of 50% greening of the transport sector, resulting from higher energy efficiency and increased use of public transport and hybrid vehicles, should generate savings of 280 billion kWh or US\$23 billion annually. Energy efficient opportunities for rail transport of up to 40% are possible, as well as 20% improvement over 1997 aircraft efficiency standards is likely by 2015 and of up to 50% by 2050. It is estimated that shifting 25% of all air travel under 750 km to high speed rail travel by 2050 would result in a reduction of around 0.5 billion tons of CO<sub>2</sub> per year. By shifting 25% of all road freight over 500 km to rail, 0.4 billion tons of CO<sub>2</sub> per year could be saved. Decreasing transportation-related CO<sub>2</sub> emissions by 50% in Arab countries would reduce GDP losses by 1.5-5%. Applying an average of 3.25% would result in annual savings of US\$61.8 billion (based on 2010 GDP figures for Arab countries).

### **Cities And Buildings**

Cities in the Arab region suffer from inadequate urban planning, and are characterized by chaotic land-use patterns and excessive urban sprawl. The uncontrolled growth of Arab cities has had numerous negative consequences. Arab cities have grown so fast that their infrastructure systems, such as those related to transportation, supply of water and electricity, and waste management, have all become incapable of adequately supporting their populations. Overwhelming traffic congestion and poor planning heavily impede mobility in these cities. Air pollution levels, primarily from vehicular emissions, have become extremely high in the Arab world's larger cities. Many cities suffer from solid waste and wastewater management problems. The lack of efficient sewage disposal networks has meant that sewage is often illegally dumped, usually making its way to city streets or coastal waters. Moreover, many Arab wealthier cities are currently undergoing massive urban transformations in a race to claim a globalized city status and become a regional capital for finance, culture, education, media or medicine. The scale and quality of these top-down undertakings raise serious questions not only about cultural alienation and the role of identity in urban development, but also about environmental sustainability.

Environmental degradation in and around Arab cities has reached alarming levels. Air, water, and soil contamination now pose serious health risks and threaten various economically important activities, particularly those related to food production. Numerous ecosystems and agricultural land in and around Arab cities have been destroyed as a result of uncontrolled urban growth. Scarce agricultural land, forested areas, grazing areas, and water bodies, such as streams, all have been decimated because of such growth. Public green areas, which serve as cities' breathing spaces and essential places for relaxation and leisure for inhabitants, are very much lacking in Arab cities. While most cities in the United States feature 20-40 square meters of green areas for each inhabitant, in Dubai, where there have been serious efforts to develop public green areas, the figure remains less than 14 square meters; in Beirut, the figure is less than 1.

Land prices and construction costs in Arab cities make access to adequate housing beyond the financial means of many. This lack of access to decent-quality affordable housing has contributed to the spread of slum areas, characterized by inadequate - if not completely absent - basic services and by ambiguous conditions regarding

land tenure. Slum areas are environmental blights where systems for solid waste management and sewage treatment are painfully lacking. In contrast to the spread of informal settlements that serve the poor of the city, privately managed gated communities and expansive suburban developments that serve affluent residents are becoming increasingly widespread. In addition to exacerbating socioeconomic segregation in cities, these low-density developments further contribute to urban sprawl and further expand the geographic limits of the city to unhealthy levels, resulting in inefficient, costly, and poorly functioning infrastructure systems.

There are also tremendous inefficiencies in energy consumption, which pervade all sectors and city activities, with some Arab countries ranked in the top 10 CO<sub>2</sub> emitters per capita and per unit of GDP. In Arab countries, buildings account for an average of 35% of all final energy consumption. The prevailing pattern in the region is of a building sector that has evolved without taking environmental and social considerations into account. Energy and water use in the existing building stock across the region, and in particular in commercial and public buildings, is alarmingly inefficient. In most commercial buildings, the currently installed systems for heating, ventilation, and air-conditioning (HVAC) have the lowest energy efficiency performance among available options, because of preferences for low cost systems over more efficient ones. This practice is aided by the prevalence of large subsidies for electricity in most countries of the region; in 2006, for instance, energy subsidies exceeded 7.1% of the region's GDP.

Among the challenges facing initiatives to introduce building efficiency regulations and codes are the lack of sufficient knowledge base within the industry, weak innovative capacity within local building supply chains to meet the demand for better materials and components, and weak institutional capacity within public agencies for monitoring and enforcement of environmental requirements.

To remedy these shortfalls, a new approach is needed for city planning and governance, built on environmentally sustainable urban design principles. Such an approach should entail protecting agricultural land in and around cities, safeguarding natural water resources, creating a safe public transportation system, designing energy-efficient buildings, adopting efficient water use, maintaining open green areas of native plant species, and rethinking the concept of waste management to incorporate extensive recycling. These efforts will create healthy and economically competitive urban communities that offer a higher quality of living for their inhabitants.

In order to facilitate the transition to green cities and buildings, a number of existing practices need to be "greened" and new green measures need to be introduced. One of the most effective urban planning policy tools for city and municipality authorities is zoning, which determines in fundamental ways what may be built where in and around the city, and how much may be built. City governors must have adequate transparency and accountability mechanisms in place to shield municipal staff from developers and entrenched economic interests groups who may attempt to influence and manipulate zoning regulations, such that decisions are made in the public interest above all.

Zoning can be best utilized to promote healthy urban density levels and mixed-use development of city neighborhoods. This would allow for a more efficient provision of various urban services and for residential, commercial, educational, cultural, and recreational centers to co-exist in proximity to each other. This

would allow for easy movement between them and allow their residents to enjoy numerous facilities, such as schools, shops, office space, and parks, close to their residences, reducing urban traffic congestion. High-density urban areas need to be coupled with efficient public transportation systems that facilitate movement between different parts of the city. High urban densities allow for public transportation systems to be more cost effective. There is also a very pressing need to make Arab cities more pedestrian-friendly, and even bicycle-friendly where appropriate.

A holistic design approach, incorporating environmental principles across the various design stages including building form, orientation, heating and cooling components, and other architectural aspects, yields the highest results. The cost to benefit ratio of passive design elements, which do not use mechanical and electrical systems, are much more rewarding than the 'active' approach that uses newer technologies. Therefore, passive design elements that take advantage of the climate, for example to heat or cool a space, should be exhausted before investing in state-of-the-art high technology components. Integrating energy efficient considerations in the design of buildings is expected to result in a reduction of about 29% of projected emissions by 2020. In Arab countries, applying this percentage reduction to the building sector's energy consumption share of 748 billion kWh would cut consumption by 217 billion kWh by 2020 and generate savings of US\$17.5 billion annually.

In terms of construction work and building materials, building codes and standards are the main institutional levers for influencing construction practices and material selection. Governments can create policies for procurement, contract specifications, building performance, and building codes regulating municipal standards. In addition to design and construction technology, buildings' environmental performance can be improved through the choice of installations and components such as heating and cooling systems, lighting, appliances, and water fixtures. The potential savings from promoting energy saving households appliances, light fixtures, and office equipment can result in significant reductions in energy consumption, to the order of about 50% relative to current levels.

Transforming conventional buildings into green buildings will contribute to addressing the unemployment problem in urban centers and create a new cadre of workers for which a growing market is expected in the region and worldwide. According to a United States study, greening buildings is said to create between 10-14 direct and 3-4 indirect jobs for every US\$1 million spent on efficiency retrofits. This figure is expected to be double or triple in the Arab region given the lower average labor productivity and cost factors. Spending US\$100 billion in greening only 20% of the existing building stock in the Arab countries over the next 10 years, by investing an average of US\$10,000 per building for retrofitting, is therefore expected to create 4 million jobs. The payback period for energy and water efficiency retrofits ranges between 2-7 years, based on the level of subsidy.

The case for green transformation of the building sector is also an economic and social one. Removing water and energy subsidies and directing a portion of these savings towards green social housing will help reduce the cost burden on low income households for basic services (through efficiency gains). In this context, investing in green buildings can complement other strategies in improving access to basic services and living conditions for the poor. At the same time, this shift in

subsidies removes one of the key market distortions and provides an economic justification for green buildings in the housing market. Consequently, promoting green building practices will have far reaching implications for sustainable urban transformation and for socioeconomic development in a region experiencing rapid urbanization and high unemployment rates.

It is estimated that the amount of spending on building and construction in Arab countries will reach US\$116-233 billion in 2012. If Arab governments commit to greening the construction sector, spending will have to increase by at least 20% resulting in additional investments of between US\$23-46 billion in the same year. These additional green investments will create 10% more green jobs in the same year.

Traditional design approaches in Arab architecture are in many cases more responsive to environmental elements. These approaches incorporate much of today's knowledge about climatic design - a process of identifying, understanding, and controlling climatic influences at the building site - for achieving comfortable and healthy environment for inhabitants. Devices such as wind towers, courtyards, vegetation, fountains, shading elements, the orientation of the house, and the various means of dealing with passive energy in traditional architecture, are typical examples of environmentally sustainable traditional design. The rich architectural heritage of the region should be considered, adapted, and applied where relevant and appropriate in the context of contemporary conditions and should complement modern technologies, and as such contribute to environmental and cultural sustainability.

### ***Solid Waste Management***

The waste management sector in Arab countries is characterized by underdevelopment, underinvestment, and high-risk "waste dumping" practices. Although the volume of waste generated is alarmingly increasing, high-level political commitment to waste management is weak, with many Arab countries lacking national strategies or integrated plans for municipal solid waste (MSW) management. It is estimated that MSW generated in Arab countries in 2020 will exceed 200 million tons per year. Although close to 80% of total MSW generated is decomposable and recyclable, the recycling rate is lower than 5%.

The sector is plagued by insufficient regulations and weak waste disposal standards. Proper waste collection and transport systems are lacking and coverage is inadequate. In many Arab countries, uncollected waste may account for up to 50% of all waste generated with most of the waste directed to open or controlled dumpsites. Open-air burning is often used at these dumpsites. Moreover, MSW is commonly mixed with industrial and medical wastes during disposal. Improper dumping and open-air burning of solid waste allow decomposed waste products to pollute the air, ground and surface water, and soil. These pollutants may then find their way into the air or enter the food chain, causing direct health hazards. In general, financing for waste management is strained by limited budgets and inadequate cost recovery. It is common for cities to spend 20-50% of their available recurrent budget on solid waste management. Yet it is also common for one half of the urban solid waste to remain uncollected and one half of the city population to be unserved by MSW collection services.

It is estimated that the annual damage costs from inadequate waste management as a percentage of GDP were 0.3% of GDP for Arab countries in 2006, which means that greening the waste management sector would save Arab countries US\$5.7 billion annually based on 2010 GDP figures.

Given the sector's state of underdevelopment and unsustainable practices, there is an urgent need for a fundamental shift in the approach to MSW from waste dumping, burning, and/or land-filling to a resource management approach that seeks to capture value from waste materials through reduction, reuse, recycling, and recovery. This can only be achieved by regarding waste not only as a costly liability, but as an economically valuable resource that can be altered and reused in a manner that addresses public health and environmental concerns.

Arab governments need to develop national waste management strategies and master plans that provide political backing for undertaking a waste minimization and diversion approach to MSW. The aim of waste reduction is to eliminate waste before it is produced and to reduce both the quantity and toxicity of waste. The broader definition of minimization encompasses three elements which are, in order of desirability, avoiding or reducing waste generation and increasing waste quality at the source, material recovery through reuse, and recycling.

In order to achieve financial sustainability, the first step is to have an understanding of the actual cost of MSW services in Arab countries. Investment needs in the sector over the next 10 years in West Asia and North Africa have been estimated at over US\$21.6 billion annually, broken down as follows: collection and transfer (38%), land filling and composting (27%), mechanical and biological treatment (17%), dump upgrade or closure (12%), and waste-to-energy (6%).

Financing can be made available through a combination of tariffs and local taxes, attracting private sector investments, extending producer responsibility, and raising revenue from the sale of reused and recycled products. However, what creates the most dividends is building a foundation for waste minimization in the first place, and investing in the infrastructure for waste recovery.

Government public policies, public-private partnerships, and/or innovative financing and cost recovery schemes would encourage investment in waste reduction, reuse, and recovery. These green policies can take the form of economic incentives, mandates for extended producer responsibility, regulations in favor of green solid waste management, and cost recovery. The effectiveness of these policies can be significantly increased by sustained campaigns for public awareness, mass education, and social marketing. Political engagement and public participation are necessary preconditions.

Municipal solid waste management directly stimulates the economy because it is labor-intensive and requires investments in machinery and equipment for handling, transport, and processing. Developing a green MSW management sector provides opportunities for the diversification of Arab economies. It contributes to job creation and stimulates demand for products, systems, and services in other industries including agriculture, manufacturing, construction, waste-to-energy, processing, transportation, retailing, and professional services.

In addition to stimulating multiple economic activities, green MSW

management offers outstanding investment opportunities in recycling, composting, and energy production. Organic food waste, which accounts for 40-80% of municipal waste in Arab countries, can be used to produce compost for agricultural use and biogas to replace fossil fuels. Converting waste into value-added products while recovering energy is still in its infancy in the Arab world with a significant potential for expansion. Incentives for producing organic compost or recovering energy from solid waste are needed to attract investment.

### **Tourism**

Tourism has become an important sector in the economies of most Arab countries, contributing to economic diversification, job creation, and foreign exchange earnings. However, adverse environmental and social effects tarnish the sector's economic achievements. The unregulated procurement, travel, accommodation, recreation, and hospitality services, coupled with uncontrolled resort construction, have led to the excessive use of energy, irresponsible use of water, and the generation of large amounts of waste. The sector's contribution to global GHG emissions continues to grow annually by 2-3%. The extensive

## **PROPOSED REGIONAL INITIATIVES**

Apart from efforts at the national level to facilitate the transition to a green economy, cooperation among Arab countries needs to be promoted. AFED is proposing some regional initiatives in this direction, which should be established and managed by governments as well as regional bodies, such as the League of Arab States (LAS), the Gulf Cooperation Council (GCC), and the Arab Maghreb Union (UMA).

**Arab Sustainable Development Institute (ASDI):** A regional Arab institution will be needed in order to provide policy guidance to public policy makers and policy institutions in Arab countries. The proposed Arab Sustainable Development Institute can do so by articulating the types of public policies that will be needed for a transition to a green economy. The institute's mandate will include developing and assessing the benefits and costs of proposed sectoral policies including incentives, price signals, subsidies, tax credits or exemptions, grants, green financing mechanisms, and revenue neutral rebates, among other mechanisms. Issues such as equity and fairness, impact on different stakeholders, and potential implications on different segments of the population, particularly the poor, should be taken into account in assessing policies. The proposed Arab Sustainable Development Institute should also be given the mandate to organize on a regular basis short executive policy education courses to develop and enhance the capabilities of mid-level Arab

policy-makers to formulate public policies. Seminars and briefing sessions can also be organized for policy makers to disseminate best practices and share lessons of sustainable development policies.

**Arab Fund for Research and Development (AFRD):** Innovative green technologies, products, and processes will be needed to address the specific requirements of the region's transition to a green economy. Innovation is spurred through research and development (R&D) that is locally established and funded. Therefore, investment in research and development is necessary to build an Arab-based pipeline of innovations at various stages of development. The proposed Arab Fund for Research and Development would provide the funding needed to support R&D activities at research institutions, public and private sector organizations, and universities. Aside from transforming green concepts into new products, R&D is fundamental to creating and capturing distinctive high value-adding opportunities that drive high-margin profitability and fuel economic expansion.

**Arab Renewable Energy Center (AREC):** Renewable energy programs, of different scopes and in various countries of the region, remain scattered and largely experimental, with little or no regional coordination. The Arab Renewable Energy Center (AREC) is proposed to promote renewable energy

construction of sea resorts causes coastal and marine ecosystem degradation. In addition, questions have been raised about the implications of introducing globally inspired models of tourism on society, culture, and community development.

The Middle East and North Africa have approximate shares of 6% and 2% of global tourism, respectively. The share of international tourism to GDP varies between 26% in Lebanon, 17% in Jordan, 12% in Egypt, 10% in Morocco and Tunisia, and 9.0% in Bahrain. The share of international tourism receipts to total exports in 2009 was highest in Lebanon (33%), followed by Jordan (28%), Morocco (26%), Egypt (22), and Syria (19%). In Egypt, tourism was responsible for one in every seven jobs in 2010. In 2010, the contribution of tourism to total employment in the Arab region was about 4%.

Given the region's potential to attract international tourism and the need for economic diversification and employment opportunities, the sector has been the target of significant investments. Apart from the coastal resorts in the North African Arab countries, other countries in the region including Abu Dhabi and Dubai (in the UAE), Oman, and Qatar have identified the market for conventions, conferences, and cultural attractions as a feasible tourist niche.

solutions suitable for the region, and coordinate between national initiatives to facilitate cooperation and transfer of experience.

**Regional Center for Sustainable Communities (NCSC):**

Given the fast pace of urbanization and construction activity in the region, and the impact on the demand for, provision, and allocation of services, it is critical to adopt sustainable urban design principles and practices when managing the growth of cities. The proposed National Center for Sustainable Communities will be entrusted with disseminating best practices on land use patterns, mixed-use development, zoning regulations, and smart growth. The center should also develop standards and building codes for green and sustainable buildings including wastewater and solid waste recycling.

**Regional Network for Cleaner Production:**

Arab countries should establish an effective network of national cleaner production centers to promote R&D and disseminate best practices in clean production and processes. The mission of such a network would be to develop the capacity of manufacturers to shift to more sustainable patterns of production, reduce waste, and use resources efficiently.

**Regional Agricultural Projects:** Promoting cooperation between Arab countries in the field of

sustainable agriculture is critically needed. Joint agricultural initiatives and collaboration should optimize the use of land and water resources in the region, based on the comparative advantage of each country, while contributing to regional food security and rural development. Regional agricultural projects can be designed to bring the resources of different Arab countries including land, labor, water, finance, and know-how to complement each other. Investments in regional sustainable agricultural projects should seek to create jobs, increase the productivity of cultivated land and to bring additional arable land under cultivation using sustainable agricultural practices.

**Arab Regional Transport Network:**

Arab countries should consider building an efficient, clean, and affordable network of rail lines connecting all countries of the region. This network will not only facilitate the movement of individuals but also merchandise, hence promoting trade and regional economic integration. A railway network will reduce transportation costs, provide access to regional markets that otherwise would be inaccessible, and stimulate the economies of those villages, towns, cities, and even regions that dot the path of the railway lines. This will have the effect of boosting agricultural, industrial, touristic, cultural, educational or service economic activities. The viability of introducing electricity-driven railway trains should be a priority.

The current trend of tourism development in a number of leading destinations in Egypt, Jordan, Morocco, Tunisia, and the Gulf countries is focused on integrated tourism centers (ITC), which usually are large-scale developments of over 200,000 m<sup>2</sup>, located in coastal areas. Formed as clusters of hotels, residential homes, retail stores, marinas, and golf courses, ITCs are large consumers of energy and water and large generators of waste. One of the main concerns of ITCs in Arab countries is the maintenance of golf courses, which consume large amounts of water, a critically scarce resource in the region. The average water consumption of one golf course in the Gulf region is estimated at 1.16 million m<sup>3</sup> per year, reaching 1.3 million m<sup>3</sup> in Dubai, enough to cover the annual water consumption needs of 15,000 inhabitants.

The absence of binding regulations and the lack of monitoring are principal barriers to transitioning to a sustainable tourism sector. Green initiatives in the Arab tourism sector are currently almost entirely voluntary because Arab governments are unable or unwilling to formulate and enforce necessary regulatory standards to govern the behavior of investors and developers. Furthermore, limited investment incentives exist for green tourism. Conditions for ITC development rarely stipulate any environmental measures. In fact, governments typically even subsidize electricity, water, and fuel, leading to their overuse and associated negative environmental impacts.

Environmental impact assessment (EIA) studies are conducted only on a project-by-project basis, making it difficult to actually assess the cumulative impacts of tourism activities on the environment and the economy. Moreover, government agencies entrusted with reviewing EIA studies often lack expertise to make further recommendations for corrective actions.

While ministries of tourism would be expected to formulate the overall strategy for the tourism sector, it should be developed in close consultation and collaboration with other relevant ministries and stakeholders. This is because issues related to water, energy, transport, building, waste management, infrastructure, and socioeconomic development, do not fall within the jurisdiction and mandate of the ministry of tourism. The required coordinated policy response to promote sustainable and green tourism should involve the design of a package of policy instruments to include regulations, incentive measures, finance, environmentally sound technologies, and capacity building efforts coordinated across multiple relevant ministries and agencies.

Ecotourism as well as community-based cultural tourism play a significant role in nature conservation and in supporting local economies and halting rural-to-urban migration, thus contributing positively to the eradication of poverty. It is therefore important for international organizations and Arab governments to provide financial support to this small but important market niche.

Sustainable tourism, which is a broader concept than ecotourism, is being increasingly recognized internationally as the preferred option over conventional tourism. Destinations that enjoy clean and safe environments attract more tourists and generate more income than polluted and overcrowded destinations. Therefore, increased investments in sustainable tourism by Arab countries will increase their share of international tourism, while generating additional green jobs and higher income.

A 12% higher share of international tourism in Arab countries is estimated to generate

at least US\$228 billion annually, based on 2010 GDP figures, and an additional 5.6 million jobs, which would raise the sector's share of employment to 10%.

The impacts of sustainable tourism on energy and water consumption can also be assessed to determine the impact of efficiency measures on consumption reduction. Based on 2010 estimates, the Arab tourism sector attracted about 59.2 million tourists. The average energy consumption of a tourist staying for one week is estimated to be 798 kWh, which is some 20% higher than the average consumption in the region. The combination of adopting energy efficiency measures and utilizing renewable energy sources is estimated to reduce energy consumption by 45%, which could generate energy savings of 360 kWh per tourist per week or 21,300 million kWh per year for the Arab region. It will also reduce CO<sub>2</sub> emissions by 52%. Water efficiency measures will have the effect of reducing water consumption by 18%. Assuming an average water consumption of 300 liter per day per tourist, an 18% drop in water consumption will save Arab countries 22,400 million liters of water per year.

## **CONCLUDING REMARKS**

Arab economies have underperformed, failing to meet basic aspirations once thought to be within reach. The current development paradigm adopted by Arab countries is not yielding improved conditions for millions of people in the Arab world. Unemployment rates are alarmingly high, poverty is stubbornly persistent, food and water security remain illusive, and the environment is impoverished, while Arab economies continue to be structurally fragile, undiversified, and inefficient. These shortfalls are the logical outcome of a development model based on a high throughput, energy-intensive economy, driven by consumption, services, and low value-adding activities.

However, the shortfalls of today's Arab economies go beyond policy gaps and distorted models. Arab governance systems have for a long time been unable to recognize that the economy, environment, and society are linked. Even when such recognition has existed, they did not have the capability or the political willingness to address these linkages. Therefore, Arab economies have not fostered sustainable development strategies. And this simple fact may explain why they are now confronted with aggregate impacts that may have reached the breaking point. The Arab uprisings may be one manifestation of the breaking point. In addition to policy gaps and distortion in development models, Arab economies' shortfalls are becoming rooted in social inequality, political disempowerment, and the concentration of wealth and power.

Thus, Arab economies today face a number of challenges and a choice between two futures. The brown economy future promises short-term economic growth in GDP terms while continuing to diminish the stocks of social and environmental capital. The green economy future offers the prospect of stimulating economic development while ensuring improved social and environmental conditions. This report lays the argument for why Arab governments should want to invest in the green economy future. All things being equal, the green economy offers the conditions for social stability, environmental sustainability, economic resiliency, and an authentic cultural identity that the Arab world desperately aspires to.

Arab countries are often described in terms of rapidly growing populations in a

region with scarce water and agricultural land resources. Although these taken-for-granted facts may represent some of the truth, there is little controversy over the fact that public policies have a significant role in promoting the sustainable management of these resources in a manner that meets the essential (food and water) needs of all people. Public policies do matter and can make a difference in sustainable resource use.

The willingness to pursue a green economy agenda provides a window of opportunity to initiate a fundamental re-examination and amendment of current public policies in Arab countries. The authors of this report have presented in each chapter the enabling policy reforms needed to make the transition to a green economy. This report does not have the last word. AFED intends for the ideas presented to stimulate discussions and debates across the Arab world about the costs, benefits, and risks inherent in different policy choices.