

# ***The Environment and the Middle East***



***Regional and International Cooperation***

***Volume III***

*Middle East Institute Viewpoints  
June 2011*

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Tel: 202-785-1141  
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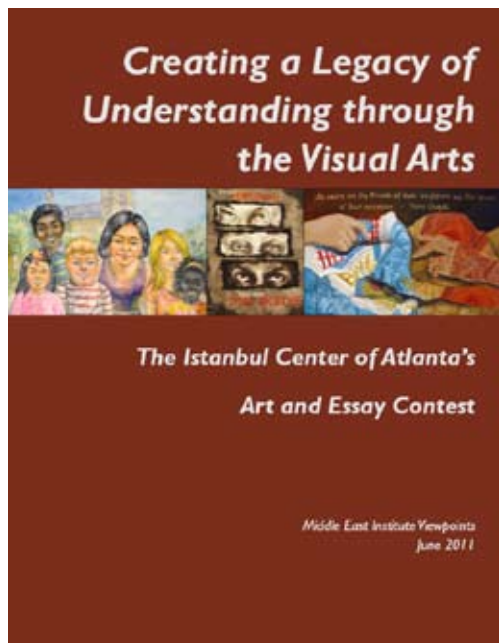
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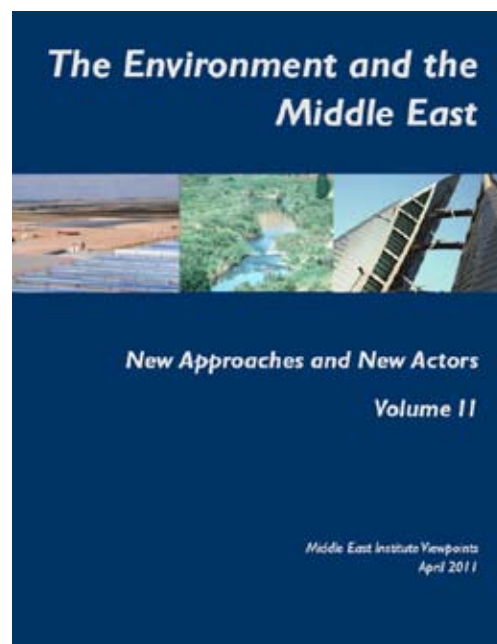
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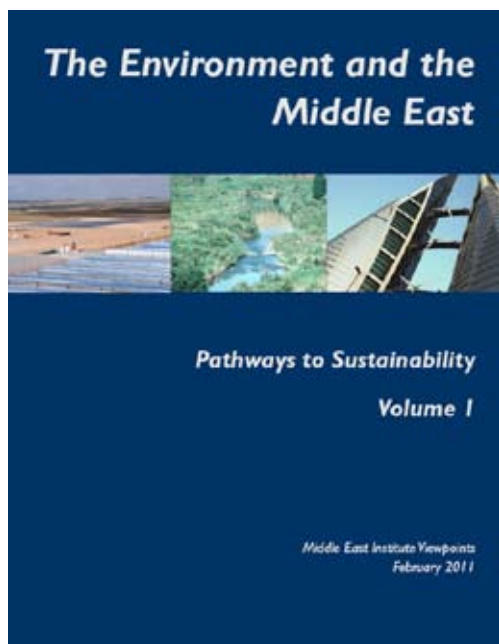
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## About the Authors



*Mahi Tabet Aoul received degrees in telecommunications engineering and meteorology engineering at Strasbourg University and Paris-Sorbonne. He specialized in the field of the atmosphere at both the University of Fort-Collins and the University of Miami, and has taught at Laval University in Canada as a visiting professor. Aoul was the founder and first Director of the Hydrométéorological Institute for training and research. Aoul is also affiliated with the Centre en Anthropologie Sociale et Culturelle (CRASC) and (Laboratoire des Systèmes d'Information en Santé (LABSIS).*

*Katarina Uherova Hasbani is an energy policy expert focusing on MENA countries and their policies of energy diversification. She worked previously for the European Commission and is currently based in Beirut.*



*Jens Klawitter (MSc) currently works as a free researcher for Germanwatch and Bread for the World. His focal points are sustainability issues, low carbon development strategies for the MENA region, and the Desertec concept.*

*Christine Parthemore is a Fellow at the Center for a New American Security (CNAS), where she directs the Natural Security Program. She has a BA from The Ohio State University and an MA from Georgetown University in unconventional threats and nonproliferation.*



*Franziska Piontek is currently a researcher at the Potsdam Institute for Climate Impact Research. She is also associated with the Research Group on Climate Change and Security at Hamburg University, where she focuses on the Nile Basin and impact of climate change on conflict and cooperation. She holds a PhD in Physics and a Masters in Peace and Security Studies.*

*The views expressed in these Viewpoints are those of the authors; the Middle East Institute does not take positions on Middle East policy.*

## About the Authors (cont.)



*Dr. Mohamed Abdel Raouf Abdel Hamid is an Independent Environmental Researcher, currently working as an expert for UNEP West Asia GEO-5 report, HBS-Middle East, and others. Previously, he was the Program Manager — Environment Research at the Gulf Research Center, Dubai.*

*Adriana M Valencia has a PhD and a Masters in Science from the University of California, Berkeley in Energy and Resources. She has several years of multi-regional work experience in the environmental and renewable energy fields in various organizations.*



*Marcel Viător is a Resident Fellow for energy and climate policy at the German Council on Foreign Relations (DGAP) and an Associate at the Stiftung Neue Verantwortung (snv), a Berlin-based think tank on responsible leadership.*

*Ahmed Zahran is the business development manager for renewable energy and carbon trading at Tri-Ocean Energy (member of EK Holding Group). He holds an MSc in Economics from the University of London, and a diploma from the European College of Liberal Arts in Berlin (ECLA) in Philosophy and Literature. Ahmed holds a BSc in Finance from the American University in Cairo.*





## Introduction

This concluding volume of the *MEI Viewpoints* series on the *Environment and the Middle East* explores the scope and modalities for region-wide and international cooperation to address the environmental challenges facing the Middle East. The implications of two such challenges that receive special attention in this volume — climate change and the increasing pressure on the Nile — are far-reaching and profound. As the contributors emphasize, though self-help is necessary, it is insufficient. Furthermore, international support for mitigating measures, while critical, should be geared toward projects that have a regional dimension.

Environmental issues, one author contends, are among the underlying causes of the revolutions that have spread throughout the region. If that is the case, perhaps the Arab Spring will yield a political order that is not only more transparent and accountable but more responsive to popular demands for responsible stewardship of the environment. This is the very outcome that the international community should help its regional partners to achieve.



# Implications of Climate Change on Energy and Security in the MENA Region

*Jens Klawitter, Christine Parthemore, Katarina Uherova Hasbani, Adriana Valencia, Marcel Viëtor, and Ahmed Zahran*

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Global climate change is expected to have severe effects on world energy production and consumption. Specific security implications will arise for the Middle East and North Africa (MENA).<sup>1</sup> These effects will impact international and national security, as well as economic and social security within countries. This article first explores the direct effects of climate change on energy in MENA countries. This is followed by a brief analysis of its potential security implications. Finally, the article recommends adaptation and mitigation measures to address some of the challenges on energy systems presented by climate change.

## *IMPACT OF CLIMATE CHANGE ON ENERGY IN THE MENA REGION*

### *CHANGES IN ENERGY DEMAND*

Climate change has already started influencing energy demand patterns in most countries in the MENA region. Peak hour patterns, air conditioning intensity, and need for water desalination are among daily life processes that have changed to cope with increasingly extreme temperature variations. Several examples of these changes are already happening today. Nevertheless, it is important to note that greater changes in demand may result from future effects of climate change. Energy supply will be affected as the global climate is altered.

First, countries are forced to rely more on energy-intensive methods of providing sufficient water supplies, such as desalination and underground water pumping when precipitation declines and evaporation from waterways increases.<sup>2</sup> This effect of climate change drives increasing energy demand and elevates costs that MENA countries must account for. Second, agricultural practices are affected by temperature changes as farmers become more dependent on more energy-intensive methods (e.g., by crops requiring more fertilizers, different irrigation methods, and more varied harvesting patterns) in order to maintain productivity levels. Finally, productivity habits are changing in the region as higher temperatures decrease the ability of laborers to work healthily in open-air conditions. Hours of operation for some businesses are therefore changing, for example to earlier or later hours in the day. This change in productivity hours (apart from changing peak hours of energy demand) may lead to growing overall energy consumption if hotter

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1. In the context of this article, we define the MENA region as the Southern and Eastern Mediterranean countries. Additionally, we define energy security as stable, reliable, and sustainable supplies of energy at affordable prices.

2. According to Dr. Hafez Salmawy, head of the Egyptian Electricity Regulatory Authority, the energy consumption of underground water pumping has grown to consume around 28% of the electricity provided by the Beheira Electricity distribution company (responsible for electricity distribution for most of the northwestern part of Egypt). Interview, November 8, 2010.

weather drives increased demand for air conditioning.<sup>3</sup>

#### CHANGES IN ENERGY SUPPLY

Energy supply has been negatively affected by changing weather patterns. One case in point relates directly to changing water availability. As water levels decrease due to lower precipitation and increased evaporation, capacity for electricity production (e.g., from hydropower and other water-intensive generation technologies) may decline.<sup>4</sup> Decreasing water availability can also negatively affect cooling and cleaning systems required for Concentrated Solar Power (CSP), nuclear power, and various other thermal generation technologies.

*As water levels decrease due to lower precipitation and increased evaporation, capacity for electricity production ... may decline*

Stress on existing energy production facilities, which may lead to higher energy prices and power outages, is a concern too. Pressure on the available production capacities makes critical the need for MENA countries to examine options such as enhancing energy efficiency, shifting away from the current centralized energy production models, and allowing more players from the private sector to participate in energy production in order to mitigate supply disruptions.<sup>5</sup> It is worth noting that not all changes in temperature and weather result solely in negative effects on energy supply. Some opportunities seem to have arisen, for example, in some parts of the region where there have been more sunny days than before, which can increase the productivity of solar technologies and make solar farms more economically viable.<sup>6</sup>

#### IMPACT ON INFRASTRUCTURE

The existing energy infrastructure in the MENA region was not designed to cope with the effects of climate change and as a result risks of system failures are manifesting themselves through increasing numbers of energy outages. Developers will increasingly need to account for the changes described above — especially the impacts of decreasing water supplies — in building and managing energy infrastructure in the MENA region. It is important to note that many necessary changes to energy infrastructure require considerable lead times under business-as-usual scenarios, changes which may augment challenges for energy infrastructure. However, with the increased energy demand in many countries in the region, this lead time is expected to increase while the window of opportunity to avoid short-term energy shortages is decreasing. For example, nuclear power plants would need several years or even decades to be built from the day the policy decision about their con-

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3. In the same interview with Dr. Salmawy, he indicated that farmers are now shifting a good part of their irrigation to take part during the night to avoid the evaporation associated with increased temperatures which means higher energy demand at new times of the day.

4. To cite an example from South America, in 2008 droughts caused major electricity shortages in Chile, which relies on hydropower for almost two-thirds of its electricity generation capacity.

5. The section on “Mitigation and Adaptation” focuses on some of the available options.

6. Note, however, that continuous increases in temperature (translated into days with ambient air temperatures higher than 37.7 degrees Centegrade, or “hot days”) could negatively affect CSP production, resulting in lowered plan efficiencies.

struction is made (currently, eight years is the global average).<sup>7</sup> As climate change coincides with growth in populations and energy demand, adopting lower-carbon energy technologies that minimize lag time will be critical.

#### *IMPACT ON THE TRANSPORTATION SECTOR*

The transportation sector is one of the main energy-consuming sectors in any society (globally it consumes around 26% of total energy demand and represents 25% of the global CO<sub>2</sub> footprint)<sup>8</sup> and it directly affects the daily lives of people. The existing transportation infrastructure in the MENA is currently not designed to address the challenges of climate change<sup>9</sup> and is not adequate for meeting the expected increasing needs of its societies. Any future incentives for mitigating climate-changing greenhouse gas emissions, such as carbon pricing or MENA countries signing international climate agreements, will require major changes in the region's transportation sector.

#### *IMPACT ON THE CONSTRUCTION SECTOR*

Climate change is also resulting in important changes in the housing sector in the MENA as increasing temperatures, particularly in summer months, are also increasing the demand for air conditioning. Strongly related to that sector is the fact that 29% of global energy demand comes from households which are responsible for 26% of global CO<sub>2</sub> emissions. That said, any improvements in this sector would have a substantial impact on global energy and CO<sub>2</sub> footprints.<sup>10</sup> Therefore, some initiatives are being developed to increase the energy efficiency of buildings and to reduce related energy requirements. However, the necessary paradigm shift in household energy conservation and efficiency remains a distant goal that requires more demand-side management. Yet the MENA is still in the phase of expanding urbanization, with large numbers of new construction projects, which creates a unique opportunity for more sustainable development.

#### *OTHER ECONOMIC IMPACTS*

There is a wide array of additional impacts on the general energy economy that MENA countries must account for. Government budgets dedicated to energy subsidies will now have to deal with more extreme changes in energy consumption. In Egypt, for example, the government is facing new opportunity costs and dif-

**... energy (e.g., petrol) subsidies in Egypt increased from around 10 Billion EGP in fiscal year 2001 to 40 Billion EGP in 2006 to an expected 67 Billion EGP in fiscal year 2010/2011**

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7. See Matthias Deutsch et al., *Renaissance der Kernenergie? Analyse der Bedingungen für den weltweiten Ausbau der Kernenergie gemäß den Plänen der Nuklearindustrie und den verschiedenen Szenarien der Nuklearenergieagentur der OECD* (Berlin/Basel: AG Pragnos 2009), p. 110, [http://www.prognos.com/fileadmin/pdf/publikationsdatenbank/Prognos\\_Studie\\_Renaissance\\_der\\_Kernenergie.pdf](http://www.prognos.com/fileadmin/pdf/publikationsdatenbank/Prognos_Studie_Renaissance_der_Kernenergie.pdf).

8. See International Energy Agency (IEA), *Worldwide Trends in Energy Use and Efficiency* (2008).

9. See Hamed Assaf, "Infrastructure," in Mostafa K. Tolba and Najib W. Saab, eds., *Arab Environment: Impact of Climate Change on Arab Countries, AFED Report* (2009), pp. 113–120.

10. IEA, *Worldwide Trends in Energy Use and Efficiency* (2008).

difficult choices. Household energy consumption, which is highly subsidized by the government, is rising. At the same time, demand from businesses is growing as private industries seek to expand or as new, often energy-intensive, industries are created. This competition for energy supplies between households and businesses has direct implications on government revenues, as the government must choose (or strike a balance) between taxing industries on energy use to gain revenues, and paying subsidies to households for their energy consumption.<sup>11</sup> This debate is creating social tensions which are further exacerbated by the dramatic growth in household energy demand. As a result, energy (e.g., petrol) subsidies in Egypt increased from around 10 billion EGP in fiscal year 2001 to 40 billion EGP in 2006 to an expected 67 billion EGP in fiscal year 2010/2011.<sup>12</sup> This increasing transfer of subsidies to households is creating major opportunity costs for the government, further reducing its capability to provide reliable energy supplies for the existing industries (due to increased outages) which has negative effects on the industry's hardware. Similar developments are common across the whole region, as governments are facing difficult choices about the future of their subsidy-based energy systems. A positive effect is that the region is currently witnessing the creation of smaller energy companies that are challenging the existing incumbent big public players. A larger number of companies has the potential for distributing the energy supply risk among a bigger number of energy suppliers and allows for more adapted local solutions. This provides just one example of how seemingly minor changes in the energy system driven by the effects of climate change do have the potential to drive extensive changes in social and economic dynamics.

#### IMPACTS OF CLIMATE CHANGE ON SECURITY IN THE MENA REGION

As we have illustrated above, climate change will create new dynamics in the energy sector across the MENA region. These changes might exacerbate or create new security concerns at the international and national levels, in addition to affecting domestic security and stability within MENA countries. Depending on the energy choices that countries make in addressing the threat of global climate change, transitioning to more sustainable energy sources could also produce positive security effects.

*... decisions by MENA governments to use available sources for exports rather than domestic consumption (in Morocco and Egypt, for example) could create new social and political tensions*

#### INTERNATIONAL ASPECTS

Changes in **regional energy demand**, including growing competition for reliable sources of conventional energy (oil and natural gas resources in particular), are creating several concerns. The finite nature of cheap fossil fuel resources could create supply and demand imbalances, with the potential to drive price increases for poorer populations within the MENA. Additionally, decisions by MENA governments to use available sources for exports rather than domestic

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11. Of course, governments can always have varying taxing schemes that benefit the poorest members of society more and that impose higher taxes on users or industries that exceed energy ceilings, but this also requires planning and time for implementation and enforcement.

12. See *Al Youm Al Sabe'è* newspaper, November 7, 2010.

consumption (in Morocco and Egypt, for example) could create new social and political tensions. On the other hand, international cooperation among countries could create security benefits if cooperation on renewable energy is developed between MENA and non-MENA countries or within the MENA region. For example, the governments of Qatar and the United States signed a Memorandum of Understanding on Renewable and Alternative Energy in early 2010 that will lead to knowledge exchanges and potentially joint funding for research and development in MENA; the US government signed an additional agreement with the government of Saudi Arabia to increase energy-related exchanges.<sup>13</sup> Business relationships centered on clean energy can likewise create economic opportunities and promote international cooperation while drawing foreign direct investment in infrastructure and water projects – all with the potential to bolster country-level and regional stability and prosperity.

Additional implications include indirect effects resulting from **shifting international relations and geopolitics as global energy demand and supply change and affect the MENA** and its role as the world's primary energy exporter.<sup>14</sup> Also, increasing global demand and competition for raw materials, components, and qualified human capital related to alternative or new energy technologies (nuclear, solar/CSP, wind turbines, etc.) can result in increased costs and lead times for building new energy generation capacity, which subsequently can lead to a lack of perceived energy security.

#### NATIONAL ASPECTS

At the national level, **social and domestic stability** could be challenged by insufficient generation capacity and thus inadequate energy supply. For example, in the summer of 2010 when temperatures were high in the region, Egypt was exporting gas based on existing contractual obligations despite pressing domestic needs. However, possible synergies could arise, as increasing domestic demand pushes for further regional cooperation such as increased regional connectivity of electric grids (e.g., using the different peak times and the available load capacities to supplement each other's energy needs). This type of interdependence can incentivize greater cooperation among countries.

Additionally, there is potential for public instability and tensions resulting from shortages of energy and water. This could also hinder economic development and obstruct access to basic needs of the population. Depending on the choice of the energy mix, human development could be hindered and health conditions could deteriorate, resulting in further economic and social pressure on the governments across the whole region.

On **the economic security side**, inadequate energy supplies could inhibit business growth (e.g. according to the World Bank,<sup>15</sup> problems in access to electricity services constrain businesses opportunities in Lebanon). The lack of government

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13. See John Prata, "Qatar, US Sign Deal for Energy Research," *Gulf Times* (February 26, 2010).

14. As the US, European Union (EU), and other historical fossil fuel importers reduce imports as they mitigate emissions and adopt renewable energy sources, energy demand growth in China, India, etc. is creating stronger trade relationships among those countries and the MENA region.

15. The World Bank (International Bank for Reconstruction and Development & International Finance Corporation), Country Partnership Strategy for Lebanese Republic for the Period FY11–FY14, July 28, 2010.

action represents possible security implications as policy actions do not respond adequately to changing energy patterns.<sup>16</sup>

**Governments' decisions** about where to devote financial resources for energy subsidies, tax policies, and other government support can have a broad range of implications for social, economic, and national security.

### *Types of Energy*

The changing patterns of energy supply present several security risks based on the adoption of specific sources of energy. **Nuclear** energy presents potential proliferation concerns, economic and security risks, and huge potential costs to society (such as insurance costs not covered in the official costs of potential accidents in the initial cost assessment). The increased use of **natural gas** could result in additional competition for access to the available supplies among countries in the region and with regard to their gas export policies. The potential exploitation of **unconventional fossil fuel** supplies, such as shale oil, also presents risks to water supplies and environmental damage. With respect to **renewable energy sources**, potential security benefits could include increased reliance on domestic sources of energy supply and reduced environmental and climate risks compared to other energy sources. Increasing interdependence through electricity interconnections and trade among countries and regions could contribute towards improving relations.

### *Infrastructure*

Economic and social stability issues may arise with a possible mismatch between extreme weather conditions (i.e., temperature extremes) and the existing energy infrastructure as energy demand soars or fluctuates. In the summer of 2010, for instance, the sudden increase in temperature/extended heatwave in the MENA region exposed the bottlenecks and inadequacies of the existing infrastructure in handling these conditions, e.g. for accommodating peak demand.<sup>17</sup> This could be made worse by the ineffectiveness in how countries plan for future demand and the related energy infrastructure.

### *Possible Benefits*

There are also potential security benefits of energy portfolio diversification, technological cooperation, and development through improved national research and development (R&D) policies, which would encourage private sector investment in R&D and enhanced cooperation among countries, for example in renewable energy. In addition, energy diversification, increasing competition, and environmental benefits can all enhance societal stability and bring further security benefits.

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16. Governments not addressing demand issues adequately (varies by country), involvement in regulation/restricting ability of businesses to secure their own energy supplies, and releasing themselves of the responsibility to secure adequate supplies.

17. As a result of failing electricity grids, insufficient electricity generation capacity, or lack of feedstock for electricity generation, major electricity shortages occurred throughout the region during the summer heatwaves of 2010. These shortages resulted in protests in Egypt, Iraq, and Lebanon.

## RESPONDING TO CLIMATE CHANGE THROUGH MITIGATION AND ADAPTATION

A wide variety of mitigation and/or adaptive actions may be taken to lessen or overcome adverse effects of climate change on energy. Both mitigation (reducing the contributions that lead to an increased carbon footprint) and adaptation measures (taking steps to reduce the negative impacts of climate change on energy security) will be important for coping with these security concerns and for leveraging potential security benefits. These measures could include international cooperation, national policies, and measures that apply to both levels.

**International cooperation** will be critical to addressing climate change-related issues in energy sectors across the MENA region. This should include cooperation among countries on energy demand management, for example in enhancing efficiency and energy savings/conservation. It will also be important for MENA countries to develop cooperation with the EU and United States on renewable/clean energy research, development, and deployment. In this context, it will be important for technology cooperation to include R&D conducted *within* the MENA, rather than simply transferring technology developed abroad into the region. There is also potential for regional cooperation among MENA countries in order to leverage shared infrastructure, including electricity interconnections for increasing regional power trading.

At the **national/state level**, it will be important for countries to shift to renewable energy sources in their energy mix in order to reduce demand competition for non-renewable sources such as fossil fuels. Governments should pay special attention to improving energy infrastructure management and improving planning to cope with the impacts of climate change. This will also require appropriate policies and regulatory frameworks that incentivize energy efficiency, a diversified energy mix and behavioral change. In particular, governments will need to encourage small businesses' activities in the energy sector, for example by enacting policies that support local-level development of renewable energy sources. Additionally, governments can develop and implement higher, more environmentally friendly fuel standards while managing the potential social and economic implications of changes in their transportation sector on low income groups among citizens.

It is important to mention that there is plenty of room for the region to make further advances when it comes to efficiency improvements. According to an Energy Sector Management Assistance Program (ESMAP) report<sup>18</sup>, MENA energy intensity was some 60% higher in 2009 than that of Organisation for Economic Co-operation and Development (OECD) countries and 40% above the world's average. As a matter of fact the MENA region is one of the worst performers when it comes to energy intensity worldwide.<sup>19</sup>

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18. The World Bank, *Tapping a Hidden Resource: Energy Efficiency in the Middle East and North Africa. Energy Sector Management Assistance Program* (February 2009).

19. See World Resource Institute, *Earth Trends*, <http://earthtrends.wri.org/text/energy-resources/variable-668.html>.

Finally, many of these measures will apply to both the international community and the national governments in the MENA region. Incorporating likely climate change effects into energy forecasts and planning will be critical for all countries and international institutions. A good example is ensuring that energy plans account for increased sensitivity to water supply changes. For instance, CSP developers have to give greater considerations to hybrid and dry cooling technologies to conserve water. They should also combine renewable energy projects with desalination technologies in order to maximize energy production and efficiency in water consumption. As CSP projects may be funded and developed nationally or by international consortiums, adequate planning for climate change impacts on water and energy must be both national and international.

All countries could define feasible targets/policy goals and develop instruments for the implementation of the above while being conscious of security risks in designing these policies. In this context, governments will need to ensure timely implementation of the aforementioned measures and make sure that the results are delivered for the benefit of their citizens and businesses. Strengthening cooperation among the public sector, the private sector, and academia could be critical for this process, particularly using appropriate measures to enhance education, training, and capacity-building. Planning and budgeting for the immediate and long-term impacts of climate change should become a priority for the energy sector.

## CONCLUSION

Implementing the above measures and accounting for the potential security concerns resulting from climate change impacts on the energy sector will continue to be challenging. Remaining obstacles in the MENA region include the need to drive the public debate on climate change and energy, governmental capacity to implement major shifts in policies, and public education. This transition is going to take some time. However, given that the effects of climate change are already visible, there are various mitigation and adaptation measures that will have to start immediately. The longer the wait, the more pressing the challenges will become for the region, especially for the poorest who have the least ability to adapt.



# Cooperation over Nile Waters: Needed More under Climate Change, More Attainable after the “Arab Spring”?

*Franziska Piontek*

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2011 marks the beginning of a new era for both Egypt and Sudan, opening new possibilities to overcome the decade-old Nile water conflict. After the revolution in Egypt, many hope for a reorientation of the country’s foreign policy towards Africa and a potential new approach to negotiations on allocation of the Nile waters. The independence of South Sudan will increase the number of Nile riparian countries to 11,<sup>1</sup> opening up the opportunity for the new Republic of South Sudan to become a mediator between the upstream and the downstream states. If these new conditions lead to a successful agreement on the Comprehensive Framework Agreement on Nile waters including all riparians, this would constitute a win-win situation for all and an improved basis to tackle the challenges facing the basin in the coming decades.

## BACKGROUND

The long-standing *status quo* on water allocation in the Nile Basin rests on two agreements from 1929 and 1959<sup>2</sup> dividing 87% of the Nile waters between Egypt and Sudan. Egypt, which relies on the Nile for up to 99% of its water supply, views these “historic rights” as essential for its survival. In the past, despite its location as the most downstream riparian country, Egypt has managed to establish itself as the unchallenged “hydro-hegemon” of the basin<sup>3</sup> — the most powerful country in terms of military, economic, and political strength, as well as a partner in strong alliances, especially with the United States. In this capacity, it has blocked all attempts at water infrastructure development in the upstream countries, including by vetoing the financing of such projects from international institutions like The World Bank.

However, this *status quo* has been increasingly under pressure in the past decade, due to several factors. First, the challenges for upstream countries with respect to their water sectors are mounting, intensifying the pressure to develop water infrastructure and increase water use and withdrawal. These challenges include population growth, the first effects of climate change, and development gains, which increase the need for water for consumption, agriculture, and electricity generation. Second, the improving economic situation of the upstream countries — Ethiopia

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1. Currently, the countries in the Nile catchment region are Burundi, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, and Uganda.

2. The 1929 treaty, which dates from colonial times, was concluded between the colonial power Great Britain and Ethiopia. It recognizes Egypt’s prior rights and gives Egypt veto power over all projects with the potential to reduce the amount of water it receives. The 1959 agreement includes a division of water between Egypt and Sudan.

3. Mark Zeitoun, “Hydro-hegemony: A Framework for Analysis of Trans-boundary Water Conflicts,” *Water Policy*, Vol. 8, No. 5 (2006), pp. 435–460.

is currently is the fastest growing country in Africa — enables them to implement projects even without foreign support. Examples are the recently inaugurated Tana Beles Dam and the recently announced “Great Millennium” or “Renaissance” Dam in Ethiopia. Third, as part of its increasing engagement in Africa, China provides financial support in particular for dams and irrigation systems, without consulting downstream states. An example of its involvement is the construction of Sudan’s Merowe Dam.

The increasing ability of upstream countries to undertake the development of their water resources, thereby possibly reducing the flow arriving in Egypt, strengthens the upstream bargaining position. Meanwhile, demands for a more equitable allocation of water

***Egypt, which relies on the Nile for up to 99% of its water supply, views these “historic rights” as essential for its survival.***

amongst all basin countries have grown louder and more insistent. In 1999, this was met by a twofold cooperative approach — the Nile Basin Initiative, focusing mostly on building trust and technical cooperation, and the D3-project, high-level negotiations with the goal of a new, basin-wide agreement on water allocation. In 2007, these negotiations resulted in a draft Cooperative Framework Agreement, which was not signed due to continuing disagreements over Egypt’s historic claims that it was (and still is) unwilling to give up. In a display of their new confidence, five upstream states<sup>4</sup> proceeded to open the signature process in 2010 without the approval of Egypt and Sudan. With the signature of Burundi in February 2011 as the sixth country, the ratification of the agreement may proceed and the likelihood of it coming into force, thereby finally moving from historic to equitable water allocation in the basin, has greatly increased. Egypt and Sudan are now under pressure to either participate by accepting a revision of allocations, or be left out without a stake in the future developments of the basin.

#### *CLIMATE CHANGE: INCREASING IMPORTANCE OF COOPERATION*

Cooperation on the use and development of the Nile water resources promises a win-win solution to the whole basin when comparative advantages of the riparian countries are utilized.<sup>5</sup> These include, for example, hydroelectric power in Ethiopia, Sudan’s agricultural potential, Egypt’s technical and financial abilities, and increased intra-basin trade in electricity, food, and goods. Benefits from basin-wide water management also include a reduction in evaporation losses by storing water at higher elevations and in deep gorges in Ethiopia rather than in the desert heat of Lake Nasser, a reduction of downstream dam siltation, and reduced downstream damage from floods through upstream flow regulation.

There are additional benefits of cooperation, given the impact of climate change. One of the main effects of climate change will be increased flow variability and higher frequency and intensity of floods and droughts. Resulting damage can be reduced most efficiently by cooperative basin-wide flow management. Effects of climate change on the

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4. Ethiopia, Kenya, Rwanda, Tanzania, and Uganda. This is known as the Entebbe Agreement.

5. This has been discussed frequently in the literature. See, for example, Dale Whittington, “Visions of Nile Basin Development,” *Water Policy*, Vol. 6, No. 1 (2004), pp. 1–24.

overall flow are very uncertain at this point, and predictions include both large flow increases as well as equally large decreases. An increased flow could decrease the conflict potential by allowing the upstream countries to increase water use without decreasing downstream flow. However, it will still constitute a challenge for infrastructure, agriculture, and settlements along the river — a challenge best met by efficient flow management. A decreasing flow would further increase conflict potential and could potentially threaten the livelihoods of many along the river. Cooperation would be the only way to use the precious water most efficiently and beneficially for all riparians.

#### *NEW EFFORTS TOWARDS COOPERATION OR REINFORCEMENT OF THE DIVISION?*

The first actions of the new Egyptian government and the government of South Sudan are not yet conclusively pointing towards either cooperation or confrontation as the future of Nile water politics. On one hand, Egypt is already building close ties with the government of South Sudan. During a visit of the Egyptian Prime Minister to South Sudan, Egypt offered mediation in case of differences with Sudan as well as assistance in the areas of agriculture and water use, while the President of South Sudan assured that his country would respect the original allocation treaties. Furthermore, a revival of the Jonglei canal<sup>6</sup> project was discussed, pointing towards an Egyptian attempt to reduce its strong dependence on the Blue Nile flow.<sup>7</sup> Egypt has also voiced its opposition after the announcement of the “Great Millennium Dam” to be built in Ethiopia.

On the other hand, Egypt has offered new negotiations to Ethiopia based on the principle of equitable water shares. An Egyptian delegation of politicians, academics, and civil society activists visited Uganda to talk about the Entebbe treaty. In parallel, Uganda has announced that it would “not ratify [the Entebbe Agreement] in a hurry. We want Egypt on board.”<sup>8</sup>

***Cooperation would be the only way to use the precious water most efficiently and beneficially for all riparians.***

Therefore, it seems that both scenarios are possible at this point: either a reinforcement of the alliance between Egypt and Sudan with the explicit support of the new country of South Sudan and a continued insistence on the historic water allocation, or a new orientation towards Egypt’s African neighbors and a cooperation-oriented water policy. Even with a reduction of its water shares, Egypt could clearly benefit from a cooperative, basin-wide management of the Nile waters and a more stable political environment with economically-prospering neighbors in the basin. Therefore, cooperation and an equitable allocation would not be a zero-sum game, but would rather create a win-win scenario for all Nile riparians.

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6. The Jonglei canal is a project to drain and bypass the Sudd swamp in South Sudan in order to reduce water lost in evaporation. It was put on hold in 1984 by the Sudanese civil war. It would increase the flow of the Nile by almost 5 m<sup>3</sup> per year, but the environmental and societal consequences are tremendous.

7. Due to high evaporation of the White Nile flow in the South Sudan Sudd swamps, the Blue Nile arising in the Ethiopian highlands contributes 85% of the Nile flow reaching Egypt.

8. *Al-Ahram Weekly Online*, “New Key, Old Padlock,” Issue No. 1043 (April 14–20, 2011), <http://weekly.ahram.org.eg/2011/1043/eg9.htm>.

# Environment and Sustainable Development in the Maghreb

*Mahi Tabet Aoul*

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The Maghreb extends about 2,000 kilometers on either side of the Greenwich meridian (-13° West from Cabo Jubi and 11.08° East to Kelibia) and is located on the same longitude as Europe. Although the Maghreb forms a single climatologic and geographical unit, it is a diverse landscape of mountains, fertile areas, and steppes. Nevertheless, the similarity of climate, geography, and culture in the Maghreb provides a solid foundation for developing a common environmental strategy.

## *ELABORATION OF A SUSTAINABLE DEVELOPMENT STRATEGY*

A common environmental strategy for the Maghreb must address four types of constraints: natural, human, mode of governance, and management of obligations related to conventions, protocols, and principles worldwide.

### *NATURAL CONSTRAINTS*

North Africans are unanimous with respect to the natural constraints they face: scarce and precarious water resources (quantitative and qualitative decreases in drinking water), erosion and silting of dams, increased desertification, forest fires (20,000 ha of forests disappear every year both in Algeria and Morocco), loss of biodiversity, limited agricultural land compared to that of the northern Mediterranean, reduced soil quality and water salinity, heat waves, and floods.

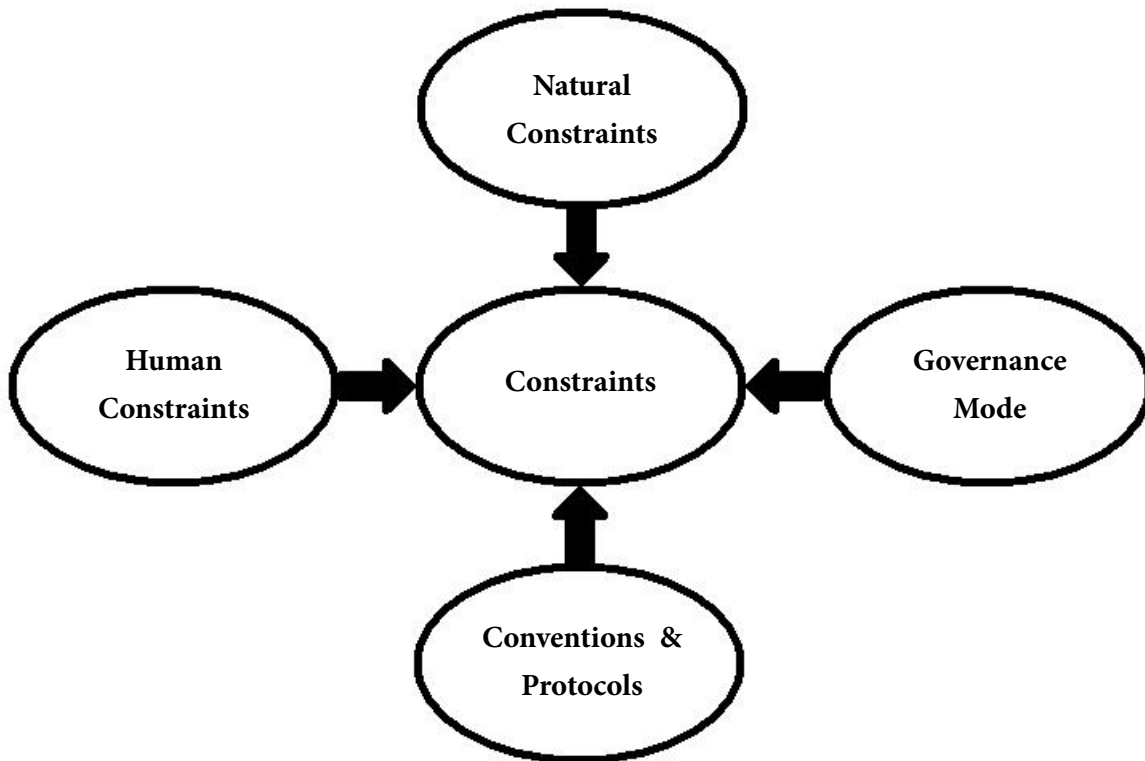
### *CONSTRAINTS DUE TO MAN*

These constraints are often the result of the actions of marginalized sectors of the population: fragile land clearing (as in highlands and steppes), declining aquifer levels by water overuse (land subsidence and intrusion of marine waters in coastal aquifers), air pollution, climate change, water and soil, uncontrolled waste and management of watersheds, flood risk, poor control of seismic standards for construction with periodic, and great losses of human lives and infrastructure.

### *CONSTRAINTS DUE TO GOVERNANCE MODE*

Sustainable development cuts across all sectors and requires the involvement of all institutional actors in a coordinated fashion. In the Maghreb, vertical governance inherited from the colonial period persists today. The great difficulty is the lack of a culture of coordination within each country. The establishment of commissions or coordinating committees in the environmental field often serves as an alibi for postponing decisions or getting rid of sticky issues.

Figure 1: Strategic Constraints



#### CONSTRAINTS RELATED TO IMPLEMENTATION OF ENVIRONMENTAL CONVENTIONS

Like other regions of the world, the Maghreb is implementing obligations related to many conventions, protocols, and principles to which it is committed.<sup>1</sup> Within the Maghreb, implementation of such obligations is entrusted to a specific institution or department that houses the national focal points of the Rio conventions. Generally, these focal points are located in different institutional structures. An inventory of fixtures was realized in October 2006 by the secretariats of three conventions on the location of the various focal points of the various conventions in three countries of the Maghreb (Algeria, Morocco, and Tunisia) (See Table 1).

Competitiveness at the national level between ministries and governmental institutions sheltering the national focal points of various international conventions results in much of the duplication of requests for technical support and funds for projects which can be integrated or have similar objectives. These projects are implemented in an inadequate manner and sectorized at both national and international levels. This has resulted in 1) a deficiency in coordination and integrated vision within various international conventions and 2) the dispersion of national focal points between several institutions.

1. These include the Rio Conventions on Climate Change, Biodiversity, and Desertification; the Ramsar Convention on Wetlands; the Stockholm Convention on Pesticides; the Basel Convention on Border Transfer of Hazardous Waste; the Cartagena Protocol on Biosafety; the Kyoto Protocol on Greenhouse Gas Emissions; and the Montreal Protocol on Substances that Deplete the Ozone.

**Table 1: Localization of Focal Points of Rio Conventions in the Maghreb**

Country	Location of UNFCCC focal point	Location of UNCCD focal point	Location of UNCBD focal point
<b>Algeria</b>	Ministry of Environment, Regional Planning and Tourism	Ministry of Agriculture	Ministry of Higher Education and Scientific Research / Ministry of Environment, Regional Planning and Tourism
<b>Morocco</b>	Ministry of Regional Planning, Water and Environment	Deputy Ministry in charge of water and forestry under the Ministry for Agriculture	Ministry of Regional Planning, Water and Environment/ Morocco mission in Geneva
<b>Tunisia</b>	Department of Environment & Sustainable Development	Department of Environment & Sustainable Development	Department of Environment & Sustainable Development

Source: UN Convention to Combat Desertification (UNCCD), *Secrétariat, Focal Points*, <http://www.unccd.int/focalpoints/focalpoints.php>; UN Framework Convention Climate Change (UNFCCC), *Secrétariat, National Focal Points*, <http://maindb.unfccc.int/public/nfp.pl#beg>; Convention on Biological Diversity (CBD), *Secrétariat, National Focal Points by Country Groups*, <http://www.biodiv.org/doc/lists/nfp-cbd-grp.pdf>.

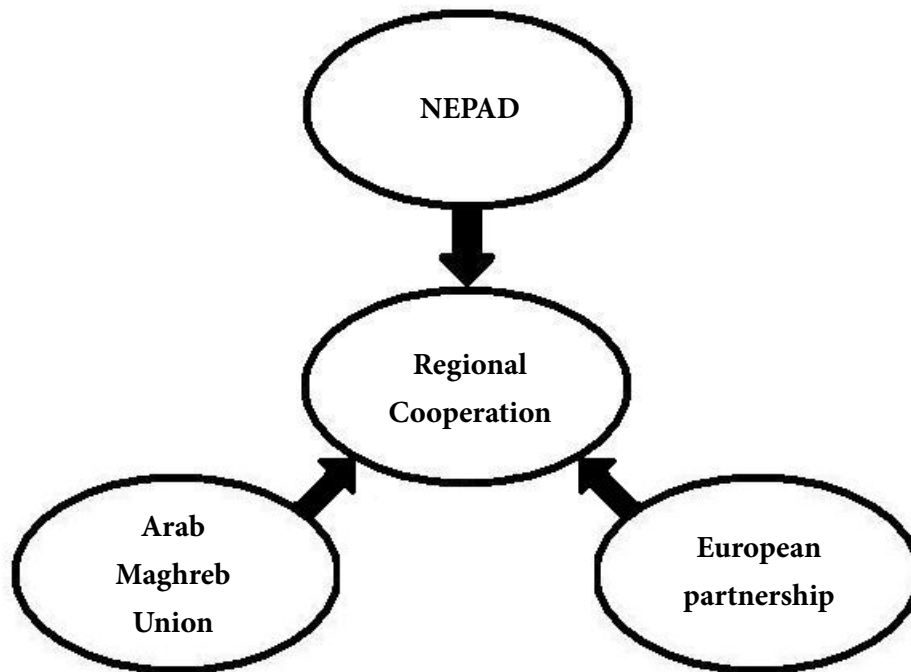
The obligations regarding the conventions relate to elaboration of inventories and action plans which are interdependent and sometimes even overlapping, involving a waste of human and material resources. To deal with complicated, delicate, and imbricated questions arising from multilateral agreements on environment, the UN Environment Programme (UNEP) in its report (UNEP/IGM/2/3 of June 28, 2001), summarized the various opinions expressed by experts on the implementation of the environmental conventions:

[ ... ] the national governments had to ensure a satisfactory coordination at the governance in relation with the environment is related to the lack of coordination at the national level as well as the absence of fundamental elements constituting a functional legal framework. It was pointed out the UNEP that could provide opinions to the governments so that they could ensure this coordination at the national level, while indicating that its efforts would be reduced to nothingness in the absence of the necessary political will to attack the problems. It was advisable to support the complementarity of conventions on environment as well as a flexible coordination of the conventions secretariats and to encourage the supply of an effective assistance to countries helping them to implement their obligations towards the multilateral instruments on environment to which they are committed. It was important to direct the activities of these secretariats which were disseminated in various points of the world. The coordination, between multilateral agreements on environment and United Nations organizations, was somewhat lacking [ ... ] at least by the fact of their number? The agreements represent an enormous administrative burden for all governments, in particular those of developing countries. This is why it would be advisable to seek more effectively to manage the multilateral agreements on environment within the vaster framework of international governance regarding the environment [ ... ]. Some urged to examine the question of possible development of universal mechanisms for applying purposes and respect of multilateral agreements about the environment of which the UNEP would ensure coordination. Others stressed that such a formula should plan to build capacities of developing countries so that they will be able to apply the agreements to which they are committed.

*REGIONAL COOPERATION*

Here, we limit ourselves to cooperation on environmental matters. The regional level includes: the Arab Maghreb Union (AMU), the environmental initiative between the New Partnership for Africa's Development (NEPAD) and the United Nations Environment Programme (UNEP), and the agreements between the Maghreb and the European Union.

**Figure 2 : Regional Cooperation**

*ARAB MAGHREB UNION (AMU)*

The AMU, which was created in 1989, consists of five countries: Algeria, Tunisia, Morocco, Mauritania, and Libya. In the environmental field, some technical projects and studies have been implemented, such as URAP (under the regional action plan to fight desertification), studies on underground water sheets of the Sahara, and the elaboration of a Maghreb charter on environmental protection and sustainable development. However, cooperation with the AMU framework has slowed because of the Western Sahara conflict. Nevertheless, some regional joint projects have been realized under the auspices of international organizations, as have many scientific exchanges.

*ENVIRONMENTAL INITIATIVE BETWEEN UNEP AND NEPAD*

This initiative, elaborated jointly by the African Ministerial Conference on the Environment (AMCE) of NEPAD and

UNEP and adopted in 2003 by the African Union (AU), aims at improving the environmental conditions to spur economic growth, eliminate poverty, build capacities for the improved application of international environmental conventions, and take up the challenges within the global framework of implementing the NEPAD. The designated areas of action within this initiative are the fight against desertification, droughts, soil degradation, integrated management of water resources, prevention, control and management of invading species, climate change, management of marine and coastal environment, and conservation and management of natural resources (forests, biodiversity, bio-security, genetic resources). It includes the cross-section questions like early warning of catastrophes, health and environment protection, poverty reduction, and technology transfer. The projects identified for the Maghreb are:

- management of watersheds (Mellègue Wadi in Tunisia and Algeria and M'soun Inaoune in Morocco);
- rehabilitation of oasis ecosystems;
- creation of an observatory for natural droughts, desertification, and natural disasters;
- reinforcement of green barrier, conservation, and sustainable use of natural resources in Maghreb countries;
- the long-term implementation of a network of ecological control
- use of geographical information systems in the field of water resources.

#### MAGHREB AND EUROPEAN UNION

Without a doubt, cooperation between the northern and southern littoral states of the Mediterranean is a necessity. It goes beyond the purely economic considerations by taking into account other requirements such as environment, climate change, human mobility, and security.

##### 1. Euro-Mediterranean Partnership (EMP):

Within the framework of the Barcelona Process, the association agreements between EU and Maghreb countries were worked out to implement the MEDA (Mediterranean Assistance) objectives laid down by this process. Tunisia was a pioneer with the signature of the agreement in 1998, while the association agreement for Morocco goes back to 2000 and that for Algeria to 2005. The table below indicates the allocated funds to each country, within the framework of the MEDA program.

**Table 2: MEDA Program for Maghreb**

<b>MEDA Program (1995–2005)</b>	<b>Obligation (O) (millions of euros)</b>	<b>Payment (P) (millions of euros)</b>	<b>Ratio P/O in (%)</b>
<b>Algeria</b>	437	144	32.9%
<b>Morocco</b>	1472	783	53.2%
<b>Tunisia</b>	875	568	64.9%



This table provides some information on the degree of commitment and efficiency with regard to the use of MEDA funds allocated to Algeria, Morocco, and Tunisia. Tunisia consumed credits amounting to 64.9%, followed by Morocco with 53.2%, and 32.9% with Algeria. This reflects, in a sense, the degree of commitment, organization, and efficiency of each country regarding the MEDA program.

### **MEDA support to Morocco**

In Morocco the EU financed six projects intended to fight soil degradation within the MEDA program framework between 2001–2005. These projects were devoted mainly to sustainable management of land use, reduction of erosion, and soil conservation.

### **MEDA support to Algeria**

The EU financed the sanitary and phytosanitary monitoring and early warning systems according to EU standards; the quality chain and improved standards for agricultural products, the conceptual support to agricultural diversification and for the studies of sectors; the promotion of Algerian-European partnerships in the agricultural sector; support for the preparation of negotiations under the Association Agreement and WTO; and the completion of a sector-based study on the effects of the national development agriculture and future development options.

### **MEDA support to Tunisia**

This support has concerned all key sectors of economy and society modernization: macroeconomics, sector-based reforms (customs, ports, privatization, etc.), educational sector, financial reform, health insurance, media, and, soon, justice. The program concerning the ports is exemplary because it allowed, among other things, the complete restructuring of the longshoreman's profession in acceptable social conditions.

## **2. European Policy of Vicinity (EPV)**

The EPV, launched in 2004, has replaced the MEDA program. The EPV aims to complement and reinforce the Barcelona Process through bilateral action plans agreed with all country partners inside and outside the Euromed zone. The EPV blurred the Barcelona Process and has tended to be imperative as the operating mode of cooperation. The EPV functions on the basis of action plans: Morocco and Tunisia signed their plans in 2004.

The EU Council considers the deep integration of the economy to be an essential pillar, which can be

strengthened by the gradual adoption of free trade agreements that are understandable and robust and that help the countries of the South to adhere to with international standards of product labelling and the organization of foreign trade.

### 3. Union for the Mediterranean (UpM)

On May 6, 2007, France put forward the idea to create the Union for the Mediterranean (UpM). After difficult negotiations with other EU Member States, it was decided to call this initiative the “Barcelona Process — Union for the Mediterranean.” The EU thus wanted to reaffirm the predominance of the Barcelona Process on the UpM recommended by France. UpM was launched in Paris on July 13, 2008. It is an intergovernmental organization with a regional vocation that includes 44 members (27 of EU and 17 partners, including the Maghreb countries). It consists in activating the Barcelona Process by giving it more balanced governance by including EU partners. The priority actions concern the cleanup of pollution in the Mediterranean Sea and the development of sea lanes as well as solar energy.

## CONCLUSION

There is a need for the development of a common environmental strategy for the Maghreb. This essay has discussed the growing number and diverse forms of regional and international cooperation on the environment that have taken place in the Maghreb in recent decades. However, it is also important to consider the effectiveness and impact on the ground of the projects that such cooperation has spawned.

We believe that these projects have served more to address the pressing concerns of individual states than to spur endogenous development that must be undertaken by national or local institutions or structures. We note the absence of a comprehensive and integrated vision for the medium- and long-terms that encompasses the Maghreb as a whole. This deficiency, coupled with poor governance at the state level, has impeded efforts to cope with the environmental challenges facing the region.

To be sure, some informal scientific exchanges between universities have occurred. To date, however, the only projects with a regional dimension were those initiated by NEPAD and some multilateral organizations (Global Environment Facility). The work done within the AMU framework was of a theoretical nature; it did not consist of projects on the ground.

In our view, regional or international assistance must be part of an overarching strategy with clear, realistic, and timely objectives. As part of that strategy, international assistance should be geared toward assisting the Maghreb countries to develop *regional*, rather than national, projects.

# Middle East Revolutions: An Environmental Perspective

*Mohamed Abdel Raouf*

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Most of the numerous articles written about the ongoing revolutions in the Middle East have focused on their political and/or economic causes and likely consequences. However, environmental and natural resource-related issues, which are also at the center of these revolutions, have received little or no attention.

This essay discusses the salience of such issues in the 2011 Middle East revolutions, with particular reference to the case of Egypt. More specifically, it argues that environmental and resource-related issues were “hibernating phenomena;” that is, they were among the underlying causes of the conflict with Egypt’s ruling establishment.

## *ROOTS OF POPULAR REVOLUTION: THE CASE OF EGYPT*

The Middle East uprisings in general and the revolution in Egypt in particular stemmed from the anger of ordinary people. The January 25 Revolution in Egypt was initiated by well-educated youth, and not, as might have been expected, by the poor or by the masses of unemployed. Yet, although youth were the vanguard of the uprising in Egypt, the overwhelming majority of the population supported their demands. Moreover, contrary to predictions, political rather than economic grievances were at the forefront of the protesters’ demands.

During the January 25 Revolution, protesters raised banners and chanted slogans cast mainly in political terms, such as “Down, down Husni Mubarak,” “Leave, leave Husni Mubarak,” “Get out,” “Game over,” and “People want freedom.” The key slogan of the revolution has been, “The people want the downfall of the regime.”

How, then, to explain the uprising? In seeking to ascertain the direct and indirect reasons for it, one must be careful to avoid conflating the triggering events, the tools employed, and the underlying causes.

There were several events that can be considered as triggers for the Egyptian Revolution:

1. The death of the young internet activist, Khaled Mohamed Saied.
2. The death of the young Islamic activist, Sayed Belal.
3. The bombing of the Kedeseen Church in Alexandria on January 1, 2011.
4. The inspiration provided by the Tunisian Revolution (December 2010–January 2011).

To be sure, social networking media, including Facebook and Twitter, played a key role in the Egyptian Revolution. However, it is important to emphasize that social networking is a communications tool, not in itself a triggering event or an underlying cause of revolution.

In fact, there were a multitude of underlying causes, or what might be called “hibernating phenomena,” that led to the conflict with the ruling establishment in Egypt. They include:

1. Continual elections fraud.
2. Manipulation of laws.
3. Massive theft of the nation’s financial and natural resources.
4. Emergency law.
5. Police brutality.
6. The Mubarak regime’s foreign policy orientation, especially its policies toward the West and Israel.
7. Corruption and bad economic, social, and political conditions.
8. The anticipated transfer of power to the President’s son, Gamal Mubarak.

#### *THE EGYPTIAN REVOLUTION AND THE ENVIRONMENT*

The most obvious connection between the Revolution and the environment was the adverse impact on the man-made sphere and biosphere caused by the burning or destruction of a number of buildings and other property during the protests (see Figure 1).<sup>1</sup>

Yet, there were many less obvious and arguably far more meaningful connections. For example, some signs displayed during the protests, such as the one depicted in Figure 2<sup>2</sup> below, indicate that some believed that the ruling regime was culpable for squandering the country’s precious natural resources.

Indeed, environmental and resource-related issues were at the very core of the Egyptian Revolution, as many of the policy decisions and their consequences of the ruling regime had come to fuel popular discontent.

The export of natural gas, especially the unusually favorable terms by which gas was sold to Israel, is a case in point. In 2004, Egypt agreed to supply Israel with natural gas at approximately one-third of the international price for a period of 30 years. This agreement angered many petroleum experts, who argued, among other things, that the gas should be



**Figure 1:** A man stands on a burned-out car photographing the burning of the main building of the National Democratic Party in Tahrir Square, Cairo.



**Figure 2:** The man on the right side is holding a sign that reads “Leave, leave. You are the one who sold the land and the Nile.”

1. <http://www.mprok.com/vb/showpost.php?p=107662&postcount=1>.

2. Flickr user 3arabawy, <http://www.flickr.com/photos/elhamalawy/5423036364/>.

used to meet Egypt's own domestic consumption requirements. Gas exports to Israel continued despite these objections and the fact that opponents managed to obtain a court decision in their favor. This is considered an environment-related issue, as one can see from the following sign (Figure 3)<sup>3</sup> raised before, during, and after the Revolution saying: "No for gas setback. Stop Egyptian natural gas exports. Stop the bleeding of Egypt's natural resources."



Figure 3

During and after the public protests that brought down the regime, protesters included environmental and resources-related issues among their catalogue of grievances, loudly proclaiming, "No" to carcinogenic pesticides and fertilizers, "No" to polluted water resources, and "No" to the bulldozing of farmland.

The following two caricatures show clearly that such issues were indeed "hibernating phenomena" — underlying causes of the revolution.



**Comic 1:** Loosely translated as "If I go to buy a tank of water, I'll have to stand in a long line, it'll be full of pollution, I'll have to pay 10 pounds, it'll cause disease that'll kill me, so it's maybe it's just better to stay thirsty." (Source: Mahmoud Elsaied, <http://www.mazikao.net/vb/showthread.php?t=47433&page=16>).



**Comic 2:** Loosely translated as "Theft of government land, theft of money, polluted wheat, food that causes cancer ... We cannot deal with this or that. It is fine and things will go on anyway!" (Source: Sharkawy, <http://www.ikhwanonline.com/new/Article.aspx?ArtID=72139&SecID=250>).

3. <http://news.maktoob.com/article/6246654>.

Two of the key slogans of the revolution were: “The cancer is everywhere, and the gas is sold for free” and “Husni Mubarak, you agent, you sold the gas and (only) the Nile is left (to be sold).” Of the many jokes circulating during the Revolution, some referred to the impact of the regime’s policies on the environment: “Our Prime Minister’s name is Nazeef (i.e. clean) and pollution is killing us all!”

It is revealing that, when the uprising ended, the same people who had been demonstrating for 18 days immediately started to clear Tahrir Square of trash and debris (Figures 4 and 5).<sup>4</sup> Similar clean-up operations occurred in cities throughout Egypt.

The link between the revolution and the environment can also be seen in the actions taken by demonstrators. Immediately after the regime was ousted from power, youth campaigns were launched to clean, paint, and plant in streets and cities across the country. These and other acts of collective “environmental citizenship” were very important. They sent a clear signal to the authorities, challenging the self-interested rational actor model that had pervaded official thinking and policies for decades and articulating the people’s wider social interests and concerns.

Interestingly, the second and third lines of a flyer circulated during the run-up to the March 19 constitutional referendum (Figure 6)<sup>5</sup> that asked people to vote “No” also mentions a better quality of life and better health.

During the celebrations of the success of the Revolution, signs were displayed (Figure 7)<sup>6</sup> asking people not to dispose of garbage in the streets and to observe traffic signals.

The list of demands issued on April 8, “The Friday of Cleansing,” included several directly related to the environment:

1. Change old governors, break up local councils, and abolish the National

4. <http://www.arb2d.com/vb/showthread.php?1480-%ED%E6%E3%ED%C7%CA-%CB%E6%D1%CC%ED%C9-....-%E1%C3%CE%CA%E4%C7-%C3%E3-%C7%E1%C8%D1%C7%C1/page3>.

5. <http://tofaan87.blogspot.com/2011/03/blog-post.html>.

6. <http://baltim.info/>.



Figure 4



Figure 5



Figure 6

Democratic Party.

2. Investigate **the issue of looting of state land.**
3. **Investigate the issue of carcinogenic of pesticide.**
4. End the corrupt process of privatization of the public sector.
5. Punish the killers of the demonstrators and those who **poisoned the food and water and destroyed human health.**

The common discourse was replete with expressions such as “the people want to achieve reconstruction and sustainability,” instead of merely “people want to overthrow the regime.” On the occasion of Sham Al Naseem Day (Easter), on April 25 — exactly three months after the January Revolution — the literal and the figurative merged into one, as I heard nearly all people exclaiming, “This is the first time we can smell fresh clean air!”

Nevertheless, the road to sustainable development has not been cleared of all obstacles. One such obstacle is residual resistance to positive change, as indicated in a sign which reads, “Still there are clumsy people who are keeping fresh air away from us” (Figure 8).<sup>7</sup> Another is the sheer number and complexity of the environmental and natural resource challenges facing the country, including those related to the theft of the Pharos monuments and Alsakury gold mines, and, most significantly, the Nile River. The Revolution has made the enactment of policies conducive to sustainable development possible, though not inevitable.

## CONCLUSION

It is clear that environmental issues and negative environmental impacts were among the underlying causes of the Egyptian Revolution. One of the important lessons of the Egyptian experience is that the Arab world needs to carry out continuous green projects that motivate individuals, especially youth, to serve and protect their countries. In this regard, it is the task of the international community through international aid, investment, and other forms of cooperation to support local efforts to pursue sustainable development.



Figure 7



Figure 8

7. <http://www.youm7.com/>.



Middle East Institute