

The Global Resource Nexus

The Struggles for Land, Energy, Food, Water, and Minerals



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Transatlantic
Academy

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About the Transatlantic Academy

The Transatlantic Academy was created in 2007 as a partnership between the German Marshall Fund of the United States (GMF) and the ZEIT-Stiftung Ebelin und Gerd Bucerius. The Robert Bosch Stiftung and the Lynde and Harry Bradley Foundation joined as full partners beginning in 2008, and the Fritz Thyssen Foundation joined as a full partner in 2011. The Compagnia di San Paolo joined in providing additional support in May 2009, as did the Joachim Herz Stiftung and the Volkswagen Stiftung in 2011. In addition, the Academy received startup funding from the Transatlantic Program of the Government of the Federal Republic of Germany through funds of the European Recovery Program (ERP) of the Federal Ministry of Economics and Technology.

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May 2012



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FROM THE EXECUTIVE DIRECTOR

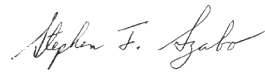
In 2012, the United States, European Union, and Japan will take China to the WTO over Beijing's rare earths policies. This is an example of how disputes between states over natural resources can be addressed within a structured, law-based system. Less certain is whether this process will deliver results in time, and what will happen in hot spot areas around the world such as the South China Sea, where the navies of several nations have recently faced off over access to hydrocarbon resources and fisheries, or Yemen, where fresh water supplies are running out just as the country, located astride some of the world's busiest shipping lanes, is in the midst of an intractable political crisis. In the Eastern Mediterranean — the transatlantic community's own backyard — Israel, Lebanon, Cyprus, and Turkey are at odds over the ownership of recently discovered off-shore gas resources that could become critical sources for the European Union. Even within states in many parts of the world, resource struggles can be seen in ballooning megacities, or in the mass migration caused by climate change and misallocated resources. Natural resources, and the struggles for land, energy, food, water, and minerals, truly represent a nexus of challenges for the transatlantic community. Yet there are also opportunities if we can show leadership, from gains in resource efficiency and greener growth, to the chance to stave off potentially disastrous conflicts.

This report represents the collective efforts of the fourth group of Academy fellows, who over the 2011-2012 fellowship year examined the theme Natural Resources: The New Geopolitical Great Game? It also builds on the work of the 2010-2011 fellows, who looked at the implications of the ongoing shift of economic and political power to non-Western regions, most dramatically toward Asia and especially China. This report is the product of the research of full-time academic fellows, informed by contributions from the Bosch Public Policy Fellows, Compagnia di San Paolo Fellow, and Volkswagen Stiftung Fellow, who were in residence at the Academy for shorter periods and provided practitioners' perspectives. The fellows engaged in an intensive collaborative research environment in which they presented their work and critiqued the work of their colleagues. They interacted with a wide range of experts and policymakers in the United States, Canada, and Europe as they shaped the research for this report.

The Academy would like to acknowledge the support of its donors in making this study and the broader Academy possible. It was thanks to their support that the fellows were able to spend nine months in Washington working collaboratively

on this theme, including study trips to Great Britain, Norway, Belgium, Germany, and Poland, and in numerous workshops and discussions with academics, policy analysts, business people, journalists, and government officials in North America and Europe. As was the case with the previous reports, we hope this report helps bridge the Atlantic policy and academic communities, and makes a contribution to the transatlantic dialogue on the nature and implications of these new global trends.

Sincerely,

A handwritten signature in cursive script that reads "Stephen F. Szabo".

Stephen F. Szabo
Executive Director
The Transatlantic Academy

EXECUTIVE SUMMARY

Unless the transatlantic community takes the lead in addressing the challenges arising from the unprecedented global demand for land, energy, food, water, and minerals, severe market disruptions are likely to occur, as are increased chances of violent conflict at interstate and local levels in many “hot spots,” especially in Asia, Africa, and Latin America.

Over the next 10-20 years, the world is likely to see accelerating demand for most natural resource commodities, as well as increasingly volatile markets. Scarcities are likely to be more common. Resource or material scarcities, as experienced by states, firms, or populations, arise primarily from failures of governance rather than from a physical shortage of resources or materials. Yet natural resource governance faces increasing complexity, especially when the linkages and inter-dependencies between different resources are considered. This study identifies a growing number of these linkages and elaborates on the challenges, dangers, and opportunities that will arise for the transatlantic community from the nexus of land, energy, food, water and minerals.

The Resource Nexus

The resource nexus originates in the interconnections between different resources, for example from the requirement of one resource as an input to produce another or from the substitutability of two or more resources. Actions taken by governments, firms, or communities affecting one resource often have consequences for other resources, in the same locale or on the other side of the world. These consequences often take the form of scarcity, environmental degradation, or destruction of livelihoods. A number of factors render the threats of today more pressing and more complex than the concerns about resource limits in the 1970s: the scale and rate of global ecological changes, the emergence of new global players with political and economic weight, and the growth of the resource-hungry middle classes. Attempts to govern the resource nexus more effectively are constrained by the low awareness among the public and policymakers, persistent over-consumption in western societies, the inflexibility and inadequacy of many existing institutions, and by the “stove-piped” structure of the institutional landscape and of the policy debates that are too often focused on single resources rather than on resource interconnections.

The report identifies three realms of the resource nexus:

- **Markets:** Markets for resources operate at local, regional, and global levels along commodity chains. These markets transmit effects between resources and between regions in an unprecedented way (e.g. between energy and minerals in the case of lithium, and between food and energy in the case of biofuels). Poor transparency prevents the effective management of resources through their life cycle in a sustainable manner. Risks of illicit trade exacerbate common future risks of high and volatile prices and abrupt interruptions of supply chains. Examples include phosphorus, biofuels, coltan, unconventional energy resources, water management, and poor incentives for recycling, reuse, and increased material efficiency.
- **State interests and inter-state relations:** Many resources straddle national boundaries. Powerful state actors may choose to exploit these resources unilaterally rather than engaging in transnational governance institutions to manage the resource more equitably. Such actions raise the risk of violent conflict. Water is a major focus of such tensions. Several maritime disputes remain unresolved and involve hydrocarbon resources and fisheries, notably in the East and South China Seas, the Eastern Mediterranean, and the South Atlantic. Dam building by upstream states on major rivers threatens the livelihoods of populations in downstream states in South and Southeast Asia and along the Nile, for example. Finally, climate change threatens to destabilize weak and highly vulnerable states and societies.
- **Local human security:** Many urban and rural communities struggle to manage the resource nexus at a local level. Access to water, food, land, and energy are central challenges in people's everyday lives in the resource nexus on the ground. Resource depletion and environmental degradation can lead to local competition for resources, migration, violence, terrorism, and the emergence of ungovernable spaces, with the potential for international repercussions. Water provision for growing mega-cities, for example, competes with agricultural and mining uses, while climate change threatens rural livelihoods.

Transatlantic Responsibilities and Opportunities

The interconnectedness of global resource challenges presents threats to transatlantic actors and interests, including those associated with supply chain interruptions and increased economic volatility, risks of interstate and local conflicts and violence, and increased poverty and declines in human security. Yet, a host of opportunities for transatlantic leadership are also identifiable, such as major gains in resource efficiency, and the conversion of resource endowments into more sustainable development, increased prosperity, and greener growth. Opportunities also exist to address persistent political and security conflicts through engaged cooperation and institution building.

This report proposes four areas for further analysis, debate, and action:

1. **“Getting our own house in order”** focuses on responses within and among the EU, the United States, and Canada. These include doubling resource efficiency in less than 20 years; working together to transition toward sustainable energy systems; coordinating efforts to properly price resources by

reducing unsustainable subsidies and pricing carbon and resources; rethinking our ideas of “the good life” and economic growth based on ever-increasing resource consumption; working together to resolve disputes in the transatlantic neighborhood; and reinvesting in global leadership by ratifying treaties and reforming transatlantic and global institutions.

2. **Engaging “the wider Atlantic”** seeks to expand the common notion of transatlanticism where resource issues are concerned, and draws inspiration from the observation that the Atlantic Basin — North and South — is endowed with substantial reserves of energy fuels and minerals, and opportunities to increase sustainable agricultural production and food security. Early-stage projects might include establishing knowledge centers for coordinating mapping of resources reserves and extraction rates and agricultural production, fisheries management, and water trends. Other initiatives may include improved coordination of development and technological initiatives, such as new biofuels. Finally, a host of inter-state disputes and transnational security challenges need sustained, high level attention.
3. **“Working with new players”** offers ideas about how to better integrate transatlantic interests and concerns with those in rapidly growing developing countries and the many critical resource exporting states. Transatlantic leaders must redouble their efforts to engage China and India across the spectrum of resource nexus challenges. Secondly, public and private actors in the transatlantic region have a host of shared interests in better integrating emerging market states and firms into effective institutions for supply chain management and a host of schemes for increased transparency, certification, and standards harmonization. Finally, engaging the new players offers opportunities to enhance cooperation on related security challenges.
4. **“Strengthening global cooperation”** argues that transatlantic actors must reinvest and reinvigorate some aspects of global institution building to address resource-related challenges. Such efforts should be directed at knowledge creation and globally-networked, participatory governance. Priorities include an international data hub to provide harmonized data on different aspects of the resource nexus; a global food and water facility of helping to increase capital investments to expand food production, clean water, and sanitation; a network of training centers directed at resource management; guidelines on land-use governance; networks for global policy learning for the improved governance of cities; and the establishment of global, multi-stakeholder forums in collaboration with regional forums to raise the profile of the challenges associated with resource nexus governance.

CHAPTER 1


RESOURCE SCARCITIES IN A CHANGING WORLD

Against a backdrop of intense, often quarrelsome, disputes about the impact of growing demand for natural resources and global warming on national and international politics, four realities must be acknowledged.

- *First*, global resource consumption seems likely to grow substantially in the decades ahead, as billions of people move out of poverty and toward higher consumption lifestyles more like those enjoyed by most in the transatlantic community. The potential for disruption of international markets and supply chains is likely to rise, which would affect the transatlantic community directly.
- *Second*, unless there is a reduction of poverty levels in the most populated regions of the world, political mayhem, including violence and mass migration, is more likely to grow and intensify both within nations and across international borders. The international community has firmly established global poverty reduction as one of the signature goals of the 21st century, including reforming global institutions as a necessary step.
- *Third*, unless there is a major reduction in global emissions of carbon dioxide and other forms of increasing environmental pressure, major negative environmental changes, including biodiversity loss, are inevitable and they will continue to accelerate toward levels that may well be unmanageable.
- *Fourth*, while binding international agreements on how to manage potential dangers posed by these trends remain elusive, governments are investing billions of dollars in security measures to hedge against a number of troubling contingencies. These include potential shortages of key resources including energy, minerals, food, and fresh water. They are also making plans in the event of conflict with neighbors over access to resources and the expected growth in large-scale immigration. Rising sea levels pose an existential threat to low-lying island communities such as the Maldives and Kiribati. Norway and other arctic powers are investing in coast guard sea and air systems just in case a scramble for arctic oil, gas, and minerals gets underway.

China features prominently in many of the current disputes about resources. A naval arms race is underway in the Indo-Pacific region as the littoral states engage in disputes, some violent, over offshore fishing and energy resources. China's neighbors,





who depend on rivers that originate in that country are worried about retaining water access, given China's needs and plans for these water resources.

Ethiopia and Sudan want to build dams on the Nile to generate electricity. Egypt has many times stated that if upstream countries interfere with the Nile it could be a *casus belli*. African countries that have leased large tracks of land to Chinese, Indian, South Korean, and Saudi Arabian companies worry that their own food supplies may be in jeopardy. Europe is concerned that the Arab uprisings in North Africa and the Middle East sparked in part by rising food prices and political repression will intensify illegal migration.

In North America, there are well-funded campaigns to both develop and oppose more indigenous energy production, including shale gas, heavy oil, and offshore oil and gas. Demand for electricity and fresh water in the Gulf continues to grow at unprecedented rates. This has increased the appeal of nuclear power despite the accident at Fukushima and the fears that Iran's nuclear program has a military focus.

The range of potential risks and uncertainties relating to a single resource is magnified when the links between different resources are taken into account. It is this "resource nexus" that provides the focus for this report.¹ At the time of writing, South Sudan provides an excellent example of the nexus of energy, water, food, and land. Armed conflict has already erupted between South Sudan and Sudan over the land and oil fields along their shared border. South Sudan lies in the upper reaches of the Nile, which provides water supplies crucial to Egypt's existence, and yet South Sudan does not participate in the river basin management institutions. It wants to develop a large commercial agricultural sector by selling land to corporate investors. This may disrupt water supplies to downstream states as well as the traditional land tenure systems within South Sudan.

These and other seemingly threatening realities also provide opportunities and stimuli for societies and businesses to seek better ways to manage natural resources, through enhancing resource efficiency, adapting lifestyles, reducing carbon emissions, and alleviating poverty. With its wealth, technology, and global industries, the transatlantic community is well placed to play a leading role in such innovation.

¹ A number of recent studies have influenced our thinking on the resource nexus and broader resource issues, including S. Bringezu and R. Bleischwitz, eds., *Sustainable resource management: Global trends, visions and policies* (Sheffield: Greanleaf Publishing 2009); P. Collier, *The plundered planet: why we must, and how we can, manage nature for global prosperity* (Oxford: Oxford University Press 2010); German Advisory Council on Global Change, "World in Transition – A social contract for Sustainability," WBGU Report (2011); H. Hoff, "Understanding the Nexus (Background paper for Bonn 2011 Conference: The Water, Energy and Food Security Nexus)," Stockholm Environment Institute Report (2011); M.T. Klare, *The race for what's left: the global scramble for the world's last resources* (New York: Metropolitan Books 2012); McKinsey, "Resource Revolution: Meeting the world's energy, materials, food, and water needs," McKinsey Global Institute Report (2011); S.-A. Mildner, "Konfliktrisiko rohstoffe? (Potential conflicts from resources?)," SWP & DGAP Report SWP-Study S05 (2011); PBL, "Scarcity in a sea of plenty?," PBL-Netherlands Environmental Assessment Agency Report 500167001 (2011); United Nations Secretary-General 's High-level Panel on Global Sustainability, "Resilient People, Resilient Planet: A future worth choosing," UN Report (2012); World Economic Forum, "Water Security: The Water-Food-Energy Nexus," WEF/Island Press Report (2011); World Economic Forum, "More with less: Scaling sustainable consumption and resource efficiency," WEF Report (2012); D. Yergin, *The quest: energy, security and the remaking of the modern world* (New York: Penguin Press 2011).

So What's Different this Time?

Concerns about supply, access, and overuse of resources are not new. The 1970s saw an extensive discussion of resource scarcity, bringing together concerns about global population growth and anxieties over growing resource interdependence magnified by the oil crises and Western concern about Soviet power. Some of the themes in today's resource concerns parallel these earlier debates on "limits to growth," as many analysts still rely on linear trend analysis and Malthusian fears about population growth, while others suggest markets and new technologies will change or transcend ecological limits.


So what is different now? One significant difference is that earlier worries often revolved around the notion that resources were physically scarce — that they would "run out" in the not-too-distant future. While some contemporary analysts still believe this, most do not. Demand for all resources is indeed expected to increase over the coming years and decades.² But evidence suggests that there is enough oil and natural gas — and coal and uranium — to continue powering industrial growth for decades or even centuries. Similarly, minerals from iron ore to rare earths exist in reasonably plentiful supply, with some uncertainties for a number of so-called critical materials.³ The shortage of land, water, and food is probably more serious. However, it is not the physical amount of such resources that cause them to be globally scarce. The challenge is to govern the access, to allocate and to use them in the most sustainable manner; in other words, to govern resources across countries and companies within the absorptive capacity of the planet. Failures to do so exist even in our own communities, for example, the failure to complete European internal markets for electricity and natural gas or the struggle in southwestern Texas between gas companies and farmers over scarce water.

Three categories of such changes help to understand the ways that emerging resource nexus concerns are different from earlier debates: 1) The structure and trends in the global economy, 2) the structure and trends in world politics, and 3) the scale and rate of global ecological change. These three are discussed in turn below.

In the ten years before the 2008 financial crisis, the world economy almost doubled in size in purchasing-power parity (PPP) terms, with annual real GDP growth rates in the range of 3-4 percent. Rates of growth varied greatly and were greatest in South and East Asia. These changes are reflected, for example, in the expansion of the G7 to a G8 that includes Russia and a G20 that adds the EU and Turkey, as well as Asian members (China, India, Indonesia, South Korea), Latin America states (Argentina, Brazil, and Mexico), South Africa, and Saudi Arabia. The G20 thus represents about 85 percent of the global economy. This economic growth was assisted by a rapid expansion in world trade, which saw the value of global trade rise three-fold from

² For example, forecasts suggest that over the next 20-25 years, average annual rates of demand growth may reach 1 percent for energy, 2.5 percent for minerals, 1.7 percent for food, and possibly as high as 3.5 percent for water. International Energy Agency, "World Energy Outlook," IEA Report (2011); Food and Agriculture Organization, "Anticipated trends in the use of global land and water resources," FAO Report SOLAW Background Thematic Report – TRO1 (2011), <<http://www.fao.org/fcit/fcit-home/en/>>; Hoff, "Understanding the Nexus (Background paper for Bonn 2011 Conference: The Water, Energy and Food Security Nexus)," Report, p. 10.

³ R.L. Moss, et al., "Critical Metals in Strategic Energy Technologies: Assessing Rare Metals as Supply-Chain Bottlenecks in Low-Carbon Energy Technologies," European Commission Joint Research Centre (JRC), Institute for Energy and Transport Report (2011); US Department of Energy, "Critical Materials Strategy," DoE Report (2011), <http://energy.gov/sites/prod/files/DOE_CMS2011_FINAL_Full.pdf>.



US\$5.5 trillion in 1998 to \$16 trillion in 2008.⁴ This trade greatly enhanced the degree of interconnectedness between countries in the same region and between different regions. The widespread economic growth has not only improved income and livelihoods but has led to a globalization of western lifestyles. The resulting surge in demand has stretched the ability of supply chains and of governance institutions to keep pace.

The emergence of new political actors in the international arena, including states such as China, Brazil, and India, as well as large private, public, and state-owned firms from the global North and South has occurred over the last 20 years. During the previous global resource “crises” in the 1970s, the international political discourse and organizations were dominated by Organisation for Economic Co-operation and Development (OECD) states and, in the case of oil, by Organization of the Petroleum Exporting Countries (OPEC) and subsequent attempts at cartel building. Today, a new and dynamic global geography of economic and political power is emerging, one that looks more multilateral and less transatlantic in its axes. The rise of new powers has been accompanied by a rapid growth in the numbers of countries making the transition to market economies and/or more democratic forms of governance. The number of democracies has grown from less than 40 in the 1960s to about 90 today, with even greater growth in the openness of markets in the same period.⁵ Such economic and political transitions often include greater political instability, state failure, secessionism, and ideological conflict. Finally, new technology and media provide opportunities to improve both collective action and the ability of governments to monitor behaviors.

To be clear, “scarcity” cannot be measured objectively. Nor are diverse groups of people and organizations likely to agree on when, whether, how, or why a particular resource is scarce. Thus, the report builds on recent analysis that treats scarcity as having multiple dimensions, or nodes, of debate (cite PBL, 2011 report). Our analysis distinguishes five such dimensions: physical, economic, political, environmental, and equity. Certainly, each dimension is related to each of the others, but articulating each dimension separately helps to capture the complexity and contradictions at work in debates, conflicts, and cooperation around resources. In general, this report agrees with many recent analyses that most critically important resources are not, in a global sense, geo-physically scarce. In other words, there are few signs that human will “use up” all minerals, fossil fuels, or water. Rather, as argued throughout, most resources are asymmetrically distributed around the globe and scarcities are most often revealed in the other four dimensions, and associated in some way with aspects of governance.

The human impact on the global environment and the earth system as a whole is now large enough to denote a new geological epoch: the Anthropocene.⁶ Humanity is now a geophysical force, as influential on the earth as other major ecosystem functions. The scientific literature is filled with such indicators, including those related to CO₂ emissions, land-use change, annual earth moving, water use, biodiversity loss,

⁴ World Trade Organization, Statistics database. 2012, WTO.

⁵ M.G. Marshall and B.R. Cole, “Global Report 2011,” Center for Systemic Peace Report (2011).

⁶ see, e.g., P.J. Crutzen, “Geology of mankind,” *Nature* 415/6867 (2002) pp. 23-23; W. Steffen, et al., “The Anthropocene: are humans now overwhelming the great forces of nature,” *AMBIO: A Journal of the Human Environment* 36/8 (2007) pp. 614-21; J. Zalasiewicz, et al., “The Anthropocene: a new epoch of geological time?,” *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 369/1938 (2011) pp. 835-41.

river damming and a host of rapidly accelerating indicators of product and resource consumption. The Anthropocene concept suggests that humans cannot persist on business-as-usual paths through the 21st century because the stress on the global ecosystem and its many life-sustaining functions is simply too great. Unless people change their behaviors and modify their lifestyle expectations, nature itself will constrain the human race with unpleasant consequences for the planet, especially for the poorer populations of the world.


Today, resources are high priority concerns in all levels of government, corporate boardrooms, and local communities. Fears about resource prices and access are back in vogue. Some concerns are long-standing: oil supplies and dependence on the Persian Gulf region; the relationships between resource competition and war; agricultural productivity, food costs, and questions about the ability to feed a growing human population; deforestation; and freshwater supplies. Other stories are newer: the political, economic, and strategic impacts of rapidly growing resource demands from the economically dynamic parts of the developing world; shale gas reserves and the technologies and practices to extract them; the relationship of “green” technologies to minerals mining and markets; and the concerns about Chinese dominance of rare earth metals production. A new era of resource nationalism may be emerging. This report looks at these issues in a new way by focusing on the governance of the resource nexus.

The Resource Nexus Approach: Understanding Challenges and Finding Opportunities

The resource nexus comprises the numerous linkages between different natural resources and raw materials that arise from economic, political, social, and natural processes. In this report, we focus on the nexus of water, energy, minerals, food, and land.

Numerous studies analyze scarcities of single natural resources in detail. International organizations, and an array of other public, private, and civil society sector analysts, produce massive quantities of information about the trends and host of challenges associated with particular resources. Such research often develops priority lists of concerns in hopes of stimulating additional research, technical and process developments, or policies to address identified concerns. Some research also contributes to improved understanding of the relationships between natural resources and social problems or development and to establishing periodic assessments of the state of knowledge around particular challenges, as seen with the Intergovernmental Panel on Climate Change (IPCC) and the Millennium Ecosystem Assessment or the recently established International Resource Panel.

More recently, a few explorations analyze the complex connections between multiple resources, their related trends in supply and demand, and the myriad connections of these to social, economic, and political institutions. These attempts to grapple with the linkages among multiple resource issues is the nexus approach. Some are well known, like the linkage between agriculture, food, land-use, and water in the production of biofuels. Yet, much analysis and policymaking about these connections takes place without attention to the large and growing demands on fresh water supplies made by energy production and mineral and energy extraction and processing. Furthermore, environmental challenges such as climate change and

An aerial photograph of a river valley, likely the Amazon, with a semi-transparent blue overlay. The river flows through the center, surrounded by lush green vegetation and some cleared areas. The blue overlay is a vertical band that runs down the left side of the page, partially covering the river and the surrounding land.

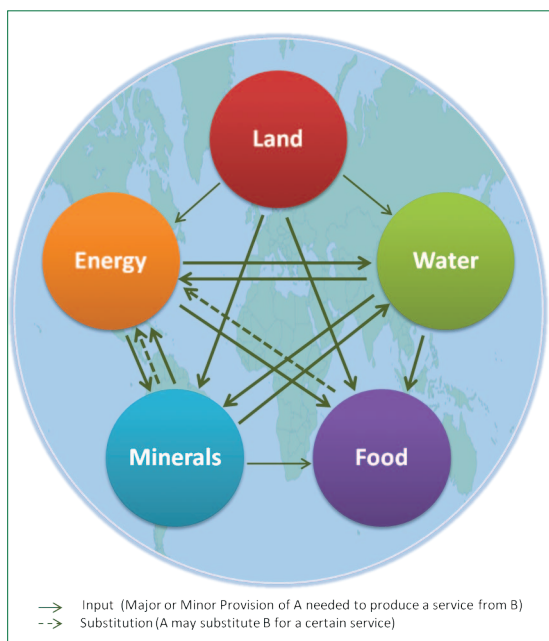
ongoing economic volatilities make the whole set of relationships more uncertain and less predictable. This is especially relevant given the changing political dynamics of the international system including the rise of emerging economies such as China, India, and Brazil.

Acknowledging the resource nexus provides a more integrated view, allowing us to better understand resource-related questions that would be difficult to answer in the more traditional pillared or “stove-piped” approach. The nexus approach, by capturing the interconnectedness of resource challenges, may also offer additional opportunities to improve such use, via efficiency gains, substitution, reuse and recycling, reduced consumption, and a host of other options. At the same time, it lowers the risks associated with trying to govern resource concerns in isolation. For example, biofuels policymaking demonstrates that governance choices made in Washington, DC, and Brussels can have effects at local and national levels well beyond the transatlantic region. Moreover, understanding the nexus and struggling with its implications is likely to become more important over time, as climate change and biodiversity loss put more ecosystems under stress while global demand for resources and most finished goods continues to grow.

This research conceptualizes the nexus as a set of interactions, including important drivers of existing and future risks, threats, and opportunities. While the nexus approach conceivably includes all resources, this analysis focuses on five essential resources: water, energy, minerals, food, and land. The nexus approach also includes physical and social/institutional connections. Human needs all require bundles of resources — for food, shelter, and so on. Human aspirations as they are played out currently require far more resources. Even the most acute demand — for freshwater — usually is connected with energy to produce and transport the water as well as with physical distribution systems. In more general terms, resources serve as direct or functional inputs in the production process of another resource, or they can substitute the use of another resource. Indirect effects also have to be taken into account: claims for one resource can compete with other useful demands (think of land used either for the production of food or for bio-energy). The ecological nature of the resource nexus thus stems from the geo-chemical-ecologic conditions as well as from their socio-technological-economic-political contexts. These dimensions are intertwined at many levels of social and ecological structure.

Figure 1 shows the many ways in which resources interact. Some nexus issues may be more obvious than others to various audiences, as the connections between food and water suggest. Water is an essential input for any means to produce useful forms of energy and materials; so is energy to produce food beyond subsistence level, to transport water to customers and end-users, and to extract and transform minerals. Minerals, in the form of fertilizers, are indispensable for modern forms of agriculture, and they are needed to produce electricity and energy services. Modern water systems also depend on utilizing minerals for production and distribution. Note that all these resources have a huge dependence on land — very high for agriculture and drinking water, far from being negligible for energy and minerals. Finally, the relationship of each of the groups of resources, included in the nexus figure, relative to land adds a further layer of complexity. Minerals and energy systems make demands on land and its uses and, to some extent, may compete with water and food security as land uses change. Likewise, competition between various land uses is driven by urbanization,

Figure 1: The Resource Nexus



Source: own compilation, PBL 2011

growing agriculture demand, the need for some environmental and habitats protection, and a host of other issues.

Sustainable Lifestyles and Sustainable Livelihoods

There are some uncomfortable realities about the consumption of natural resources that underlie this report. While most people in the transatlantic community lead very comfortable lives, much of the world's population struggles to procure even the most basic requirements of food, water, and fuel. "Biopoverty," or the lack of access to sufficient basic commodities, is a significant social, political, and moral challenge.⁷ Hunger and lack of clean water are the greatest health

risks to humans. Hunger kills more people than AIDS, malaria, and tuberculosis combined. Most of the hungry live in Asia, but as a percentage of population, sub-Saharan Africa is worst hit. Lack of clean water, meanwhile, is the leading cause of illness and death globally, with more than 3.5 million yearly deaths coming from water-related diseases. Also, an estimated 1.45 million premature deaths occur from household air pollution caused by burning traditional biomass. By contrast, an average of about 55,000 deaths is recorded as the result as victims of civil wars and interstate wars.⁸

The high level of consumption of natural resources in the global North cannot be delinked from hunger, water shortages, and energy insecurity in even the remotest corners of the global South. At the same time, the perspective of some 3 billion consumers entering the middle class globally in the next years to come does raise a number of questions on what lifestyles these people may chose, how the transition is managed, and what the consequences are. Against the backdrop of global environmental change, globalization, and urbanization, the resource nexus has implications both for lifestyles and livelihoods. Just as there is no circumventing the reality that the transatlantic community must come up with more sustainable lifestyles to lower overall resource use, it is also clear that the livelihood strategies for the most marginalized in the world must become more sustainable right now in order to cope with the resource scarcities they face.

If people accept that "more is not always better" — at least for material resources and products — there is a need to change behaviors, values, metrics of progress, and

⁷ D.W. Roberts, *Global governance and biopolitics: regulating human security* (London: Zed Books 2010).

⁸ <http://www.genevadeclaration.org/fileadmin/docs/GBAV2/GBAV2011-Ex-summary-ENG.pdf>

policies, to organize politics so as to use less and still live better, and to decouple of notions of economic growth from ever greater use of resources.

Governance Matters

A central argument in this report is that most resource nexus challenges arise from inadequate governance or disagreements about governance, and that solutions to address these challenges lie in adapting existing governance institutions or creating new ones. Governance means not just the world of states, but also a broad set of actors and social institutions, from individual NGOs, firms and international organizations, to norms surrounding particular behaviors or processes. Thus, governance happens within and between states, but it also happens within and between firms and among firms, states, NGOs, and citizens. Some analysts focus more attention on the institutional dimensions of such governance, exploring the institutions of transboundary water management, for example.

States remain the repositories of the greatest amount of governance authority. But this is only true, of course, where states function reasonably effectively. Resource governance, from global to local, includes a significant set of challenges related to weak, failed, and generally ineffective states. This adds two elements to the debate: multi-level governance meaning that the local, regional, national, and international levels interact, as well as poly-centric governance meaning that usually many centers of decision-making exist that can exert power over neighbors and other actors.⁹

The source of the nexus challenges lies primarily in governance. Across the many governance challenges associated with the resource nexus, we highlight the following threats that face the transatlantic community and the rest of the world over the next ten years or so:

- Economic costs: price volatility and high prices affect populations and industries in developed and developing countries. Poor and marginalized groups may be unable to afford the energy or food they need, and the profitability and competitiveness of industries lower down the resource value chain can be undermined.
- Ecological destruction: badly managed urbanization and industrialization, accompanied by poor practices in the production and use of natural resources, causes the degradation and destruction of other resources. These impacts almost certainly accumulate and lead to intensified pressure on environmental capacity.
- Violence and political conflicts: resources can trigger or fuel violence between states, non-state actors, local and national communities, and individual citizens.

⁹ The central point of the “governance turn” of recent years is indeed to get beyond the state and call attention to the interactions between organizations, institutions, and individual actors among the public, private, and civil society sectors. This notion of governance includes states and their policymaking, of course, but it also includes the myriad ways that groups of individuals or firms organize themselves (or are organized by others) to shape goals, practices, and ideas. As such, governance includes public-private partnerships, cooperatives, corporate social responsibility initiatives, sectoral standard setting, and campaigns to change norms and ideas. While some aspects of governance may be state dominated, others will endeavor to keep state involvement at a minimum. Since almost all resources are part of market transactions until they reach final consumers (some local biomass used for energy purposes being one of the exceptions) or end as waste in whatever form, the way of how markets are governed is decisive for the resource nexus (chapter 2).



Bingham Canyon copper mine, largest man-made hole in the world, Utah, United States

Socio-ecological changes help terrorist groups to gain new supporters and to hide in places where surveillance is poor.

- **Poverty and human degradation:** Effective and innovative uses of the earth's resources have long been a basis for human survival and progress. Failure to meet the nexus challenges assessed in this report suggests disastrous results for huge numbers of individuals and communities. It creates inter- and intra-generational tensions over equity.

Although many of the triggers and escalating factors for these threats may be regional or global in nature, the scale of the impact is often local.

These challenges provide opportunities as well as threats. Tight commodity markets offer business opportunities for saving material purchasing costs and to innovate. The resource nexus also offers synergies between energy, water, and other resources. Comparing the United States with Europe, it seems that the strategy of resource efficiency is high on the European policy agenda, while it is largely absent across large parts of the United States (with huge variations across countries and states). The EU has established resource efficiency as one of their seven flagship projects for their 2020 agenda, and it also has manifold tangible programs and initiatives on the ground, though it still has difficulty setting binding energy efficiency targets. Yet market volatility, the frequent lack of transparency and openness of many commodities markets and poor governance deter the investments and innovations needed, absent better governance. There needs to be much more stringent efforts to unleash resource efficiency on all relevant markets both in the transatlantic community and internationally. With proper policies in place, the 95 resources-dependent countries that exist worldwide could potentially turn their endowments into development opportunities for the world's billion poor people. High commodity prices also have spurred technological development and created new energy resources, ranging from offshore oil fields to unconventional gas.

These diverging global changes are accompanied by two mechanisms that make governance even more challenging. First, global drivers can become more important than local drivers in systems such as river basins, agriculture, and regional economies. This may reduce the resilience of long-standing mechanisms and lead to ungovernable spaces. Second, increasing connectivity allows local turbulences



to spread farther and faster, with greater risks of unintended side-effects on other resources and regions.

This report identifies a range of options for improving the governance of the resource nexus and these options are underpinned by two premises. First, the transatlantic community has a relatively good track in playing a leadership role in designing and implementing international governance institutions of different types. Second, it is probably neither useful nor feasible to create a new global institution to directly govern the world's natural resources. Rather this report identifies a number of incremental innovations as well as a need to support more strongly certain existing institutions, both old and new. The transatlantic community can take a lead by establishing shared approaches to enhance resource efficiency, and by the U.S. Senate ratifying the UN Convention on the Law of the Sea (UNCLOS). Steps are needed to set up new global and regional data hubs and new networks for sharing best practices in resource efficiency. The transatlantic community should reach out to newly emerging nations to support recent initiatives on transparency and certification as well as long-established institutions for resource sharing such as river basin agreements.

Aim of this Report

The aim of this report is to highlight the complexity of the resource nexus and the challenges, physical dangers, and great opportunities that the planet faces over the coming years and decades. Precisely because the scope of the subject is broad and diffuse, the report presents an overview of the subject matter using a number of pertinent examples and develops a framework for policy analysis, policymaking, and strategic management. This study does not set out to resolve any particular set of problems but rather to identify areas of particular concern as well as to make general policy recommendations that make sense for the transatlantic community itself and for its outreach to other global actors. In identifying a potential leadership role for the transatlantic community, this report captures the shared norms and identities between European and North American nations, while also addressing the contrasting perspectives that characterize the resource policy discourse on either side of the Atlantic.

Some of the most immediate and troublesome resource issues concern the crises in the Middle East over access to oil, especially from the Gulf and the dire food security situation in Eastern Africa. These crises obviously demand the attention of decision-makers. Rather than add to an already extensive government, think tank, and academic literature on these subjects, this study looks at a longer time-frame of ten years or so where it identifies not only new potential crises over resources but also points to some encouraging new opportunities to innovate and manage resource scarcity with better governance, new technology including information technology, new business models, and greater transparency between governments, major companies, and individuals.

The report also makes the case for expanding the idea of the transatlantic community, which has historically revolved around the North Atlantic countries, to include the growing important countries of South America and West Africa, which brings together a greater Atlantic arena termed the “wider Atlantic.” Although such collaboration would not, by definition, be based on shared norms and identities in

the same way as the transatlantic community of the North Atlantic, the littoral states of the wider Atlantic basin should seek to cooperate to pursue practical measures to improve the governance of the resource nexus and the management of other security challenges that affect all states involved. In addition, and of comparable relevance, the report underlines the necessity to cooperate with key countries such as China, Russia, India, and others.

Three Realms of the Nexus

The report presents a framework for understanding the resource nexus, which identifies three “realms” of the nexus:

- A nexus driven by markets at local, but predominantly regional and global levels in interaction with respective policies (Chapter 2).
- A nexus driven by strategic state interests, usually at an inter-state regional level (Chapter 3).
- A nexus at the local level with similar characteristics in different locations and with potential for escalation to large scales (Chapter 4).

Although each realm of the nexus is defined by certain characteristics, overlaps between the realms exist, as do interactions.

The report first examines the new market geography brought about by increased demand for commodities and the pressures these place on existing institutions at a time of discord among the major economic powers concerning the “rules of the game.” Many new exporters have entered commodity markets lately, especially from Africa and Asia. Both risks and opportunities in those markets can be analyzed along the lines of three “I”s: market Integration, Information, and Internalization of negative externalities (referring to the environmental dimension). Chapter 2 shows that cumulative risks along these three dimensions can lead to increasing price volatility and increasing prices, increasing illicit trade of commodities as well as to ungovernable spaces in dozens of countries — all with repercussions in our part of the world. However the transatlantic community could better unleash business opportunities of resource efficiency and improve the markets domestically and internationally. Without an explicit international dimension, resource efficiency strategies face an uphill battle against existing distortions and unfair competition. Along these lines, Chapter 2 argues:

- Ongoing policies on transparency and due diligence should be better coordinated between the United States and the EU. Political roadmaps along existing initiatives such as the Natural Resources Charter and the Mining Model Agreement for Sustainability offer the chance of translating natural endowments into real wealth for more than 90 resource-exporting countries.
- The United States and the EU face major challenges at home to make their own markets function better; for example, through completion of the internal markets for electricity and natural gas in Europe or the removal of perverse subsidies supporting agricultural commodities in the United States and Europe.

- Since the resource nexus involves different resources, a new market paradigm should move beyond simple questions of access and supply and instead adopt a life-cycle view on using resources in the most sustainable manner. Getting the prices right will certainly trigger innovations along whole value chains. In addition, active support for technology development and for transition strategies should be at the heart of transatlantic policy coordination.

In response to the strategic implications of growing competition and potential conflict over key resources among the major powers, while contemporary concerns about access to Persian Gulf oil and the crisis of famine in Africa command the most attention of decision-makers, focus is needed on the longer term conflict potential of resource struggles in disputed off-shore areas and along the great rivers of Asia and Africa. Among the conclusions presented in Chapter 3 are the following:

- Within the Atlantic community, conflict over the ownership and access to the potential resources of the Arctic and the Eastern Mediterranean has so far been averted. But the stakes in both cases are sufficiently high that careful monitoring of these regions is necessary to prevent a “scramble for the Arctic” or a serious confrontation in the Mediterranean over disputed access to off-shore natural gas.



A large cargo container ship sails into port

- The most likely regions for conflict over off-shore resources including oil, gas, minerals, and fish are the Persian Gulf and the China Seas. Most countries of these regions are spending billions of dollars on weapons and other security systems to assure or deny access to the bounties that exist or are believed to exist.
- Over the next decade, problems of access to adequate fresh water from the great rivers of Asia and Africa may become as serious as the current preoccupation with fossil fuels. Part of the problem is that China controls the Tibetan plateau, which is the source for the rivers essential for South and Southeast Asia. Asia needs huge amounts of fresh water for food, industry, and energy and there is no permanent institutional mechanism in place to resolve outstanding disputes about rights.
- Climate change, especially abnormal weather and sea-level rising poses a huge threat to sea coasts and land areas affected by drought. Forced migration on

a massive scale is possible and, fearful of such migrants, countries are taking precautions to protect their borders with fences and intrusive security measures.

Classic strategic concerns must be supplemented by recognition of the emerging human security challenges at the local level. The daily struggles for resources in local contexts, such as fetching increasingly scarce freshwater, growing food on ever scarcer land, and securing fuel for cooking, impact billions of humans. Far more than simply an “over there” problem, the nexus on the ground manifests itself to the transatlantic community in the form of migration, propensity for violence (including terrorism), and local conflicts that can escalate to wars of global concern. Moreover, the problems of resource allocation and competition are increasingly being concentrated in the burgeoning megacities of the world, and this dynamic presents a host of novel governance challenges — including for the transatlantic community. Key points from Chapter 4 include:

- Environmental change, in particular climate change and loss of biodiversity, and urbanization will be major drivers of the conflict over natural resources at local and regional scales. Changing land tenure norms, and marginalization of agricultural lands due to the effects of climate change and overuse, will further inhibit local food production and will result in growing environmental migration. Subsistence crises will impact far more humans than large-scale famines, and therefore will be a growing concern for policymakers.
- The world faces an urban future, in which the key sites for competition over natural resources will increasingly be within and among cities. The ill-effects of structural changes will be disproportionately born by slum dwellers in the global South. In an interconnected, globalized world, these ungovernable spaces pose a distinct set of challenges not only for the Indias and Brazils of the world, but also for institutions within the transatlantic community.
- While the prospects for interstate conflict over resources are very real, an even greater likelihood is for multiple, concurrent, ongoing “small wars” in which resource conflicts become mapped upon inter-ethnic, tribal, and illicit trade syndicate dynamics.



CHAPTER 2

MANAGING MARKETS UNDER STRESS

A New Market Geography

Over decades, the well-established markets for natural resources could by and large safeguard access, open new fields, develop new technologies, and allocate the materials needed to meet the various demands.¹⁰ Markets have demonstrated their ability to cope with shocks, such as during the oil crises of the 1970s, that were superseded by a long-lasting period of low prices for all commodities. Yet there are also examples of improvements to be made in existing market structures. Many of these relate to trade barriers, industry protection policies, and the failure to properly address negative externalities such as greenhouse gas emissions and other forms of pollution. The overall efficiency to use resources along international value chains offers plenty of opportunities that are largely yet untapped (see Figure 4).

Then there are additional challenges ahead. Future prospects indicate a long-lasting period of stiff competition for natural resources, perhaps over a few decades, which will be characterized by *both* high volatility and increasing prices. It is expected that the resource nexus translates into environmental restrictions and higher costs for extracting and transforming materials for industry. The markets for fuels, metals, and agricultural goods interact more frequently than in the earlier years, with additional interaction with local water and food markets. This is partly driven because new solutions to access new natural resources increasingly interfere with other resources. To give an example, extracting unconventional gas resources requires significant amounts of water, and in areas where water supplies are scarce this has led to struggles between gas companies and others, like farmers, who would like to use that water.

For sure, these challenges are accompanied by opportunities. High commodity prices have spurred technological development and created new energy resources, ranging from offshore oil fields to unconventional gas, which comprise an area more than twice the size of the traditional transatlantic space, with enormous reserves not only in the United States and Canada, but also in Brazil, Angola, Namibia, and Argentina. In that same geographical domain, government policies to reduce greenhouse gas emissions in the transport sector and its dependence on oil have incited enormous

¹⁰ M. Radetzki, *A handbook of primary commodities in the global economy* (Cambridge, U.K.: Cambridge University Press 2008); World Trade Organization, "World trade report 2010: Trade in natural resources," WTO Report (2010).



activities in the market for biofuels, with positive and negative effects. Brazil has enormous food growing potential to supply states in West Africa, where it recently opened a dozen new embassies as evidence of more intense trade relations. Manufacturing companies and governments are developing strategies towards improving resource efficiency. However, without an explicit international dimension, resource efficiency strategies and other opportunities face an uphill battle against existing distortions and unfair competition.¹¹

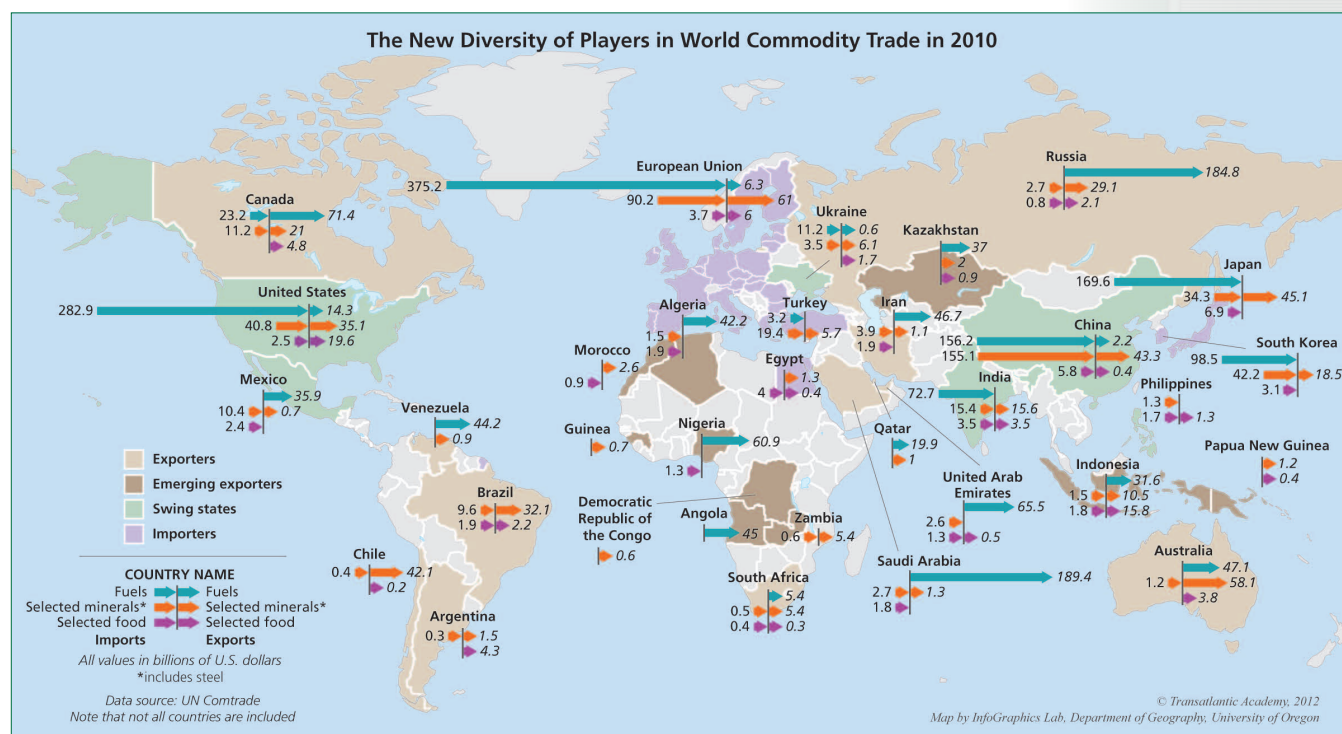
The resource nexus and the limits of governance will put the transatlantic community at risk of being exposed to international security threats and shortages of supply. A new geography of commodity trade has clearly emerged (see Map 1).¹² The weight of the developing world has increased. China's influence in the minerals and energy markets is a good example of this new geography. Other striking examples include:

- Food import dependencies:
 - The Philippines is the largest importer of rice, followed by United Arab Emirates (UAE), Saudi Arabia, and Iran.
 - Mexico and Egypt are among the top importers of maize (Japan being the top importer).
 - Egypt is the top importer of wheat, with Brazil, Indonesia, and Algeria following behind (after Italy and Japan).
- The dominant position of Russia as a commodity exporter (energy and minerals, increasingly so with the opening up of the Arctic) as well as Brazil (minerals, agricultural goods, energy resources).
- The growing importance of “new kids on the block”: exporting countries of Africa (oil, minerals), Central Asia (oil, gas), and Southeast Asia (biofuels), with the conundrum that some 95 countries worldwide derive at least 50 percent of their export values from commodities and can be called resource-dependent.
- The increasing production capacities in a number of emerging economies (e.g., China, India) for refined materials and key products such as steel and cement, while their capacities to produce food domestically seems uncertain. Comparable to the position of Saudi Arabia, with its huge reserve capacities in the oil market, they can be characterized as “Swing States” because they currently develop huge capacities and whatever happens in their domestic future of materials or agriculture will have significant impacts on international markets. The domestic production of natural gas in the United States and Canada will likely change the international markets.

¹¹ R. Bleischwitz, et al., *International economics of resource efficiency: Eco-innovation policies for a green economy* (Heidelberg: Physica 2011).

¹² P. Dicken, *Global shift: mapping the changing contours of the world economy* (Thousand Oaks, CA: Sage 2011). The graph displays imports and exports of the following commodities (numbers in brackets refer to UN COMTRADE classification): coal (321), petroleum oils (333), natural gas (343), aluminum (285, 684), copper (283, 682), fertilizers (562), iron ore (282), steel (282, 673, 674, 675, 676), wheat (041), rice (042), maize (044), and fixed vegetable fats and oils (422). Note that major countries and major commodities are included; further research may be able to develop a fully comprehensive map.

Map 1: The New Diversity of Players in World Commodity Trade



It is however worth noting that the EU-27 is the largest importer of fuels worldwide. The United States follows closely behind, but may change this status due to rapidly increasing production of domestic shale gas and, eventually, extraction of new oil fields (see Map 1).

Large shares of world commodity trade have moved from the transatlantic community and its other OECD partners to the emerging economies and a number of developing countries. How international trade policy is formulated will be decisive for the character of future competition. Major players are advocating different perspectives on how the allocation of resources should be organized. Europe and the United States favor a market-based allocation with international rules, an approach that is supported by the WTO. In contrast, many examples show the dawn of a *new age of resource-nationalism*: ranging from expropriating foreign companies (as has been the case in Venezuela, Bolivia, and Uzbekistan) to imposing windfall profit taxes and other forms of becoming more possessive over natural assets and establishing a state capitalism with commodities as core business (Russia) or a neo-mercantilism of favoring exports. This global shift and tendencies of resource nationalism in many countries pose challenges for the management of international commodity markets. Many companies are clearly worried.

Over the next years, a global *shift in agricultural production* towards Latin America and sub-Saharan Africa is likely. The transatlantic community has a role to play here: not only should it embrace these trends by opening up consumer markets and cutting export subsidies, but existing expertise in agricultural production methods and huge supplies of recovered phosphorus for fertilizer production could facilitate sustainable development of the agricultural sector and, in so doing, feed millions of people. Cooperation with Morocco, which has emerged as a main supplier of phosphorus

Figure 2: Institutions and Actors for the Governance of Commodity Markets
Polycentric and Multi-Level Governance



Note: Consumption refers to private households.

Source: Transatlantic Academy

will be essential. In contrast, large parts of Asia (in particular India and China) will very probably encounter difficulties in increasing food and water production to meet their domestic demand, resulting in new security challenges, as Chapter 3 will demonstrate.¹³

The new geography of bustling commodity markets poses challenges for efforts to coordinate private and public actors on a global scale and along international value chains. The new challenges comprise three “I”s: Integration, Information, and Internalization of externalities, the latter referring to a well-established principle of environmental policy.¹⁴ The stiff competition ahead can only be coped with from a governance perspective that covers the levels of value chains, states, and actors on the ground — a polycentric and multilevel governance¹⁵ perspective comprising business, other stakeholders, national governments, international organizations, and the institutional mindsets of these actors. Figure 2 illustrates the institutions and actors and displays the collective goods dimensions along the life-cycle of using resources.

¹³ Food and Agriculture Organization, “Anticipated trends in the use of global land and water resources,” Report.

¹⁴ Externalities are those costs caused by private activities that are passed on to other actors without being reflected in market prices; examples are the costs of second-hand smoking or water pollution caused by chemical industry. The seminal paper by R.H. Coase, “The Problems of Social Cost,” *Journal of Law Economics* 3 (1960) pp. 1-44., defined the principle of internalization of externalities, and it has been an essential part of all environmental policies since the 1970s; see also W.J. Baumol and W.E. Oates, *The theory of environmental policy* (Cambridge U.K.: Cambridge University Press 1988).

¹⁵ Defined by V. Ostrom, et al., “The organization of government in metropolitan areas: a theoretical inquiry,” *The American Political Science Review* 55/4 (1961) pp. 831-42. Following their analysis of water management systems in California as: “Polycentric” connotes many centers of decision-making that are formally independent of each other.” See also the more recent work of Philipp C. Schmitter on polycentric governance.

It pledges a public interest in how resources are used, which can be translated into governance strategies.

Integration and Dissociated Markets

In international relations, one usually thinks of the first “I,” integration, as a process of eliminating frontiers between states; market integration eliminates frontiers between economies. The elimination of tariffs within GATT/WTO and the creation of an internal market for goods and services in the EU can be regarded as successful processes of enhancing integration. In the business world, vertical integration describes a style of management where a supply chain becomes united through common ownership (e.g. oil, gas, electricity, water, fashion products, and consumer electronics). In a wider sense, supply chain management — characterized as managing an interconnected dynamic network of businesses towards the provision of consumer goods with the objective of creating net value — can also be regarded as a case for market integration.

For most commodity markets, however, integration is difficult to accomplish. Over the last decades, resources have basically been traded on markets and between companies. In our globalized world, it takes often more than a dozen steps with numerous suppliers until a final product reaches the consumer. Despite global communication improvements, markets are dissociated in terms of how the life-cycle of using resources is managed. Efforts to manage resources more efficiently encounter principal-agent problems, splintered incentives, and user-investor dilemma that accumulate over geographical borders and different standards and legislations.¹⁶ As a result, two-thirds of many resources used are wasted.

The global commodity markets have accordingly expanded both in terms of physical volume and monetary value. The physical volume of traded goods increased by a factor of 2.5 over the past 30 years, with more than 10 billion tons of goods now being traded around the globe.¹⁷ Non-renewable materials account for more than three-quarters of commodity trade in physical terms, dominated by oil, while renewable materials that include forest products and agricultural goods account for less than one-quarter. It is worth noting that international trade of water and construction minerals is almost negligible because of their more even distribution and high transportation prices per unit due to their physical properties. In contrast, the share of metals has increased over the years.

As of early 2012, commodity prices were at an all time high. The increases since the year 2000 have basically erased all the price declines of the 20th century. The winners are energy and mining companies, especially large corporations with close ties to governments in China, Russia, and other emerging economies. Many farmers in the transatlantic community have benefitted from the emphasis on producing biofuels.

¹⁶ International Energy Agency, “Mind the Gap: Quantifying Principal-Agent Problems in Energy Efficiency,” IEA & OECD Report (2007); S. Sorrell, *The economics of energy efficiency: barriers to cost-effective investment* (Cheltenham: Edward Elgar 2004).

¹⁷ Surprisingly little data and evidence exist on the physical dimension of international trade; with bustling prices it is usually difficult to realize what amounts of commodities exactly have been traded. See e.g. M. Dittrich, “The physical dimension of international trade, 1962-2005,” in *Sustainable growth and resource productivity: Economic and global policy issues*, R. Bleischwitz, et al., Eds (Sheffield U.K.: Greenleaf Publishing 2009) pp. 85-98. M. Dittrich and S. Bringezu, “The physical dimension of international trade: Part 1: Direct global flows between 1962 and 2005,” *Ecological Economics* 69/9 (2010) pp. 1838-47.

Table 1: The Relevance of Resource-Based Companies in the Top 20 Companies Worldwide (by 2011 revenue)

	Name	Market	Primary Stock Listing	Headquarters
2	Royal Dutch Shell	Oil and gas	London (LSE)	The Hague, Netherlands
3	Exxon	Oil and gas	New York (NYSE)	Irving, TX, USA
4	BP	Oil and gas	London (LSE)	London, United Kingdom
5	Sinopec Group	Oil and gas	Shanghai (SSE)	Beijing, China
6	China National Petroleum	Oil and gas	Shanghai (SSE)	Beijing, China
7	State Grid	Electricity	Government-owned	Beijing, China
10	Chevron	Oil and gas	New York (NYSE)	San Ramon, CA, USA
11	Total	Oil and gas	Amsterdam (Euronext)	Courbevoie, France
12	ConocoPhillips	Oil and gas	New York (NYSE)	Houston, TX, USA
18	Glencore Int.	Commodities	London (LSE)	Baar, Switzerland

Source: CNN markets, Fortune Global 500, others.

Table 1 shows that of the world's top 20 companies of all fields and industries, half have resources in their core business. It also shows the high share of Chinese companies; companies such as Gazprom (Russia) and Petrobras (Brazil) are becoming more important too.

The losers of price increases are most low-income people and resource-using industries, but small-scale farmers and the food markets should not be ignored. Many farmers, especially small-scale farmers in developing countries, did not benefit from price increases. The resource nexus helps to explain their dilemma: increases in sales have been eaten up by increasing costs for energy, transportation, and fertilizers. Lack of infrastructure and access to markets as well as corruption remain as structural governance deficits.¹⁸ The world's largest importer of wheat, Egypt, has been faced with a 38.4 percent increasing import bill from 2009-2010. Although the relationship between high food prices and political unrest is a complicated one, there is no doubt that concerns about prices have long been a factor in regional and national politics. The conjunction of high prices and a demographic youth bulge is one of the many reasons the Arab uprisings in 2011 occurred so spontaneously.

The case of phosphorus is instructive (see Box 1). While waste water contains a great amount of phosphorus that can be recovered with state-of-the-art technologies, appropriate incentives are missing and policy integration along the life-cycle of phosphorus mining, the use of fertilizers in agriculture and other applications, and recovery from waste water do not yet exist.

¹⁸ Small farmers' grievance is mirrored by the estimated 44 million people driven into poverty by rising food prices into the second half of 2010 (counteracting the trend that the number of people living in poverty fell between 2005 and 2008). Note, however, that global poverty statistics are under methodological discussion, because of a regional bias towards China (whose a decline in poverty might outperform increases in poverty in other parts of the world) and difficulties of estimating appropriate purchasing power parities.

Box 1: Phosphorus

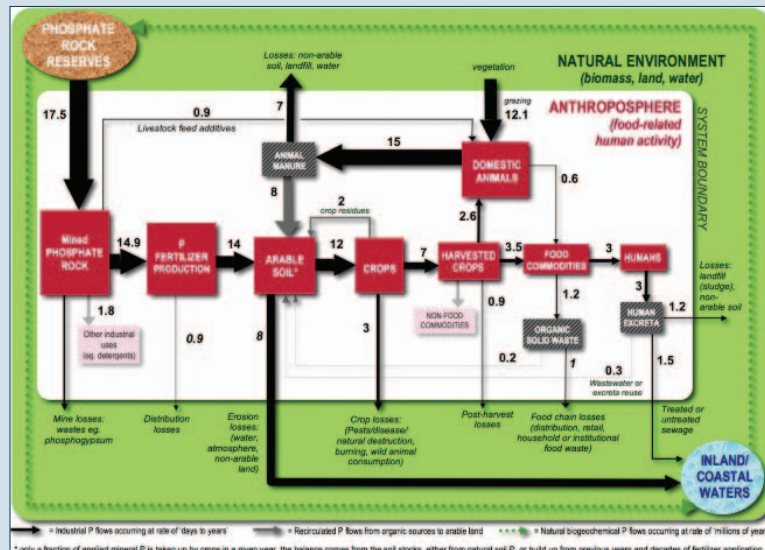
Phosphorus is an important resource commodity because of its use in the production of fertilizers. Because it has no substitute, it is also an essential component of the resource nexus (mainly food security). In relation to water and water management, phosphorus flows from agriculture to inland coastal waters and it can be recovered from wastewater/sewage sludge. Furthermore, the excess use of phosphorus in agriculture and related water flows cause hypertrophication (depletion of oxygen in the water that may cause fish populations to decline). Recently, phosphorus demand has also been tied to the energy market because of demand for biofuels.

Phosphorus prices have long been at rather moderate levels of around \$40-50 per ton. However, in 2006 prices began to increase rapidly and peaked at around \$400 per ton in 2008. After a drop, prices have started to rise again and have reached above \$150 per ton in the third quarter of 2010. The future demand for phosphorus is expected to increase by 50-100 percent by 2050, depending on global food demand and diets as well as demand for bio-energy. Due to the location of reserves and property rights issues, clashes between Morocco and Western Sahara or within Iraq over phosphate could easily escalate.

It is necessary to look at the life-cycle use of phosphorus. Researchers estimate that some 50-80 percent of global phosphorus uses are currently lost due to overuse and inefficiency. The high amount of phosphorus in wastewater is due to residuals from human urine and excrements. To date, there is neither any monitoring system nor a comprehensive policy that addresses the optimal use of phosphorus over the life-cycle. Technologically advanced processes allow for very high recovery rates of phosphorus (up to 90 percent by means of mono-incineration). Investments, however, do not yet pay off and require stable demand expectations towards markets for secondary phosphorus.

In total, a nearly 50 percent reduction of import dependencies may be achievable. With emerging technologies (e.g., mono-incineration) there are many untapped opportunities. The transatlantic community should establish a global monitoring system and a global forum for phosphorus and its use, to coordinate sustainable use and market introduction of recovery technologies and to line up with those countries that have huge reserves, i.e. Morocco and other Arabian countries.

Figure 3: Phosphorus flows
Source: <http://globalpnetwork.net/>



Deficits of market integration also have a time gap: Mining operations need to be planned years and decades ahead of decisions made by consumers or the final goods industry. Preparing a mine for exploitation or developing an oil field in remote areas requires huge time and financial investments and a lifetime perspective of approximately four decades. The time horizons for consumer goods industries and policymakers are generally significantly shorter. Fast innovation cycles (e.g., mobile phones) increase the uncertainties for all sides. Mining operations, thus, can hardly become aligned with decisions in downstream industries. This becomes aggravated when the resource nexus is considered. Water management in Central Asia (see Box 4) can be considered as a case for poor coordination between water and energy needs across borders.

Perspectives for Better Integration: Resource Efficiency at an International Scale

A key requirement for any governance of natural resources is to address the business dimension of using materials, energy, water, and processing food. Given that resources have a price (even if negative externalities are not properly accounted for) and price expectations are generally upwards, businesses do have incentives to manufacture at the lowest possible material costs.

A closer look reveals that the material costs to businesses actually outweigh the prices of raw materials by far. German manufacturing firms report shares of materials in their gross production value of 40-45 percent; similar shares have been reported lately by other European companies lately.¹⁹ Accordingly, the potential for cutting those costs through process innovation is relatively high. A German program called “DEMEA” reports average savings per company in the order of some €200,000 (roughly \$260,000), with increases of marginal returns to sales of 2.4 percent. Similar experiences have been made in the United Kingdom and other EU member states; comparable figures for the United States are not available. The United States, however, spends about \$2 billion buying oil and loses another \$4 billion indirectly to the costs of oil dependence, oil price volatility, and the costs of keeping military forces ready for any intervention in the Persian Gulf.²⁰

Manufacturing companies have strong incentives to get engaged in efforts to save material and energy purchasing costs. They will need to consider making resource efficiency a core element of their strategy and business models. In doing so, they will need to address various barriers such as the lack of attention, information deficits, availability of financing, and uncertainties about future demand.²¹ Many of those early improvements will be at the level of individual companies and incremental process innovation with a payback period of less than one year rather than addressing the whole life-cycle of products or material flow systems.

Good management monitors the flow of materials along value chains to establish material stewardship where by-products could be re-used and recycling offers

¹⁹ EIO, “The Eco-Innovation Challenge; Pathways to a resource efficient Europe,” DG Environment, European Commission Report (2011), <www.eco-innovation.eu>.

²⁰ A.B. Lovins, “A Farewell to Fossil Fuels: Answering the Energy Challenge,” *Foreign Affairs* 91/2 (2012) pp. 134-46.

²¹ EIO, “The Eco-Innovation Challenge; Pathways to a resource efficient Europe,” Report, p. 66; McKinsey, “Resource Revolution: Meeting the world’s energy, materials, food, and water needs,” Report.

tangible benefits.²² The example of the oil industry, where a number of partnering and gain-sharing arrangements to save costs have been established,²³ is instructive for other industries. The resource nexus offers potential benefits of reducing operating costs through improved internal management of water, waste, energy, materials, carbon, and hazardous materials in an integrated manner. Indeed, this can and should be combined with efforts to reduce environmental impacts. While these strategies will improve the return on capital, other strategies can improve growth and contribute to better risk management:

- Guide investment decisions at portfolio level based on resource trends and risk analysis;
- Develop new products and services with resource-efficient features able to attract customers; and
- Manage risk of operation disruptions (be it from scarcities, climate change, regulatory changes, etc.).²⁴

A life-cycle approach helps to identify more tangible benefits and prioritize key initiatives such as improving the resource efficiency of buildings, increasing yields on large-scale farms, reducing food waste, reducing municipal water leakages, and improving higher overall efficiency rates in end-use products such as vehicles. It is estimated that these opportunities could create societal benefits of up to \$3.7 trillion worldwide, with large benefits occurring in developing countries.²⁵ International cooperation pays off. Figure 4 shows a selected number of those opportunities.

²² *Vertical integration* is faced with at least four challenges:

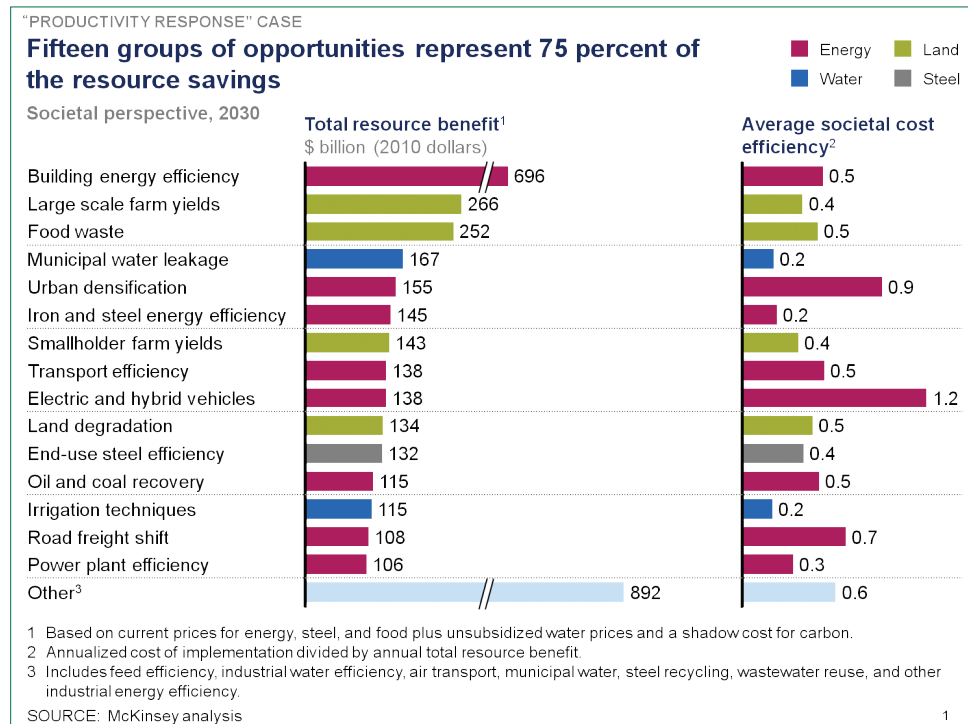
1. With good expectations ahead, the mining industry itself tends to favor capital markets rather than corporate equity or long-term contracts; their interest in vertical integration is low.
2. Key players for better materials management in the value chains are refineries and capacity producers. However they are typically medium-sized companies in stiff competition as suppliers to industries downstream. Even the steel industry has started to raise concerns over market power because of their sandwiched position between the iron ore industry upstream and the automotive or construction industries downstream.
3. Usually, supply chain management follows product chains, with the automotive industry being a good case. However, actors will also have to find ways to integrate along material flows across a number of products, thereby adding elements of horizontal integration.
4. Many used products are exported to countries where demand is high but recycling facilities are poor, typically developing countries. According to the International Resource Panel, the end of life recycling rate is above 50 percent only for a limited number of metals such as iron and platinum; for the majority, it is lower than 20 percent. As a result, material leakages occur that lower the re-use of many materials. The growing metal stocks in societies are still largely untapped (see Chapter 4). International Council on Mining and Metals, "Materials Stewardship, Eco-efficiency and Product Policy," ICMM Report (2007).

²³ Two initiatives were: CRINE (cost reduction in the new era) and PILOT; see e.g.: <http://webarchive.nationalarchives.gov.uk/20101227132010/>; <http://www.pilottaskforce.co.uk/data/aboutpilot.cfm>; <http://www.onepetro.org/mslib/servlet/onepetropreview?id=00026728>

²⁴ McKinsey, "Resource Revolution: Meeting the world's energy, materials, food, and water needs," Report; World Economic Forum, "More with less: Scaling sustainable consumption and resource efficiency," Report.

²⁵ The World Economic Forum exemplifies the idea that ambitious businesses will seek to transform demand through interactions with the consumer and transform value chains through new business models. It is worth noting that emerging economies are on the verge of entering the market for such eco-innovation. Rainer Walz points to countries such as South Korea and Singapore with emerging competences that are providing favorable conditions and high absorptive capacities for eco-innovation technologies, while countries such as Brazil and Malaysia show promising specialization for renewable materials and recycling. R. Walz, "Competences for green development and leapfrogging in newly industrializing countries," *International Economics and Economic Policy* 7/2 (2010) pp. 245-65.

Figure 4: Opportunities for Resource Savings



Material Flow Analysis (MFA) is a measurement tool that can overcome deficits of both integration and information.²⁶ It measures and analyzes the flow of biotic and abiotic materials (including agricultural goods and energy) across system boundaries between the natural environment and the human sphere. Integrating the stages of production, consumption, and recycling, it offers a comprehensive perspective for resource policy. Since Eurostat and OECD have provided handbooks on the measurement of material flows, and do, in fact, promote the collection of data and use of MFA concepts, there are many opportunities for the transatlantic community and for industry to use MFA in their strategies. From a resource nexus perspective, land and water should be added.

Policies, however, will be beneficial to overcome barriers and to stimulate market development in favor of developing new resource-light products and systems. Hybrid forms of governance such as agencies with partners from the private sector and public-private alliances can certainly help to promote best practices and disseminate knowledge as well as to improve qualification and training. Nevertheless, market integration is also a task for national and international policies and in particular for the transatlantic community. Without an explicit international dimension, resource efficiency strategies face an uphill battle against existing distortions and unfair competition.

The strategy of resource efficiency is more advanced in Europe than in the United States. This is in line with a roughly 30 percent better performance in the EU compared to the United States (with huge variations across countries and states).

²⁶ See e.g. www.materialflows.net; www.is4ie.org; Researchers such as Friedrich Schmidt-Bleek, Stefan Bringezu, Marina Fischer-Kowalski, Robert Ayres, and others created it in the 1990s to analyze the use of natural resources in societies.

The EU has established resource efficiency as one of their seven flagship projects for their 2020 agenda, and it also has manifold tangible programs and initiatives on the ground.²⁷ The United States, however, could possibly save more than four-fifths of its fossil carbon emissions along with savings of \$ 5 trillion against business as usual by the year 2050.²⁸ Energy efficiency is also at the heart of the Euro-Atlantic Security Initiative made by Sam Nunn, Wolfgang Ischinger, and Igor Ivanov in February 2012.²⁹

Information Deficits and Lack of Transparency

The second “I,” information, is a twofold challenge of management, which is a lack of reliable data and transparency. Since global value chains start with extraction or production at local sites and take a long time to end up as waste, one can argue that all governance levels need to be connected for a better resource management. Yet, there is no international organization charged with collecting and disseminating data on resources in a comprehensive manner. Food and energy are covered well in separate organizations (the Food and Agriculture Organization (FAO) and International Energy Agency (IEA)). However, geospatial data is largely privatized. Data on water, land, and minerals remains in the realm of national services and the private sector. There are deficits for comparative analysis regarding access, transparency, reliability, validity, time series analysis, etc. Data on the resource nexus is almost entirely missing. Accordingly, analysis on the future demand for minerals, food, water, and the resource nexus is challenging for market actors and public policies alike.

Figure 5 depicts information deficits in resource markets covering availability, access, and the dissemination of such information and estimated responses (i.e., the gap between knowledge and action). It points to different forms of information deficits, in particular to deficits in getting access to data, disseminating them to relevant players and transform information to response strategies. Data availability on critical materials, global water availability, commodity transportation, global land use, future demand trends (energy trends are better covered), and environmental impacts of materials is especially poor.

Here transparency enters. Information useful to assess national governance and human rights is lacking too. The existing market structures and business behavior underperform accordingly. The case of coltan (see Box 2) demonstrates how information and transparency deficits support a lack of awareness from downstream industries and consumers, and can even contribute to civil war dynamics. The response strategy to establish transparency in the United States and Europe encounters uphill challenges of connecting a large number of actors and suppliers in diverse countries. Distinct from other commodities, most critical materials are not traded publicly on exchanges with spot markets, but via private contracts and industries, and are thus shrouded in secrecy.

But the issue goes much further and enters the security debate. The markets for these activities are intertwined with markets for heroin, cocaine, firearms, smuggling of migrants, female trafficking, counterfeit consumer goods, counterfeit medicines, and

²⁷ See e.g. www.eco-innovation.eu; http://ec.europa.eu/environment/enveco/resource_efficiency/

²⁸ Lovins, “A Farewell to Fossil Fuels: Answering the Energy Challenge.” ”

²⁹ www.carnegieendowment.org/2012/02/04/munich-security-conference

Figure 5: Information Deficits in Resource Markets

E = Energy; M = Materials; W = Water; F = Food; L = Land.

Green indicates good information; Yellow indicates some deficits; Red indicates major deficits.

		Availability	Access	Dissemination	Responses
Extraction	E	Green	Green	Yellow	Yellow
	M	Yellow	Yellow	Red	Red
	W	Yellow	Red	Red	Red
	F	Green	Yellow	Yellow	Red
	L	Yellow	Red	Red	Red
Transportation	E	Yellow	Yellow	Yellow	Red
	M	Yellow	Red	Red	Red
	W	Yellow	Red	Red	Red
	F	Green	Yellow	Yellow	Red
	L	Yellow	Red	Red	Red
Production	E	Green	Yellow	Yellow	Yellow
	M	Yellow	Red	Red	Red
	W	Yellow	Red	Red	Red
	F	Green	Yellow	Red	Red
	L	Yellow	Red	Red	Red
Consumption	E	Green	Yellow	Yellow	Yellow
	M	Yellow	Red	Red	Red
	W	Yellow	Red	Red	Red
	F	Yellow	Yellow	Red	Red
	L	Yellow	Red	Red	Red
Waste	E	Green	Green	Yellow	Yellow
	M	Yellow	Red	Red	Red
	W	Yellow	Red	Red	Red
	F	Yellow	Yellow	Red	Red
	L	Yellow	Yellow	Yellow	Red
Environmental Impacts	E	Yellow	Yellow	Yellow	Red
	M	Red	Red	Red	Red
	W	Yellow	Red	Red	Red
	F	Yellow	Red	Red	Red
	L	Yellow	Red	Red	Red

Source: Transatlantic Academy

Box 2: Coltan

The use of coltan is almost indispensable for small-scale converters in electronic products such as mobile phones, but also for a number of other applications. Mining in eastern Democratic Republic of Congo (DRC) and early stages of coltan trade in central Africa are poorly governed and reap great profits from which the state, military actors, and rebel groups can finance activities.

Until the end of 2008, Australia had been the dominant supplier of coltan on the world market. This changed with the (temporary) closing of the Wodgina mine in late 2008. There is increasing evidence that central Africa has been the largest supplier since.

The market itself is not transparent. Until now, coltan was traded not on stock exchanges but via contracts whose terms are not public. Effective recycling systems do not exist. In addition, such recycling is perceived to be challenging given the product characteristics and high dissipative losses.

The transatlantic community has direct interests in improving the status quo. Ongoing conflict in countries like DRC will contribute to substantial flows of migrants in search of better lives. Possible solutions are in new governance approaches. Transparency and certification of the mineral chain are emerging. The Great Lakes Initiative (ICGLR), the electronics industry (GeSI/EICC), the G8, the Dodd-Frank Act in the United States, and a proposal made by the European Commission in October 2011 (COM2011 683/2, COM2011 684/2) have taken steps in that direction. At this point in time, however, it is uncertain whether these steps can help to overcome the resource-related conflict in the region. The transatlantic community should coordinate their efforts on certification and development aid.

illicit trade in wildlife, timber, gold, and other minerals.³⁰ Since the world's biggest trading partners are also the world's biggest markets for illicit goods and services, this is certainly a huge risk that requires tough action. It primarily implies going beyond the certification of single materials, since organized crime will always be able to switch to more profitable activities. There are three ensuing risks and threats for the transatlantic community. Firstly, their consumers can hardly be protected. Secondly, international markets are severely distorted, with many side effects in global business operations. Thirdly, whole countries may be captured by organized crime, and efforts to establish resilient institutions towards sustainable development are likely to fail.

Transparency in the relatively well-integrated oil and gas markets also has a security dimension. The Chinese purchasing strategy in authoritarian countries minimizes the effects of sanctions as imposed by the transatlantic community. Effective decision-making in the UN Security Council becomes increasingly difficult. Further, uncertainties exist with regard to the future supply capacities of countries such as Iraq, Iran, and Libya, and the impacts of unconventional gas and oil on international markets, with repercussions on electricity prices, chemical industry development, and transportation. There are factors that in turn influence global prices for food. With the memory of cheap oil still being alive, these price signals are not easily to interpret for future investments.

³⁰ United Nations Office on Drugs and Crime, "Estimating illicit financial flows resulting from drug trafficking and other transnational organized crimes," UNODC Report (2011).

The result of such fundamental information deficits is an increasing vulnerability of businesses acting at different levels, be it as small- and medium-sized suppliers to consumer industries or as regional utilities. It also adds investment uncertainties to green technologies in that area. On top of that, local disasters such as the nuclear accident in Fukushima (Japan), the Deep Water Horizon oil spill (Gulf of Mexico), Hurricane Katrina (Southern United States), and others affect markets globally and trigger political reactions.

Price uncertainties of a different kind exist in major markets, for instance iron ore, an almost oligopolistic structure with price-setting power. Even highly integrated value chains such as steel and the auto industry face difficulties of attaching iron ore mining to their vertical business models. Iron ores exporters from Brazil have become increasingly tough negotiators for steel producers. Uncertainties also follow from incomplete implementation of measures to address emissions of greenhouse gases and other pollutants. While on both sides of the Atlantic there are many examples of well-intended systems to put a price on carbon emissions, numerous exemptions for industries and free allocations make these systems mostly ineffective. The uncertainties of future emissions prices subsequently halt investments in large scale roll out of technologies that exist to address these issues that are most urgent.

A lack of information can also be seen as a major barrier when it comes to future markets. Remaining reserves may be known for base minerals and major fuels (OPEC estimations of oil reserves being slightly less reliable though), but the price paths of key resources are uncertain, especially for food, water, and critical minerals and taking into account regulatory and property rights issues as well as stress multipliers such as climate change. The expectations on long-term resource prices, therefore, lack reliable basic information. This means that it is difficult for investors to assess what return they might make on their investments. Even in the case of energy — where IEA and other agencies offer reliable information — future investment uncertainties prevail. According to McKinsey, the Internal Rate of Return (IRR) at current prices is less than 10 percent, meaning that these potential investments are more unlikely to be undertaken compared to more lucrative opportunities.

As a result, information on resources is available unevenly across industries and internationally.³¹ The lack of reliable data in line with global sourcing of commodities supports awareness gaps and postpones action of businesses downstream towards using resources more efficiently. The lack of transparency limits the effective governance of financial transfers and investments. In turn, both deficits increase volatility.

³¹ The resulting inefficiencies can take the forms of adverse selection — buyers know less about the quality than sellers, hence both prices and quality will lower — and moral hazard, according to which contracts cannot prevent the use of insider information for strategic purposes (e.g., if oil managers receive a bonus for declaring higher reserves in their regional business unit). Empirical evidence at the European level suggests negative impacts on the innovation attitudes of manufacturing industries: 1) Almost 50 percent of respondents had no particular view on past material price developments; the awareness of opportunities is low. 2) Only 4.6 to 16.6 percent actually introduced material saving innovations between 2006-2008, when prices peaked at international markets; this share seems to have increased more recently after the financial crisis when raw material prices started to resurge. 3) More than 20 percent of the respondents declare market power of established companies as a main barrier to eco-innovation activities (i.e., to save natural resources). Eurobarometer, “Attitudes of European entrepreneurs towards eco-innovation,” Gallup Organization Report Flash Eurobarometer 315 (2011); McKinsey, “Resource Revolution: Meeting the world’s energy, materials, food, and water needs,” Report, p. 119.

In sum, information deficits have multiple dimensions. The absence of comprehensive data and the uncertainty of future scenarios present issues of provisioning that need to be dealt with at the level of international organizations. The gap between knowledge and action will require a mix of incentives for all actors involved. The transparency issue requires action at the level of national governance structures, probably best in combination with stakeholders. It should become a top priority for the transatlantic community.

Better Information and Learning: Data, Transparency, Due Diligence, and Certification

As Figures 4 and 5 reveal, information and knowledge-related functions are transmitted through a cluster of governance activities: agencies and networks on data supply, transparency, due diligence, accountability, certification, standardization, etc. Current deficits on materials, water, and land, as well as on the environmental dimension and on learning tools, point to the immediate need to establish a global information center on the resource nexus that will be discussed below.

Procuring better information is challenging, given international sourcing and complex value chains including numerous sub-contractors that are difficult to monitor, even for the multinational on top of the pyramid. Local cultural circumstances and corruption might further hinder this process and decrease transparency. A complicating factor is the extra costs incurred to increase the reliability of information cannot easily be calculated into the prices of products. The approach of using contracts either among companies or between companies and a regulatory body is inappropriate. Investment agreements in the future should reflect the collective goods dimension of the resource nexus.

The previous few years have witnessed a whole wave of efforts to establish more transparency in the extractive industries and beyond; the Extractive Industries Transparency Initiative (EITI) and the Kimberley process for the certification of diamonds, the Marine Stewardship Council, and the Forestry Stewardship Council are but a few examples of them. Usually these tend to be focused on national governance, transparency in financing, and human rights issues. Perhaps even more importantly, the transatlantic community seems on the verge of taking action:

- The OECD has released due diligence guidelines in 2010 to facilitate a responsible global supply chain management of minerals from conflict-affected and high-risk areas.
- A section in the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 in the United States obliges extractive companies listed on the U.S. stock exchange to report their payments on a country-by-country and project-by-project basis.³² More recently, a Public-Private Alliance for Responsible Minerals Trade (PPA) was launched to set up a monitoring and certification scheme for so-called conflict minerals, especially in the Great Lakes Region of central Africa, where the illicit mining and trade of such minerals has long been a cause of suffering for the local population, particularly when used to finance militant groups.

³² SEC. 1504. Disclosure of payments by resource extraction issuers.

- The EU Commission released a communication on annual financial statements in October 2011 proposing a mandatory country-by-country and project-by-project disclosure of extractive industry and loggers of primary forests.³³
- As for oil, the Natural Resource Charter — a tool to improve governance in resource-exporting developing countries established at Oxford University - is set to be deployed in Nigeria as a benchmarking exercise for improving petroleum sector governance and revenue management. The Facility for Oil Sector Transparency (FOSTER) program will be working with the Nigerian government and other stakeholders to convene a national process to identify weak links in the policy environment and recommendations for action.
- Another useful tool is the Model Mining Development Agreement for Sustainability, where the Mining Law Committee of the International Bar Association has assembled a 200-page model contract that covers all stages of mining project development in a country. Being web-based and publicly available, it provides a negotiation tool that is especially useful for new mining countries where the capacities in public administration and local NGOs are weak, and the perspective of how to turn endowments into socio-economic opportunities is not yet well developed.

The initiatives are certainly steps in the right direction. They should be implemented and enforced as well as aligned at the highest possible standards. Together they may well establish new hybrid forms of governance and are beginning to overlap with agendas such as poverty eradication, corruption, and conflicts. They involve a number of stakeholders or “governors”³⁴ with some power in bargaining and shaming, thus going beyond the more traditional voluntary agreements that almost exclusively establish gentlemen clubs between industry and governments. Under good conditions, such hybrid governance coalitions with NGOs and empowerment of civil society in developing countries may therefore trigger the development of better institutions and a legal frame in those countries and internationally. But indeed the support from the transatlantic community will be essential for success.

However, actors in emerging economies are almost entirely missing. This means two things. Firstly, value chain operations in those countries may well become the “weak link” and put downstream businesses at reputational risks. Secondly, markets may split between transparent and certified markets in some parts of the world on the one hand, and products containing conflict minerals and high-footprint components on the other. In a scenario, markets may become divided between those who care for due diligence in supply chains and are willing to pay a premium price — probably the OECD member states and businesses — and those who do not and offer cheap products for the emerging markets outside the OECD. With rapidly growing markets for the global middle class, such drawbacks to any certification scheme can hardly be underestimated. It is crucial that the transatlantic community effectively sets standards for products and processes that become applied internationally, such has been the case in many electronic products.

³³ European Commission, Proposal for a directive of the European Parliament and the Council on the annual financial statements, consolidated financial statements and related reports of certain types of undertaking, COM (2011) 684/2.

³⁴ Defined as “authorities who exercise power across borders for the purpose of effecting policy” D.D. Avant, et al., *Who governs the globe?* (Cambridge, U.K.: Cambridge University Press 2010) p. 356.

The Environmental Challenges

The third “I” refers to the internalization of negative externalities or the necessity to lower global environmental pressures. Many resource intensive patterns continue to cause severe direct local environmental degradation due to mining waste, pollution, soil erosion, etc. Other examples of local pressures include land degradation for unsustainable biofuel production, ruining of landscapes due to shale gas and oil wells, and more subtle local conflicts over gravel extraction or windmill parks. These environmental changes accumulate internationally. All have political ramifications at the local, regional, and national levels (e.g., the debates in many U.S. states and Europe about “fracking” and shale gas development) as well as at the global level (climate change, loss of biodiversity, etc.).

Given the resource nexus, the environmental impacts occurring directly and indirectly along extraction, transportation, production, consumption, and waste are becoming more pressing. Fossil fuels are known to cause several negative environmental consequences, but base metals and agricultural goods are of equal relevance.³⁵ Uncertainties associated with climate change and policy responses not only put at risk major fossil fuel producers but also the resource-intensive production processes of steel, cement, pulp, paper, etc. and many practices in agriculture releasing methane and other greenhouse gases. Many of the new energy sources, some of which are labeled as “clean,” may have to be reconsidered from a resource nexus perspective (see Box 3).

The leakage effects of shifting large parts of manufacturing and resource-intensive production patterns to low-cost countries should also be considered. The EU has increasing Total Material Requirements (TMR) associated with its imports, meaning that negative externalities are caused in foreign countries of supply.³⁶ Comparable analysis exists with regard to land use in foreign countries for domestic food production and “virtual” water, i.e., water indirectly embodied in imported goods. The global carbon flows are another case of how the consumers in the United States and in the EU have shifted emissions from domestic manufacturing with high efficiency standards to places such as China where the efficiency level is yet low.³⁷ Again, it needs to be stressed that resource efficiency strategies need an international scope.

Climate change and extreme events such as the flooding in Pakistan (2010), Hurricane Katrina in Louisiana and the Gulf of Mexico (2005), or the heat wave in central Europe (2003), can increasingly be seen as stress multipliers that put existing institutional structures at high risks. The FAO has put forward a map that tries to locate main environmental stress factors for agricultural production for the future (see Map 2); consequences for the supply of energy and materials will be discussed below.

³⁵ LCA stands for Life-Cycle Analysis, MFA for Material Flow Analysis, a combination often called EMC, which stands for Environmentally weighed Material Consumption.

³⁶ S. Bringezu, “Key elements for economy-wide sustainable resource management,” *RESPONSABILETE & ENVIRONMENT* /61 (2011) pp. 78-87.

³⁷ Y. Yunfeng and Y. Laike, “CO₂ Emissions Embodied in China–U.S. Trade,” *Chinese Journal of Population, Resources and Environment* 7/3 (2009) pp. 3-10; Carbon Trust U.K., “International Carbon Flows,” (2011), <<http://www.carbontrust.co.uk/policy-legislation/international-carbon-flows/pages/default.aspx>>.

Box 3: Biofuels

Biofuels have been adopted on a large scale in the United States, Brazil, and the EU for a wide range of reasons associated with energy security and independence arguments, improved transportation systems sustainability, lower carbon emissions, and domestic interest group politics. While some biofuels provide more sustainable, lower carbon alternatives for carbon-based fuels, the creation and rapid development of this new market also has some social and environmental drawbacks. These cases demonstrate the possible pitfalls that searching for alternatives of carbons can bring, in terms of governance failures and direct pressure on in particular food, water, and land.

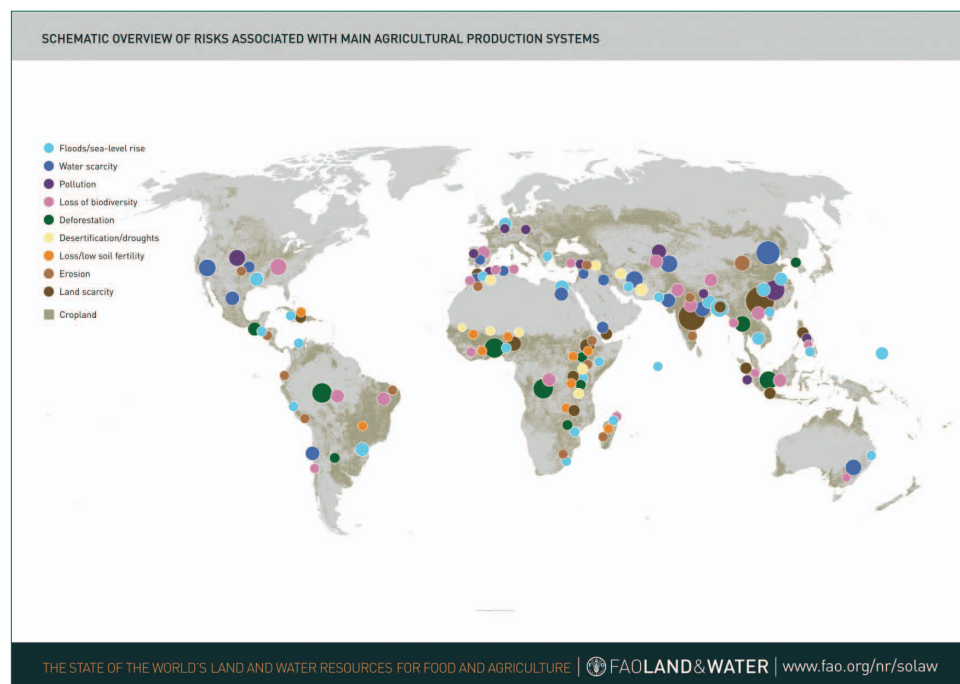
The three most prominent regions concerned with biofuels production and consumption all have mechanisms in place to stimulate large-scale production and consumption of biofuels. While these aimed to develop industry on a large scale, there are also reports of environmental, social, and market distortions in terms of large scale forestry cutting, subsequent erosion, usage of food for biofuels production and industry protection mechanisms.

Counter measures in terms of certification schemes have been employed, to a certain extent, but metrics and certification institutions remain weak and controversial. In July 2011, the first EU voluntary sustainability schemes for biofuels were published. In total, seven schemes have been accepted that directly apply in all 27 member states. Companies are obliged to use a certification scheme. In the United States, an obligatory certification scheme has been implemented in California.

In addition, blending of biofuels is actually difficult to measure, diminishing transparency of cross-border trade flows. There is an ongoing debate over indirect land use change, referring to the unintended consequences of releasing more carbon emissions through the land-use changes resulting from the expansion of the share of ethanol or biodiesel. Although the market demonstrates a clear learning curve, with increasing shares of so-called second and third generation biofuels, the fuels based on corn and palm oil, for example, are expected to form the bulk of the biofuels to be blended up to 2020 and beyond.

Most of the troubles can be resolved by better governance, that is to say through decent certification and by authorities actually checking progress made by the industry, reduction of perverse subsidies that basically slow down market development as such, better land use planning, etc. It is clear, however, that policies designed to accelerate biofuel use without respect to both the direct and indirect negative impacts can neither be assumed to reduce carbon nor minimize social impacts. This case demonstrates the global implications of both transatlantic policies and consumption patterns, and the potentially destabilizing impacts of these both within and beyond the transatlantic space unless more coordinated steps with higher ambitions are adopted. This is another example of a broader transatlantic space in which both opportunities and the risks of the resource nexus lie.

Map 2: Potential Geographical Hot Spots for Main Resource Nexi (Land-Food-Water)



Such stress multipliers lead to threats of ungovernable spaces. Any such local hotspots usually are remote and hard to connect to consumption patterns in the transatlantic community due to a lack of market integration and information. However the two feedbacks between global drivers exceeding local resilience and local disturbances to spread globally are of strategic importance. The transatlantic community is challenged to develop a multi-scale approach that connects local action and has impacts across legal and political boundaries, while global environmental pressure will have to be reduced. At the same time, it reminds policymakers to be modest in their expectations and to be aware of vested interests that may push a certain technology. This argument can be illustrated with the case of biofuels (see Box 3).

Global responsibility requires reductions in the excessive use of energy fuels, base minerals, and agricultural goods, especially from the transatlantic community. The local level is more relevant for immediate responses by citizens because impacts can easily escalate into riots for food and water. The aggregated impacts of such local and multiple externalities are likely to be as severe as the well-known effects of global change: they put supply of essential materials and production components at risk. New governance structures ought to be considered that put more emphasis on responsibility and resilience.

International Environmental Governance: Striving for Policy Coordination and Enforcement

Despite all difficulties to come to grips with climate change and the shortcomings of the Kyoto Protocol, international environmental politics can offer a number of successes such as the phasing out of chlorofluorocarbons (CFCs) that here on track to destroy the stratospheric ozone layer, the Arctic Treaty, and the United Nations

Convention on the Law of the Sea. What is perhaps even more important is a quest by many citizens worldwide for transparency and clean production.³⁸

This societal change combines a set of social and environmental issues and seems to have sustained during the financial crisis. There are many examples of regional and local initiatives that pursue such tasks even in the absence of a national policy. Quite often, this goes along with increased attention for human rights throughout the production process (e.g., from mine or well to end consumer). As the “Facebook-revolution” seems to become an established notion that illustrates the potential power of people in the age of the internet — with references to integration and information — a people-driven change towards global sustainable resource management could well become a pillar for governance strategies:

- With niches of successfully demonstrated new products and services being developed by interconnecting networks of engaged citizens and business;
- With powers of NGOs and media to disseminate them as well as to name and shame unsustainable practices; and
- With entire socio-technology regimes changing in areas, such as homes now being able to produce energy rather than consuming it. A practice of “my home is my power station” and “our neighborhood has a light resource footprint on the earth” meets the ambitions of conservatives, liberals, and greens alike and goes well beyond simple improvements.³⁹

However, there are gaps between preferences and real behavior as well as between niches and mass markets. Along those lines, there is a fundamental flaw in the price expectation of consumers: cleaner production often is demanded against the memory of low resource prices. Examples of “being better off with less material use” are not yet widely known. This indicates two knowledge gaps. First, the gap between knowledge about new clean technologies and better practices that may exist somewhere but is not publically available, and second, the gap between any such knowledge and action towards mass market development. Thus, many of those initiatives are stuck unless policies fill the gap. Accordingly, recent research reaffirms the role of politics and governments in attempts to govern green markets.⁴⁰

³⁸ The World Values Survey is probably the largest measure of the shift in values, attitudes, and opinions that has occurred over the last decades. It shows a preference of environmental protection over traditional aims such as economic growth and employment across a whole range of industrialized, developing, and newly-developing countries. Another example is the so-called Greendex-Survey, a scientifically derived sustainable consumption index of actual consumer behavior and material lifestyles across 17 countries, which is commissioned by the National Geographic Society. The latest version from 2010 confirms that the preferences in favor of environmental issues have been improving compared to 2008 and are particularly strong in India, Brazil, and China.

³⁹ World Economic Forum, “More with less: Scaling sustainable consumption and resource efficiency,” Report.

⁴⁰ R. Bleischwitz, *Corporate governance of sustainability: a co-evolutionary view on resource management* (Cheltenham, U.K.: Edward Elgar 2007); S. Jacobsson and A. Bergek, “Innovation system analyses and sustainability transitions: Contributions and suggestions for research,” *Environmental Innovation and Societal Transitions* 1/1 (2011) pp. 41-57; M. Janicke and K. Rennings, “Ecosystem dynamics: the principle of co-evolution and success stories from climate policy,” *International Journal of Technology, Policy and Management* 11/3-4 (2011) pp. 198-219; R. Kemp, “The Dutch energy transition approach,” *International Economics and Economic Policy* 7/2 (2010) pp. 291-316; M.A. Schreurs, et al., *Transatlantic environment and energy politics: comparative and international perspectives* (Farnham U.K.: Ashgate 2009).

Map 3: The World of Facebook – Potential New Networks Across the Globe



Thus, the power of politics and governance *with* governments are key configurations for a better resource management, as it has been established for environmental policy. The “weakest link” argument, however, also applies here: the multiple externalities often arise in fragile states that are unable to either establish or/and to enforce environmental legislation. This inconvenient truth can be exemplified with the case of water management in Central Asia (see Box 4). The general acknowledgement of fragility carries a number of risks and threats for resource supply that will be analyzed below.

To summarize, new policies must balance today’s desires for clean production and increased transparency, in cooperation with industries, with the aim of creating long-term stability and predictability so that long-term investments can be made. Mutual policy learning on key issues such as biofuels, certification of extractive industries, product standards that enforce resource efficiency improvements, and key policies such as cutting environmentally harmful subsidies⁴¹ would be a major step ahead. This indeed should also be done to curb carbon/greenhouse gas (GHG) emissions significantly. Long-term targets to align resource savings, ecosystem productivity improvements, carbon/GHG reduction, and energy and resource security issues will be a key transatlantic community undertaking in that regard; even better would be a joint undertaking to formulate new models of prosperity that are able to replace GDP and attract new technology developments, new business models, and new lifestyles.⁴²

Conclusions on Key Response Options: Resource Efficiency and New Partnerships

Commodity markets are likely to remain under stress. Downstream industries and consumers will almost certainly need to cope with high and volatile prices in the future. The additional risks of resource nationalism, illicit trade, and resource-related conflicts could escalate into serious supply risks and gloomy general outlooks. Many suppliers can be considered fragile; in particular new suppliers suffer from

⁴¹ The *Global Subsidies Initiative* launched by IISD aims at cutting environmentally perverse subsidies. This goes beyond the transatlantic community; many developing countries spend billions of U.S. dollars on such subsidies (e.g., India spends \$15 billion on fuel subsidies annually).

⁴² See e.g. the World Resources Forum Davos at: www.worldresourcesforum.org, www.beyond-gdp.eu, www.oecd.org/greengrowth, www.wbcsd.org.

Box 4: Water Sharing in Central Asia

Efficient water management especially along the Amu Darya river basin is crucial to the Central Asian region. It influences agricultural production, electricity generation (hydro energy plants), and industry. Availability of hydro-energy also heavily affects daily life: frequent blackouts take place in Kyrgyzstan during winter when the river's flow is at its lowest, for example.

Following the breakup of the Soviet Union, the five Central Asian republics signed several agreements on the principles of water management (Tashkent Statement 1991, Almaty Agreement 1992) and set up the Interstate Commission for Water Coordination (ICWC). However, currently there is no institutionalized regulatory and/or conflict resolution mechanism among the Central Asian republics that would be able to regulate water and energy sharing together. Instead, water sharing is based primarily on annually renewed (or not, as in 2001) interstate agreements.

The frequent struggles between Kyrgyzstan and Uzbekistan are a prime example of the necessity for interstate water sharing oversight. On-going and recently completed dam-building projects in upstream countries (primarily the Rogun and Sangtuda projects in Tajikistan, and the Kambarata I-II projects in Kyrgyzstan) are expected to increase existing tensions between upstream and downstream actors. The lack of a coordinated water management framework results in the on-going depletion of the irrigation infrastructure, due to lack of investment in dams and pumping stations. Social tensions inside the republics increase due to poverty originating from the mismanagement of water resources. These come on top of ethnic tensions that are already present. Mismanagement of water resources already has serious environmental consequences, such as the depletion of the Aral Sea, desertification, soil salinity, and regular unintended floods due to lack of investments in infrastructure.

Map 4: Central Asia Water



The absence of coordinated governance systems to manage water resources in the region has led to a vicious circle in which all states concerned might be worse off in the end and security is likely threatened.⁴³ Given a) the interest in stability and supply of resources and b) the rich experience in solving trans-boundary water management and pipelines issues that the transatlantic community has, it should play a role in addressing this conflict.

⁴³ See also the recent report on Global Water Security, Intelligence Community Assessment ICA 2012-08 that puts this water management as well as the Brahmaputra river basin at highest risk.

the “resource curse,” the institutional inability to transform natural endowments into prosperity for the poor.⁴³ With stress multipliers such as climate change, volatile commodity prices, and pressure from population growth — factors that are very difficult to be influenced by those states — risks of violent conflicts increase⁴⁴ and many of these countries may actually fail (see Map 12 and Figure 6). The escalating mechanism, thus, may emerge from a regional food and water crisis in poorly governed spaces and failing national states, and result in interruptions to international supply chains. Ungovernable spaces can also occur within large states that may not otherwise be regarded as fragile (e.g., Indonesia, India, Mexico, Northern Caucasus, and others). Such developments lead to irrational supply strategies and potential breakdowns. Hence, this risk for international markets could become quite severe.

Doubling Resource Efficiency by 2030 (Based on the Levels of 2010)

The opportunities of resource efficiency are largely untapped. Since this strategy captures all resources and most actors of societies, it lowers the costs and the risks stemming from the resource nexus. There needs to be much more stringent efforts to unleash resource efficiency on all relevant markets both in the transatlantic community and internationally. In that regard, the 95 resources-dependent countries could potentially turn their endowments into development opportunities for the 1 billion poor people that exist today. Setting an ambitious target such as doubling resource efficiency within the transatlantic community offers the following two main benefits: firstly, it pays off for manufacturing and sustainable growth and secondly, it helps to develop international markets. A mid-term perspective is a model of prosperity with millions of new jobs in clean tech, recovering precious resources, and resource-efficient manufacturing. The transatlantic community should take the

⁴³ P. Collier, *The bottom billion: why the poorest countries are failing and what can be done about it* (Oxford: Oxford University Press 2007); Collier, *The plundered planet: why we must, and how we can, manage nature for global prosperity*; D. Lederman and W.F. Maloney, *Natural resources, neither curse nor destiny* (Palo Alto, CA & Washington, DC: Stanford Economics and Finance & World Bank 2007).

⁴⁴ See e.g. M. Humphreys, “Natural Resources, Conflict, and Conflict Resolution,” *Journal of Conflict Resolution* 49/4 (2005) pp. 508-37.; S. Dinar, *Beyond resource wars: scarcity, environmental degradation, and international cooperation* (Cambridge, Mass.: MIT Press 2011).; L. Guesnet, et al., “Natural Resources in Côte d’Ivoire: Fostering Crisis or Peace? The cocoa, diamond, gold and oil sectors,” Bonn International Centre for Conversion Report (2009).; Mildner, “Konfliktisrisiko rohstoffe? (Potential conflicts from resources?),” Report.; I. Samset, “Natural resource wealth, conflict, and peacebuilding. Report for the Program on States and Security, Graduate Center,” Ralph Bunche Institute for International Studies at CUNY Report (2009), <http://statesandsecurity.org/_pdfs/Samset2.pdf>; P. Jones Luong and E. Weinthal, *Oil is not a curse: ownership structure and institutions in Soviet successor states* (New York: Cambridge University Press 2010).

lead and establish a barrier-free transatlantic market place for trade and investment⁴⁵ towards doubling resource efficiency:

1. Establish common standards for key products and processes in industrial sectors to enforce efficiency gains. The EU experience with the eco-design directive shall be examined as well as the U.S. Defense Advanced Research Projects Agency (DARPA) and others.
2. Establish technology platforms on resource efficiency of buildings, water, and food management with strong industry participation and use of social networks to include “crowd-sourcing” and “open innovation” to overcome lock-ins.
3. Set targets for a majority share of renewable energy use both in electricity production and in transportation by 2050 with two side-pillars: a) create a transatlantic carbon emissions trading system to support market development, and b) undertake investments in energy infrastructures. The integration of European market for electricity and natural gas by interconnecting national markets, creating more favorable conditions to invest in infrastructure, and streamlining national regulations, is an essential task. Ensure that new energy technologies, such as those used to extract shale gas and unconventional oil, are sustainable in order to reduce overall carbon footprints and prevent drinking water pollution and methane leakage. Where necessary, regulation should be developed and strictly enforced to ensure sustainability.
4. Business should improve their supply chain management along resources following the OECD Due Diligence Guidelines and efforts to improve resource efficiency. Since both the United States and the EU have started to take action on the transparency and certification of selected commodity chains, this should become better coordinated and harmonized. The scope of the regulation should be broadened to include environmental core indicators. Policymakers should support raising awareness about material intensity, carbon footprints, and water footprints, and its links with consumption patterns. Make use of modern media and prominent multipliers to reach various target groups.
5. Undertake greening of public procurement to facilitate market introduction; make public buildings, including military areas, clean technology lighthouses for future markets. Negotiate a bilateral public procurement agreement between the United States and the EU.
6. Reduce environmentally harmful subsidies on fossil fuels, mining, agriculture, and land use: support a Global Subsidies Initiative towards these aims. Recall and enforce the G20 commitment to phase out fossil fuel subsidies in G20 members. Eliminate all export subsidies and refrain from using food aid to promote exports.
7. Put prices on carbon and on resource use within the member states of the transatlantic community, even if the new large energy consumers (China, India) do not implement similar incentives immediately.

⁴⁵ German Marshall Fund of the United States, “A new era for transatlantic trade leadership. A report from the transatlantic task force on trade and investment,” GMF Report (2012).

8. Exchange best practices and their assessments at the levels of firms, technologies, and regions (the latter being especially important with regards to housing and transportation).
9. Develop technology that allows for capturing and reusing carbon in a sustainable manner. Promote the development of this technology by sharing knowledge.
10. Develop a new GDP that acknowledges the productivity of ecosystems and social systems. Establish a transatlantic forum to discuss new elements of a good life with less resource use.

New Partnerships within the Wider Atlantic and with Key Suppliers

The scope of the transatlantic community should be widened because the South Atlantic countries are becoming important players. The rise of Brazil is the most clear-cut case of a new emerging great power. With a robust democratic government and a huge resource base, including newly discovered large off-shore oil fields and a flourishing agricultural and manufacturing base, it is the regional hegemon. South Africa and Nigeria, too, both have the capacity to become major economic powers and together with other African neighbors, including Morocco, they are establishing a new South-South economic axis with the South Americans. The energy resources of the South Atlantic, together with the untapped shale gas and heavy oil in North America, have led to talk of a new energy paradigm whereby the Atlantic Basin will provide investment opportunities and eventually fossil fuel supplies for both the United States and Europe. The big international oil companies who have faced major legal, political, and physical hurdles in their explorations in the Middle East, Caspian Sea region, and Russia may now see the Atlantic Basin as a more stable environment for business opportunities, especially in light of the risks explained in Chapter 4.

Although a better collaboration would not, by definition, be based on shared norms and identities in the same way as the transatlantic community of the North Atlantic, the littoral states of the wider Atlantic basin should seek to cooperate in pursuit of practical measures to improve the governance of the resource nexus and the management of other security challenges that affect all states involved. The transatlantic community should negotiate partnership agreements and could bring in essentials such as technology and human and administrative capacities for better management and distribution. In addition, it could leverage market access to the United States, Canada, and the EU. Again, the long-term objective should be to establish a barrier-free market place for trade and investment.

In addition, and of comparable relevance, a partnership agreement between the transatlantic community and China should be pursued. The Euro-Atlantic Security Initiative made by Sam Nunn, Wolfgang Ischinger, and Igor Ivanov⁴⁶ contains useful elements in that regard; nevertheless the relationship between Russia and Europe will likely remain to be closer than with the United States and Canada.

⁴⁶ www.carnegieendowment.org/2012/02/04/munich-security-conference.

The key suggestions are as follows:

1. Coordinate standards for key production processes such as smelting and refinery across countries. Although production increasingly takes place in areas where the transatlantic community has less influence, the supply chain management efforts of industry should be supported via sectoral initiatives and monitoring due diligence processes.
2. Establish a Biofuels Technology Platform. Given the rich experience in Brazil, the United States, and the EU a platform for sustainable use of biofuels and biomass with active industry participation should be established. It shall coordinate the development of a second and third generation of biofuels and their application in transportation. Alternative trajectories of using biomass should actively be tested. Also, standards on producing biofuels and their certification should be better coordinated. Subsequent steps should establish technology platforms on resource efficiency of buildings, water, and food management with strong industry participation and use of social networks to include “crowd-sourcing” and “open innovation” to overcome lock-ins.
3. Establish new international compacts for improved international monitoring, recovery, and recycling of metals, especially critical metals, as well as for improved international monitoring, sustainable use, and recovery of phosphorus.
4. Coordinate development efforts. All transatlantic agencies undertaking development programs, foreign policy, and economic cooperation should coordinate better to establish roadmaps for sustainable resource management in countries of the wider Atlantic. Awareness, training, and capacity building should be done to facilitate environmental impact assessment and risk assessment for large projects. The aim should be to invest large-scale in systems innovations such as renewable energies to overcome current lock-ins, the use of gas in transportation etc. to substitute for oil, the use of gas in electricity production to substitute for old coal and nuclear, and system integration with renewable energies (e.g. peak load management).
5. Promote supply chain management, transparency, and certification. The transatlantic community should promote its efforts towards the resource-exporting countries of the Wider Atlantic, China, Russia, and other new players. It should engage stock exchanges (such as Shanghai) and the WTO to establish similar guidelines for due diligence, transparency, and certification.
6. Map the potential for a sustainable resource base. Geological surveys and other agencies should undertake a coordinated mapping of reserves and the potential to increase agricultural outputs. This should go along with assessing water and other environmental stress multipliers that may hamper the sustainable exploitation of these endowments. The result should be an open access knowledge hub for sustainable resource management that helps to undertake investments and regional planning.
7. Engage China. Working with China across the spectrum of resource management has become a vital policy concern for all. The transatlantic

community must engage China in the policy agendas outlined by this report because China is a major resource user with world-wide interests and influence and it can set an example for other large developing economies. Issues such as resource exploitation, resource use efficiency, and environmental protection are already high priorities for China's government and can be addressed through the existing and new institutions discussed in this report. Engaging China on transparent governance, the resolution of international resource disputes and sea-lane security will require greater tact and diplomacy because China's norms and interests in these respects are quite different from those of the transatlantic community, particularly with respect to sovereignty.

8. Review existing partnerships and agreements on resources. Existing and emerging inter-governmental partnerships (such as the energy partnership between the EU and Russia) should take account of the resource nexus and be better coordinated. They should refer to common principles such as provided by the Natural Resource Charter, the Mining Model Agreement, and others. Participatory processes should follow the standards suggested by the United Nations process on Business and Human Rights. Without developing infrastructures, basic plans for water and electricity distribution, commodity transportation and industrial development becomes extremely challenging. Therefore partnerships should focus attention on sustainable infrastructural development. Local communities must always benefit first from such facilities, in terms of sufficient food, clean water, basic roads, and proper sanitary installations. Also, information technology can function to connect local communities with national, regional, or even global networks that should be of mutual benefit.
9. Broaden investment treaties. Efforts to negotiate a multilateral investment agreement should be reinvigorated and widened to include key supply countries. Any such agreement should follow the lines on partnerships suggested above.
10. Develop new economic measures that acknowledge the depletion of resources and take into account the productivity of ecosystems and social systems (i.e. the resource nexus).

CHAPTER 3

STRATEGIC INTERESTS AND INTERSTATE CONFLICT


In examining the nexus of resources at the strategic or inter-state level at this point in time, competition for access to fossil fuels represents the most clear cut case of resource interactions. The extraction of fossil fuels requires large amounts of water and electricity, two resources that are also in great demand for food production, mining, and land development. Furthermore, as new technologies and high prices open up new areas for fossil fuel extraction, the impact on the environment both on-shore and off-shore can have far-reaching, negative impacts on fishing grounds and, in some cases, fresh water supplies essential for food production in river deltas. The 2010 BP oil spill in the Gulf of Mexico is a case in point. For the future, it may be that conflict over fresh water supplies from the great rivers of Asia and Africa provide the most vivid example of the nexus where the demand for food, land, and electricity generation in upstream states competes for river water that is vital for the livelihood or even survival of downstream states.

The Emerging Environment

Military conflict between states remains a serious risk in the 21st century, especially in Africa, the Middle East, and Asia. Since the emergence of the state system, conflicts over resources have been a steady ingredient of international politics. The major powers have often wanted possession of, or access to, many of the same territorial and natural resources, from salt, tea, and bananas to oil, iron ore, and uranium. International resource politics has often been a brutal business. Analysts have long debated the relative importance of resource scarcity as a cause of war, with pessimists often predicting that a dramatic increase in resource wars are just around the corner and optimists expressing confidence that effective international institutions, open economies, and technological innovation should all but eliminate the temptation to war. The contemporary record suggests that within regions that have close institutional ties and share common laws and values, resource quarrels are settled judiciously. This has been the case within the North Atlantic community for the past half century.

Thus, if good global governance (including adherence to international treaties, conventions and protocols), good business practices, and regional mechanisms for conflict control and confidence building measures were the norm throughout the continents, the management of scarcity problems, though difficult, would be substantially easier to envision and achieve. There would be no reason to use coercive





measures or, in extremis, force to assure or deny access to resources. But at this time in the 21st century, these conditions do not apply in many regions, as illustrated throughout this report. While interstate warfare has generally declined since the end of World War II, some trends point toward a more confrontational and nationalist world where some of the basic rules and norms of the post-WWII order are being challenged. This is happening at the very time when the power and influence of the North Atlantic community is on the wane, and while the demands humans are making on the earth's resources grow rapidly. In spite of growing recognition that global problems require global solutions, we still live in a world where power and authority are centered on states. What is changing is the political and economic strength of many emerging countries — such as China, India, and Brazil — even as the number of states grows. Underlying, and sometimes shaping these changing contexts, are tensions and hostilities about the origins, nature, and future of the Western liberal order constructed over the last century.

Like it or not, some of the most intense challenges over resources will be between the emerging economies, including their weak neighbors where few established rules for compromise have been established. Thus, while it is highly unlikely that the North Atlantic countries would ever resort to force against each other over access to water, fish, minerals, or energy, the same cannot be said for several of the most divisive disputes in the Middle East, Africa, and Asia. Some of these disputes also directly involve the U.S. and European powers given their residual power and interests in regions such as the Persian Gulf, Africa, the Indian Ocean, and the western Pacific.

In the Mediterranean, South Atlantic, the Caspian and Black Seas, the Persian Gulf, Indian Ocean, China Seas, and West Pacific, there are many unresolved disputes over resources and access to them. There are regional agreements, especially among the Southeast Asian countries, but by and large governance of regional disputes over resources is minimal. And this at a time when the staggering growth in international commerce, especially sea-borne commerce, has witnessed the ever growing importance of safe transit through shipping lanes and the need for protection from piracy and terrorism. The lack of effective governance in places such as Somalia and Yemen creates conditions in which pirates and even radical terrorists can exist unperturbed by the state. It is again unfortunate that some of the most vulnerable states in the world are located in critical strategic locations astride some of the world's most important shipping lanes.

It is against this backdrop of strategic uncertainty and potential chaos that the specific examples of resource conflicts become relevant, especially in the Southern Hemisphere and the Indo-Pacific regions. What makes the emerging environment likely to generate sources of conflict are two new but very different developments that will have far-reaching implications for regional disputes and the question of access rights. The first concerns technologies of access. Recent breakthroughs in drilling technology, especially for fossil fuels, has opened up frontiers for exploration that were until recently considered impractical for financial and technical reasons. This is especially the case with off-shore deep water drilling technologies of the kind being deployed in the Gulf of Mexico and off the coast of Brazil. While there are obvious environmental dangers with these new technologies as witnessed in the BP oil spill in the Gulf in 2010, the scramble to develop new deep water drilling is only just beginning.

The other factor is global warming and the impact that climate change will have on sea levels, ice packs, permafrost, and weather patterns. As discussed in other sections of this report, the impacts of climate change are likely to induce greater water scarcity and variability of supply, changes in agricultural productivity, sea level rise, and migration. These developments, and many others, are often referred to as threat multipliers at local, national, and regional scales, particularly in parts of the world that already experience significant challenges in terms of political stability, state capacity, and economic development. Such changes, and the instability and social and political disruptions to which they may contribute, pose threats to U.S. and European interests, as well as to the interests and livelihoods of millions of people in affected areas. As such, climate change is geopolitical because it can shape the strategic interests, goals, and policies of individuals, communities, states, and other organizations.⁴⁷

This chapter first outlines some of the contending views about the historic relationship between resources and the propensity for military conflict. It then reviews the most immediate and high stakes issues concerning the protection of energy supplies. This is followed by an examination of potential future conflict over the control of off-shore resources, especially fossil fuels. The impending crises over access to fresh water and food, especially in Asia and Africa is followed by a brief discussion of the preparations some countries are taking to protect themselves from resource disputes and the security problem posed by migration. This provides a bridge to Chapter 4, which is focused on resource problems at the local and regional levels.

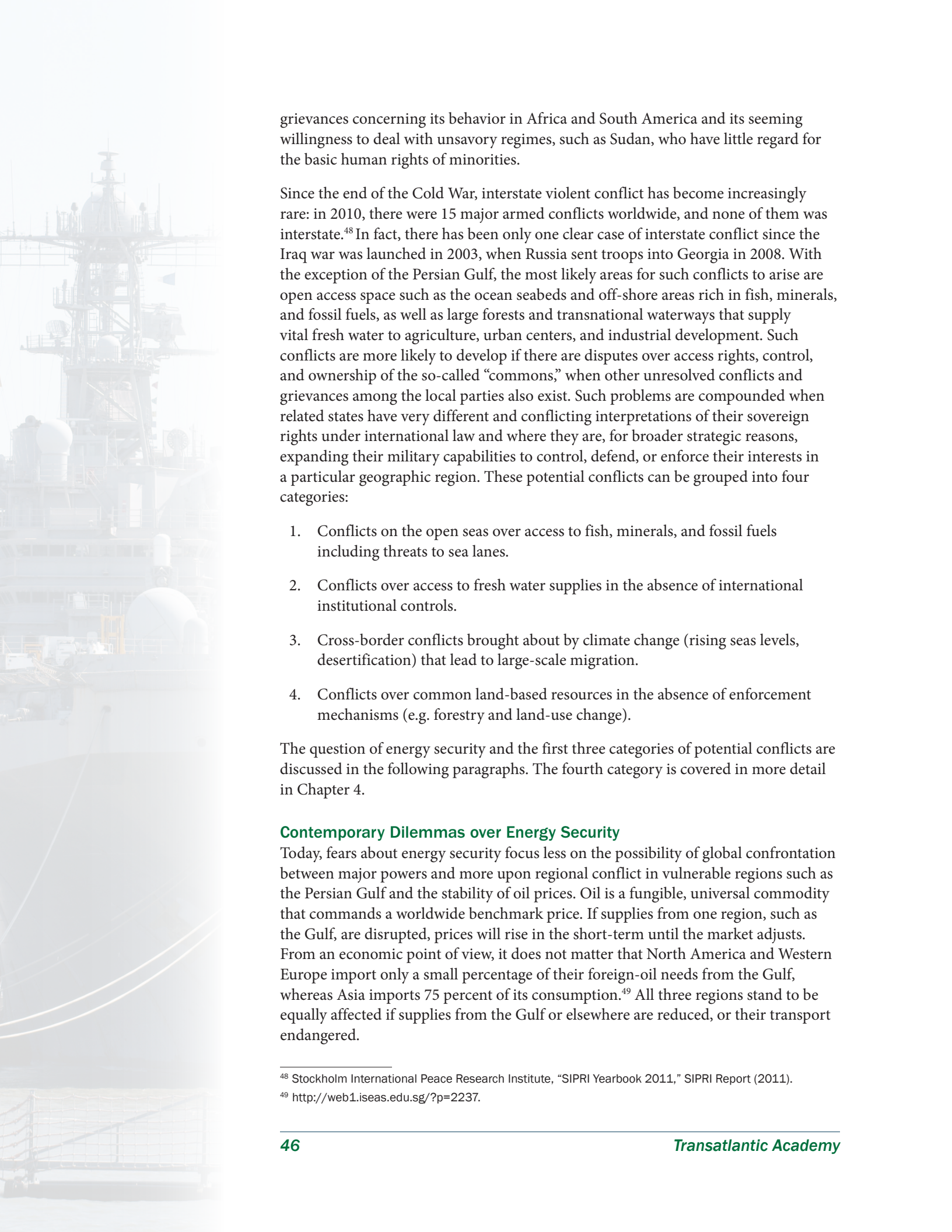
Resource Conflict and Geopolitics: Past, Present, Future

The 20th century is replete with examples of countries going to war to protect or assure their access to vital strategic resources, especially petroleum. Japan attacked the United States in 1941 with the intention of limiting U.S. intervention against its invasion of Southeast Asia, which was essential to provide oil, rubber, and minerals for its war effort. Fifty years later, in 1991, the United States launched a major war against Iraq following that country's occupation of Kuwait the previous August. A primary rationale was to prevent the vital oil fields of Saudi Arabia from falling under the control of Saddam Hussein. And now early in the 21st century, a possible trigger for confrontation between the United States and Iran concerns the latter's threat to interfere with oil shipping routes through the Strait of Hormuz. Other vital resources including fresh water, food supplies, and strategic minerals are cited in political and scholarly debates as having or potentially having equally troubling consequences for inter-state relations.

Short of full-scale warfare, there are innumerable examples of tense interstate relations, both bilateral and multilateral, that are about resource related concerns. The U.S.-Saudi relationship, as is well known, is premised on the countries' shared interests in getting petroleum from the Persian Gulf to the world market. Europe's dependency on Russia for natural gas supplies remains a divisive issue both between the supplier and the recipients but also within Europe, as demonstrated by Poland's displeasure with the Nord Stream gas pipeline that goes directly from Russia to Germany. China's insatiable appetite for natural resources has generated many

⁴⁷ D. Moran, *Climate change and national security: a country-level analysis* (Washington, DC: Georgetown University Press 2011).





grievances concerning its behavior in Africa and South America and its seeming willingness to deal with unsavory regimes, such as Sudan, who have little regard for the basic human rights of minorities.

Since the end of the Cold War, interstate violent conflict has become increasingly rare: in 2010, there were 15 major armed conflicts worldwide, and none of them was interstate.⁴⁸ In fact, there has been only one clear case of interstate conflict since the Iraq war was launched in 2003, when Russia sent troops into Georgia in 2008. With the exception of the Persian Gulf, the most likely areas for such conflicts to arise are open access space such as the ocean seabeds and off-shore areas rich in fish, minerals, and fossil fuels, as well as large forests and transnational waterways that supply vital fresh water to agriculture, urban centers, and industrial development. Such conflicts are more likely to develop if there are disputes over access rights, control, and ownership of the so-called “commons,” when other unresolved conflicts and grievances among the local parties also exist. Such problems are compounded when related states have very different and conflicting interpretations of their sovereign rights under international law and where they are, for broader strategic reasons, expanding their military capabilities to control, defend, or enforce their interests in a particular geographic region. These potential conflicts can be grouped into four categories:

1. Conflicts on the open seas over access to fish, minerals, and fossil fuels including threats to sea lanes.
2. Conflicts over access to fresh water supplies in the absence of international institutional controls.
3. Cross-border conflicts brought about by climate change (rising seas levels, desertification) that lead to large-scale migration.
4. Conflicts over common land-based resources in the absence of enforcement mechanisms (e.g. forestry and land-use change).

The question of energy security and the first three categories of potential conflicts are discussed in the following paragraphs. The fourth category is covered in more detail in Chapter 4.

Contemporary Dilemmas over Energy Security

Today, fears about energy security focus less on the possibility of global confrontation between major powers and more upon regional conflict in vulnerable regions such as the Persian Gulf and the stability of oil prices. Oil is a fungible, universal commodity that commands a worldwide benchmark price. If supplies from one region, such as the Gulf, are disrupted, prices will rise in the short-term until the market adjusts. From an economic point of view, it does not matter that North America and Western Europe import only a small percentage of their foreign-oil needs from the Gulf, whereas Asia imports 75 percent of its consumption.⁴⁹ All three regions stand to be equally affected if supplies from the Gulf or elsewhere are reduced, or their transport endangered.

⁴⁸ Stockholm International Peace Research Institute, “SIPRI Yearbook 2011,” SIPRI Report (2011).

⁴⁹ <http://web1.iseas.edu.sg/?p=2237>.

Box 5: “Geopolitics” Then and Now


The recent revival of rather simplistic, chessboard-style Geopolitics (with a capital “G”) is treated with skepticism by a number of Western scholars. The ways in which resources are framed and understood by political leaders are likely just as important as any material scarcities or different resource allocations in predicting how and where conflict will erupt. Growing “resource nationalism” has received much attention of late, but it is only part of a larger story.

The realities of the 21st century are more complex than can be captured solely through a lens of national interests defined by state leaders. This century will be one of connected urban centers. Its geographical, or geo-strategic, focus is not likely to be primarily about controlling vast swaths of territory via imperial state control. Governance challenges look more likely to be centered on maintaining order and caring for the provision of key resources in China’s futuristic coastal megacities, India’s technopoles, and the sprawling megacities in Latin America and Africa. Well-governed modernity — its markets and polities — seem likely to coexist alongside mostly anarchic spaces — some of them failed or failing states and some of them geographic, social, and technological spaces within otherwise functioning states. Resource wealth will be, quite literally, visible from places struggling with enduring profound resource poverty — and vice versa.

While this chapter sketches out some arenas in which traditional interstate rivalries pose threats to peace and human security, there are important differences from previous eras and previous ideas about geopolitics, that cannot be overlooked:

1. The trend toward the globalization of markets for most commodities means that there are independencies that were not present when the world wars were fought against a backdrop of nationalistic drives to secure access to land, energy, etc. Moreover, global institutions, where they function, make conflict less likely. Where there are ambiguities in global norm-setting, conflict between states is most likely to arise.
2. The global nature of challenges facing humans, such as climate change, put all of us in the same boat. This does not mean that the impacts will be the same everywhere, nor that the ability to cope with environmental change is the same everywhere, but rather that viewing the world as a collection of some 200 independent states occasionally fighting with each other is a non-starter for addressing the problems that face us. The transatlantic community has a leadership role to play in addressing these global challenges.
3. Governance failures, not scientific realities about the geographical distribution of natural resources, are the primary driver of geopolitics. For a number of scholars, evidence of rising resource nationalism and talk of “new geopolitics” suggests a profound lack of imagination — a risky, even dangerous point of view that is out of place in the 21st century. Others retort that in the new emerging powers more traditional attitudes towards nationalism and resource access is reflected in the writings of key strategic analysts and the policies and programs of the governments they write about.





In the long term, a significant rise in oil prices will invariably lead to lower demand and a fall in prices. The industrial powers have effective mechanisms for adjusting over time to high oil prices through conservation, innovation, and taxation. Furthermore, the oil-sharing arrangements set up by the International Energy Agency (IEA) in 1974 are still in effect, and the U.S. maintains a Strategic Petroleum Reserve that it could draw upon to lower the market price of oil. However, for many countries that are not part of the IEA agreement or do not have effective contingency planning, steep rises in oil prices can be disastrous. The short-term “spike” in oil prices in 1990-91 pushed India to the brink of bankruptcy and forced massive reforms in the country. Many emerging economies are today in a similar position to India in the early 1990s; the impact of sudden oil-price rises on the stability of many emerging economies is a very serious issue, with widespread political and security consequences.

Strategic Comparisons between Energy Producing Regions

Given the tumultuous history of the Middle East and the world’s growing dependence on the stability of its oil supplies, the search for reliable, reasonably priced alternative sources is a priority. This is especially the case if the expectations are that the Middle East will remain a volatile and dangerous region, which, *in extremis*, could put in jeopardy the oil supplies of Saudi Arabia. It must be noted that the Gulf countries themselves worry about their own energy needs and the increasing demand on their oil and gas to generate domestic electricity and fresh water. For this reason, the UAE and Saudi Arabia have plans to build nuclear power reactors. If these plans do not materialize, there will be even more strategic incentives to develop further oil production from the Atlantic Basin to provide a cushion on supplies.

In thinking about energy security and the importance of the Atlantic Basin, several observations are necessary. For the next decade or longer, most questions about global energy security revolve around petroleum supplies. In the future, as natural gas production and markets increase thanks to the breakthroughs in shale gas technology and increasing conventional production in Russia, the Middle East, and elsewhere, the global security of gas supplies will become a key factor in the strategic equations.

Box 6: Electricity, Fresh Water, and Nuclear Power in the Middle East

It is not only Iran who argues it needs nuclear power to generate electricity and thereby reduce domestic fossil fuel consumption. The affluent countries of the Arab Gulf all are experiencing a major surge in demand for electricity and fresh water. Saudi Arabia has plans to build 16 nuclear power plants over the next 20 years with a cost estimated at \$112 billion. The United Arab Emirates has commissioned four reactors and has signed contracts with a Korean company to oversee construction. In December 2009 the UAE and the United States signed the 123 Agreement for Peaceful Civilian Nuclear Energy Cooperation. The agreement commits the UAE to not enriching uranium or reprocessing spent fuel. All fuel will instead be purchased on the international market under IAEA safeguards. It is a matter of priority to ensure that future contracts for nuclear reactors in other Middle East countries will follow the same protocols. The fear is that unless such safeguards are in place, a peaceful nuclear plant could eventually be used to make fuel for a nuclear weapon. Given the number of unresolved conflicts in the region, this is a matter of great concern. The key conditions are no enrichment, no reprocessing, and external monitoring.

But presently, world gas markets are circumscribed by constraints on transportation. Thus, while the security of gas supplies can have a huge impact on some regions such as Central and Eastern Europe, interruptions in gas supplies do not have the same impact on the international market as occur if anything happens to petroleum supplies.

The major oil producers in the Atlantic Basin are thousands of miles apart, and while there have been many disruptions in producing countries such as Nigeria and Venezuela, North American oil supplies are unlikely to be disrupted by violence and there are no choke points or problems of access in the Atlantic equivalent to those found in the Persian Gulf and Caspian Basin. (Although China worries its oil supplies from Venezuela could be disrupted if the Panama Canal were closed.) Thus, as oil production increases in the Atlantic Basin, it will provide an important cushion in anticipating supply disruptions and the impact on markets.

The Atlantic Basin could eventually account for a high proportion of the oil and gas needs of the littoral states provided that economic and political obstacles can be overcome. Aside from cost questions — which are all-important — the great advantage of the region as a supplier is that its primary sources are spread over different continents.


The Nexus at Sea

The most effective instrument for assuring the resolution of differences over access to the largest terrestrial “commons,” the seas and oceans of the world, remains the United Nations Convention on the Law of the Seas (UNCLOS). Open for signature in December 1982 and entering into force in November 1994, it has been ratified by 154 states and the European Union. The U.S. government submitted the law to the U.S. Senate in 1994, but it has yet to be ratified. Nevertheless, U.S. government agencies, especially the Department of Defense and the U.S. Navy, have been strong supporters of UNCLOS and have adhered to its provisions on right of passage through strategic straits and its interpretations of different littoral states access to Exclusive Economic Zones (EEZs). Although China has joined UNCLOS, it vigorously disputes the interpretation of UNCLOS concerning its rights in the South and East China Seas. On the other hand, the United States, which has not ratified UNCLOS, has adopted strict interpretations of the provisions relating to off-shore boundaries very different from those advocated by China.

Since the provisions of UNCLOS are supported by all members of the North Atlantic community, it is relevant to note that virtually all maritime disputes between the North Atlantic countries, including controversies over boundaries for off-shore oil and gas fields, provisions for halting maritime pollution, sea traffic control, and access to rich fishing grounds have all been resolved peacefully.

When it comes to the governance of the commons, one must distinguish between legal agreements such as UNCLOS and regional security and economic arrangements and the basic issue of the security of resource access, including protection of the sea lines of communication (SLOCs) that bring the world’s commerce safely to its destinations.





Since 1945, the de facto control of the high seas had been first an Anglo-American monopoly and since 1971 when the British abandoned their “East of Suez” mission, a U.S. monopoly. In deploying its fleets to all the world’s most important seas and oceans, the United States believes it has been performing a service by defending the commons from potential threats. Throughout the Cold War, as the Soviet Union expanded its maritime reach, there was concern that at some point the Soviet Union would be in a position to threaten Western sea lanes. Such concerns were intensified in 1980 following the Soviet invasion of Afghanistan and the fact that such action brought Soviet troops and airpower 600 miles closer to the Persian Gulf and vital Western oil supplies.

The importance of the security of oil supplies from the Gulf will grow as Asian countries increase their demand for fossil fuel. Thus the Gulf will remain a priority for international security concerns for the foreseeable future. But increasingly, access to other major oil and gas fields has become a focus of strategic contention. To illustrate the dangers of conflict elsewhere, three cases are examined: the China Seas, the Eastern Mediterranean, and the South Atlantic. In each case, the primary resource in question is fossil fuel, but in each area there are important fishing disputes that have on occasion triggered violent incidents.

China Seas

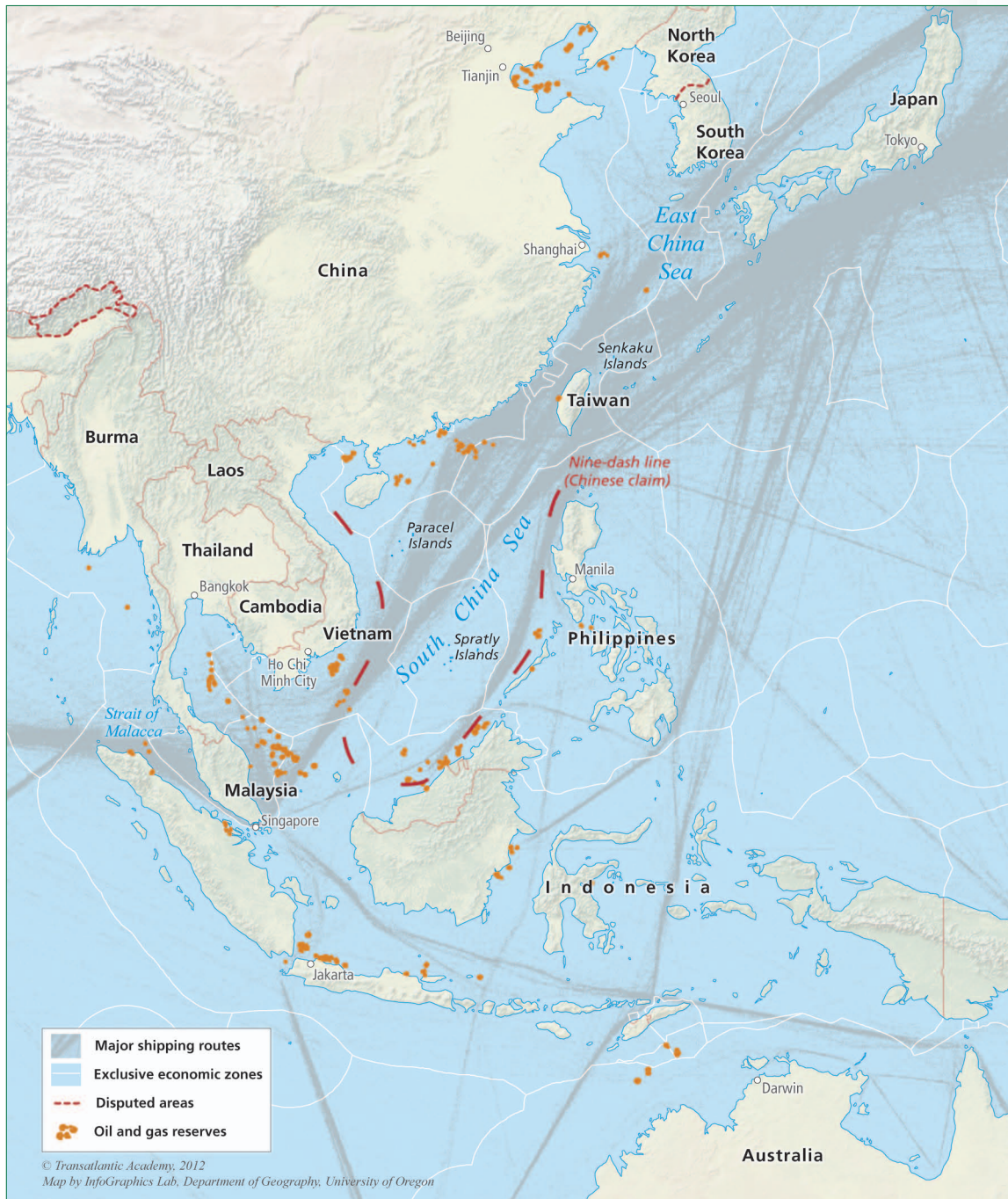
Over the past couple of decades, there has been an increase in tensions between the countries surrounding the East and South China seas. These tensions have been caused by several factors, including the rapid economic growth of China and several Southeast Asian countries, the ambiguity of maritime boundaries and international maritime law, and most importantly the discoveries of sub-seabed hydrocarbon deposits in both the East and South China Seas. There have been several violent confrontations between China and its neighbors over off-shore resources. In a dispute with Japan in 2010 over a fishing vessel, China withheld the export to Japan of rare earth metals, which are vital to its high tech industry. As tensions have risen, armed conflict is becoming a real possibility — as is seen in the rising number of maritime skirmishes and the arms buildup. Although the East and South China seas have similar details surrounding the causes and nature of their conflicts, they are also very distinct due to the nature of the actors in each conflict.

The major actors in the East China Sea conflict are China, Japan, and to a lesser extent Taiwan and the Koreans. These countries have already had a long history of tensions, armed conflicts, and disputes. The modern problems with the East China Sea including the unclear international delineation of maritime borders and laws, the growing need for hydrocarbons, and the discovery of hydrocarbon deposits have exacerbated these historical tensions.

The major actors in the South China Sea are China, Vietnam, the Philippines, Malaysia, Taiwan, Brunei, and to a smaller degree Indonesia and Thailand. The large number of actors in the South China Sea adds to the complexity of the problem. The main drivers of this case are the historical disputes between the regional powers over offshore claims paralleled by the growing demand for fossil fuel and, to a lesser degree, fish. However, unlike many other off-shore boundary disputes (e.g. Eastern Mediterranean), the disagreements about boundaries are fundamental. They derive from China’s claim that large areas of the China Seas historically fall under its

sovereignty. Thus the provisions of the UNCLOS agreements demarcating the EEZs that are accepted by the other littoral states are fundamentally not acceptable to China since it claims most of the islands in the seas. As the largest and most powerful country in the region, it believes it has both the right and the clout to have its way. But China is aware that its policies are unpopular; most of the other regional powers are eager for the United States to reassert its commitment to the freedom of the seas. Recent statements by the U.S. government, including establishing a new base

Map 5: China Seas





in Darwin, Australia, suggest U.S. maritime power will continue to be a dominant presence in the region.

The security of the China Seas is vital to the well-being of the littoral states, especially China. Most of China's Middle East oil comes by tanker through the Indonesian Straits. The most dangerous issue facing the United States and China concerns the security of Taiwan. Some believe it is China's long term intention to drive the United States out of the South China Seas and exercise direct control over the region analogous to the U.S. dominance over the Caribbean. Meanwhile a new era of gunboat diplomacy has arrived. Instability in the China Seas threatens one of the most important economic regions in the world with far-reaching consequences for both European and U.S. economic interests.

The Eastern Mediterranean

The eastern Mediterranean is witnessing a growing potential conflict involving Israel, Lebanon, Cyprus, and Turkey over the ownership of off-shore gas resources that have recently been discovered. If the initial reports of the amount of gas in these fields are correct, whoever controls them could become a major exporter to the EU. It is a case where a sensible resolution would be a "win-win" for all parties. But if this dispute becomes further entwined with the already tense relations between Cyprus and Turkey, Turkey and Israel, and Israel and Lebanon, violence is possible, which would be a disaster for all parties including the United States and EU.

There are five gas fields in the East Mediterranean Sea to which Israel lays claim. Although Israel and Lebanon are in dispute over the Tamar Field, this conflict is also a continuation of the unresolved conflict between the two countries that goes back to the founding of the State of Israel in 1948. Both countries are legally in a state of war with each other. The Israelis fear that Iran, through its support for Hezbollah, is establishing a presence on the Mediterranean, which, together with its nuclear weapons program, poses a major threat to the Jewish state.

While the disputes between Israel and Lebanon over both land boundaries and off-shore regions are serious, they would be relatively easy to resolve if it were not for the wider conflict. Both countries have submitted their own versions of the maritime boundaries to the United Nations. Under the 1982 UNCLOS, Israel can exploit resources in its economic zone, but Israel has not signed or ratified the 1982 law due to concerns of bias during arbitration. Believing part of the field to be in Lebanese waters, Lebanese officials warned against anyone acting in Israel's interest to drill in their territory, including the U.S. Noble Energy Company. The Lebanese-based Hezbollah has also been speaking out against Israeli presence at this field. Israeli Infrastructure Minister Uzi Landau responded that "Israel would use force to protect its gas fields. All statements suggest a penchant to violence if this conflict escalates. Turkey has taken an allying position with Lebanon, threatening military action against Israel if it infringes upon what Turkey deems is 'Lebanese waters.'"

Turkey and Israel are also quarreling over the Leviathan field. Turkey has rejected Israeli presence in the EEZ over which Turkish Cyprus and Cyprus are in dispute, emphasizing Turkey's "military prowess" in the region. Upon spotting a Turkish research vessel near the contested area, Israel scrambled its warplanes towards the ship. With Egypt also taking a hard stance against Israel recently, Israeli military

Map 6: Eastern Mediterranean



defense efforts may be doubled. In addition, Egypt has been the regional player to supply gas to Israel. It should be noted that the only pipeline supplying natural gas from Egypt to Israel has been attacked several times since the Egyptian uprising in January 2011.

Turkey and Cyprus remain entangled in the dispute over Cyprus and its waters. Israel, however, has made a deal with Cyprus for parts of the gas deposit, which has further angered Turkey as it believes Cyprus should not take advantage of resources until the stand-off with the Turkish-speaking north is settled. To a lesser extent, Cyprus and Lebanon are also disputing their maritime border.

Like the conflict over off-shore boundaries in the China Seas, the potential for violence over disputed claims has the capacity to bring chaos and much damage to the region. Any war between Israel and Lebanon would quickly escalate from an off-shore quarrel to a life and death struggle on land and would bring in other powers. The good news is that unlike the China Seas, the states involved do not claim entire swathes of the Mediterranean but rather they question the accuracy of demarcation lines drawn according to UNCLOS guidelines. In fact Cyprus and Israel have agreed on their respective boundaries. The problem is the unresolved Turkey-Cyprus issue and the fact that Lebanon and Israel are technically in a state of war. It is these overlying issues that make for an explosive regional cocktail. If the basic sources of conflict were resolved, all countries would benefit from developing the gas fields.

This is another example of “gun boat” diplomacy over resources. A crisis over off-shore resources involving Cyprus (a member of the EU), Turkey (a member of NATO) and Israel, (a close U.S. ally) would have very troubling consequences for the

transatlantic community. A war would be a calamity. Resolving this crisis must be a top priority for the community.

The South Atlantic and the Falklands Dispute

The South Atlantic is a region of growing importance due firstly to the economic rise of key South American and African states, especially Brazil, South Africa, and Nigeria. Second, the region is endowed with abundant minerals, off-shore fossil fuels, and fishing areas. New drilling technologies are making hitherto uneconomic off-shore deposits potentially profitable. Brazil's huge off-shore oil reserves for example may be as large as 100 billion barrels. The commodity riches of the South Atlantic are paralleled by the increasing trade and travel between the southern countries. Morocco hopes to make its airport at Casablanca a major regional hub in West Africa.

These developments have persuaded the countries of the North Atlantic to reconsider their relationships with the South and better understand the multiple developments that are changing the strategic geography of the entire Atlantic Basin.

One issue that could spark intra-Atlantic quarrels concerns the U.K.-Argentina dispute over the Falkland/Malvinas Islands. The issue of sovereignty of the Falkland Islands has been a contentious one between the two countries for the last 200 years. The Falkland Islands are about 300 miles off the coast of Argentina and possess a small number of inhabitants. The Argentinean invasion in 1982 provoked a brief but violent war with over 1,000 casualties. In the wake of the conflict, Britain has maintained a significant military presence on the islands. The Falklands have been "self governing" since 1985, with most islanders strongly attached to their status as U.K. citizens. Diplomatic relations between the U.K. and Argentina were renewed in 1989, but Argentina has never given up its claim on the islands.

Today, the Falklands issue might be more accurately regarded as a political rather than an outright security dispute. Argentine President Cristina Fernandez de Kirchner again laid claim to the Falkland Islands, and their recovery remains an unwavering feature of official Argentine discourse. The EU and the Commonwealth of Nations

Map 7: South Atlantic/Falklands



has supported the British claim, while the OAS and China have backed Argentina. The United States continues to remain neutral regarding Falkland sovereignty, as does the United Nations.

Although renewed military conflict over the Falklands is extremely unlikely, political frictions here can inhibit a new approach to southern Atlanticism, especially among NATO members. Looking even further south, overlapping claims, especially between Chile and Argentina, in the Antarctic, could emerge as an additional impediment to — but also perhaps an incentive for — a more explicit approach to cooperation in the southern basin. These cannot remain purely regional issues, given the longstanding research presence of global actors in Antarctica, and the question of access to resources in nearby waters.

Fresh Water, Food, and Geopolitics

Although access to petroleum, and more recently gas, has historically been the most clear cut case of a cause for resource conflict, the question of access to fresh water supplies could become the most divisive resource issue in the 21st century. And the focus of the most serious problems will be in Asia where huge populations, economic growth, environmental degradation, overfishing, and unresolved territorial disputes overlap.

Fresh water access is an issue as old as human history and derives from the reality that without adequate fresh water supplies there can be no human settlement, let alone agriculture and industrial development. In the folklore of the U.S. settlement of its western regions, endless skirmishes over access to water between native Americans, farmers, cattle barons has been grist for many Hollywood movies. Variants of these confrontations continue to this day, the most clear example being the struggle between farmers and shale gas producers in Texas for adequate water supplies at a time of growing demand and perennial drought.

In the Middle East and South and Southeast Asia, water conflicts are far more serious and carry the risk of armed conflict. In the case of the Arab-Israeli conflict, the prime factor has been the state of war between Israel and its neighbors since the creation of the state in 1948. Today, Israel has diplomatic relations with Jordan and many of the water disputes between the two countries, both with respect to the shrinking of the Dead Sea and the flow of water in the Jordan Valley, have been addressed in a relatively cooperative manner though no long-term solutions to the problems have been found. In the case of Israel's water problems with both Lebanon and Syria, no progress is possible because of the enduring state of war. This is a case where water disputes could become a catalyst for a confrontation but where the overriding causes of the conflict are far deeper and more complex than merely a resource question.

The Nile Basin

When we turn to the Nile Basin, it is a different story. For Egypt, access to predictable quantities of Nile water is essential for the survival of the country's large and growing population. Ninety percent of Egypt's population lives within a few miles of the Nile, with over 40 million living and farming in the wide Nile Delta on the Mediterranean. Successive Egyptian governments have made it clear to the upstream states that control the sources of the Nile that any serious interference with its flow would result in a crisis. And the problem today is that with growing populations in both Egypt



Map 8: Nile



and the upper states, the demand for the Nile is increasing both for agricultural and energy generation. The White Nile has its source in Uganda; the Blue Nile, the larger of the two rivers, originates in Ethiopia. Egypt has a long standing treaty with Sudan over the sharing of the Nile waters. This is still in effect, though no one knows what will happen now that South Sudan has become an independent state, since the White Nile will run through its territory on the way to Khartoum where it joins the Blue Nile.

Because of population increases and the evaporation of the waters due to global warming, both Egypt and Sudan need increasing water for agriculture

and consumption. Both are concerned about developments in Uganda, but more so in Ethiopia. These countries have plans that could divert some of the Nile water or slow down its flow. Ethiopia intends to build a series of dams to tap the Nile for hydroelectric power, which the country desperately needs. Egypt and Ethiopia have been in intense negotiations to try to avoid a major crisis. Egypt has long maintained that any major interference with the flow of the Nile would be considered an act of war. Negotiations between Ethiopia and the new interim leadership in Egypt seem to have lessened tensions and Egyptian inspectors will be able to visit Ethiopia to make sure no serious diversion of water takes place. The problems in Uganda are more manageable and less serious because the White Nile does not contribute as much water as the Blue Nile.

The other longer-term water problem facing Egypt is the possibility of rising sea levels in the Mediterranean caused by global warming. This could ultimately result in serious flooding of the Nile Basin, which would wreck crops and destroy the homes of millions of Egyptians.

Thus, no matter what type of political system evolves in Egypt, its destiny is uniquely tied to the Nile. It has been the source of Egypt's historic power and influence for

Box 7: South Sudan in the Wider Context of the Nile

The new state of South Sudan exemplifies the inter-state resource nexus involving fresh water, energy, and food. The country lies mid-stream along the Nile River and is rich in oil and water resource. But the appearance of this new state is exacerbating long-standing tensions between the other riparian states along the Nile. This occurs at a time when climate change is increase the stress on water and food supplies across northeast Africa, a region already blighted by poverty, malnutrition, and ill-health.

South Sudan became an independent state in July 2011, taking with it some 75 percent of Sudan's daily oil production, but the only export pipeline from South Sudan runs north through Sudan. South Sudan is totally reliant on Sudan for its oil revenues, and Sudan is reliant on South Sudan for oil supplies. As of March 2012, a dispute over the pipeline tariff remains unresolved and South Sudan has cut off the flow of oil to Sudan.

South Sudan also needs electrical power. The nearest potential source lies in Ethiopia, which has grand plans for the construction of hydro-electric dams. In turn, Ethiopia requires oil, which could be supplied by South Sudan. But the construction of dams in Ethiopia would enrage Egypt.

A major economic objective of the government of South Sudan is to develop a large agricultural sector, taking advantage of its plentiful water resources and fertile land. This requires investment, and the government is likely to seek large-scale corporate investment from the Middle East and Asia. But at the same time, it has to manage the legitimate expectations of its own people for access to land, a problem exacerbated by the absence of an established system of land tenure, by the return of large numbers of displaced people, and by past and ongoing pollution of land and water by oilfield operations.

South Sudan has not yet joined the Nile Basin Initiative or the Nile River Basin Cooperative Framework. The development of commercial agriculture will affect the flow of water to downstream states. Further, South Sudan is unlikely to press ahead quickly with restarting the construction of the Jonglei canal, a project that would increase flow of water to Sudan and Egypt but yield little benefit to South Sudan.

7,000 years. Any serious change in its flow would have disastrous consequences. The security of the Nile must be the highest strategic priority of any Egyptian government, no matter what its political ideology.

Asia's Water Crises

An equally tense situation is emerging in Asia, in this case because the downstream states who depend on rivers originating in China are worried about China's massive dam construction and the impact this will have on both the quantity and quality of water flowing through South and Southeast Asia. As scholar Brahma Chellaney has written "Water scarcity is set to become Asia's defining crisis by midcentury, creating obstacles in its path of continued rapid economic growth and stoking new interstate tensions over shared basin resources."⁵⁰ He points out that access to abundant fresh water has been an essential component of Asia's rapid growth but that within the continent, there are very few international water management protocols and, by and

⁵⁰ B. Chellaney, *Water: Asia's new battleground* (Washington, DC: Georgetown University Press 2011).



Map 9: Mekong Basin



large, water use has been grossly mismanaged. By far the most important strategic factor is China's control of the Tibetan Plateau. This elevated, enormous area of land (two-thirds the size of the entire European continent) is the incubator for all the major rivers of South, Southeast, and East Asia. These include the Yellow and Yangtze, which flow through China alone; the Mekong which starts in China but becomes the vital waterway of Vietnam, Laos, Cambodia, and Thailand; the Irrawaddy, which is Burma's main river; and the Brahmaputra, the Ganges, the Sutlej, and the Indus, which are the vital waterways of Bangladesh, India, and Pakistan, respectively. A combination of global warming-hastened glacial melt, the increase of black carbon from pollution,

and the huge hydro projects developed mainly by China threaten the long-term viability of this water storehouse, also known as the "third pole." China's actions pose a threat to populations living downstream with respect to supplies of water and food, to health, and to biodiversity. This may constrain economic development and enhance economic marginalization, which in turn may undermine domestic political stability in these downstream states. Tensions between these states and China will be exacerbated. The key obstacles lie in China's overall approach to energy and environmental policy, and its unwillingness to engage in multi-lateral river basin management institutions.

Defense Preparations and Resource and Climate Threats

Although there are reasons to be optimistic that many disputes over resources can be resolved peacefully, the reality is that the major states of the world are spending billions of dollars to protect or deny access to resources and to prevent the illegal migration of people who may have become resource refugees due to crop failures caused by adverse weather conditions or ethnic conflict. Resource-related security expenditures run the gambit from ships, aircraft, and missiles for sea lane and sea

Map 10: South Asia Waterways



denial missions to physical and electronic barricades and fences designed to keep out unwanted migrants.

Arms Procurement

Today the arms procurement policies of the Gulf countries are among the most extensive in the world. Their resources have made them rich but now they feel the necessity to defend those resources by spending billions of dollars on aircraft, missiles, and maritime assets. Similar patterns of defense procurement are visible to the east from Indonesia to Japan, with China playing the leading role in regional defense spending. States are hedging their bets against their neighbors by investing not only in military hardware, but by building infrastructure, including dams, that threatens neighbors.

An interesting case of a major new armament program related to resource protection is Brazil's multi-billion dollar effort to build a fleet of nuclear-powered submarines to patrol its huge off-shore EEZ, including deep water oil rigs. The fleet will also permit Brazil to project power far into the Atlantic and beyond. It will be part of its efforts to be regarded as a major new player in the emerging international environment. It can be expected that other South Atlantic powers with off-shore resources,



Box 8: Maldives - The Canary in the Ocean

Even skeptics of global warming are now willing to acknowledge that if there are small rises in sea levels, this poses a potentially catastrophic risk for those countries with low-lying land. Consider the case of the Maldives, a chain of 1,200 islands and coral atolls 500 miles south of India. The former president of the Maldives, Mohamed Nasheed, a far-sighted democratic leader, has taken the issue extremely seriously and campaigned around the world to alert people to the dilemma the planet faces. In an address to the Finnish Institute of International Affairs in 2010, he stated:

“The Maldives is just 1.5 meters above sea level and even a small increase in sea level would really create a number of challenges... Our water table is being contaminated through sea water intrusion and therefore we have issues to do with food security. Ocean temperatures are rising and therefore fishing and fish stock and our fish catch are dwindling. We have a number of challenges and issues and if you think this is a thing to do with the Maldives, and up in Iceland or down in Australia you are safe, you are very misled.”

It is possible that the Maldives archipelago could vanish this century unless monumental expenditures are undertaken to build protective walls for some of the larger islands. The cost is probably prohibitive. For this reason, Maldives leaders are talking about contingency plans to relocate the population over a number of years.

Fortunately, the Maldives continues to be a haven for rich tourists who come to enjoy its tranquility and beautiful island settings. This is enabling the government to establish a sovereign wealth fund to prepare for the day when they all have to leave. But where will they go? Natural destinations would be South Asia, specifically India and Sri Lanka, which are close by and where they have strong cultural, ethnic, and religious ties. And since there are only 300,000 islanders, such a transfer is not out of the question.

This outcome would be ideal, but in reality the process is likely to be much messier and more violent. One problem is that many of the outlying islands in the archipelago are uninhabited and under no direct authority. They have therefore become ideal hiding places for smugglers, pirates, and terrorists. Those outer islands that still support population and agriculture will be vulnerable to encroaching salt water, which will destroy fresh water supplies and ruin farming and interrupt fishing. In other words, as the Maldives gradually succumb to rising sea water levels, the poor will be effected the most and will have to migrate to the larger islands, posing social and political challenges for the leadership.

including Argentina and Nigeria, will eventually also upgrade their maritime defense capabilities.

The melting of the Arctic ice packs and the thawing of the huge permafrost regions of northern Canada and Russia has already generated talk about a “race for the Arctic.” Although it will be many years before the infrastructure for exploiting Arctic resources becomes viable, governments are already taking out insurance policies and increasing investments in maritime military assets to protect their potential bounties. However, to date, while there have been some blatant outbursts of nationalism over the ownership of the Arctic, this remains a open region that has so far been remarkably free from conflict unlike the cases cited above (See Box 9).

Box 9: Cooperation in the Arctic

Climate change is opening up the Arctic. Sea ice around the North Pole is decreasing year by year and the vast permafrost areas in Russia and Canada are thawing. These processes have exposed treasure-troves of oil, natural gas, and minerals, yet a rush for the Arctic is not expected in the foreseeable future. In addition, leaving the occasional nationalistic rhetoric out of consideration, the states surrounding the Arctic have so far cooperated on the future challenges that the region faces.

There is a possibility that cooperation could end, however. Despite global warming, the Arctic is still inhospitable and the obstacles to extract resources are enormous. There is no infrastructure to support extraction and facilitate transport to the markets, technologies to extract resources in the bitter cold are too expensive to make a sound business case with current prices, and a skilled workforce is not in place. In the longer run, permafrost thawing may prove to be the greatest obstacle to Arctic development.

So far the governance of the Arctic has evolved peacefully and is expected to continue to do so. An Arctic Council was established in 1996, building on the momentum of a 1987 speech by Mikhail Gorbachev calling for the Arctic to be a “zone of peace.” The Council, which includes Russia, the United States, Canada, Denmark, Norway, Finland, Iceland, and Sweden, has reached agreements that advance cooperation on oil spills and drilling disasters. In addition, it has agreed to take firm stands on the topic of climate change that affects the whole region, something that some of the individual members such as the United States, Canada, and Russia have often refused to do in public. Most of the geographical disputes in the region have also been agreed upon, the Canadian Northwest Passages a rare exception.

There have been some provocative gestures and signs of growing nationalism, reminding us that peaceful cooperation is never a given. Yet despite these incidents, encouraging signs of cooperation and wise, if limited, development of resources, prevail. The biggest challenges are likely to come from climate change and permafrost thawing that affects, in particular, the approximately 4 million local inhabitants of the region.

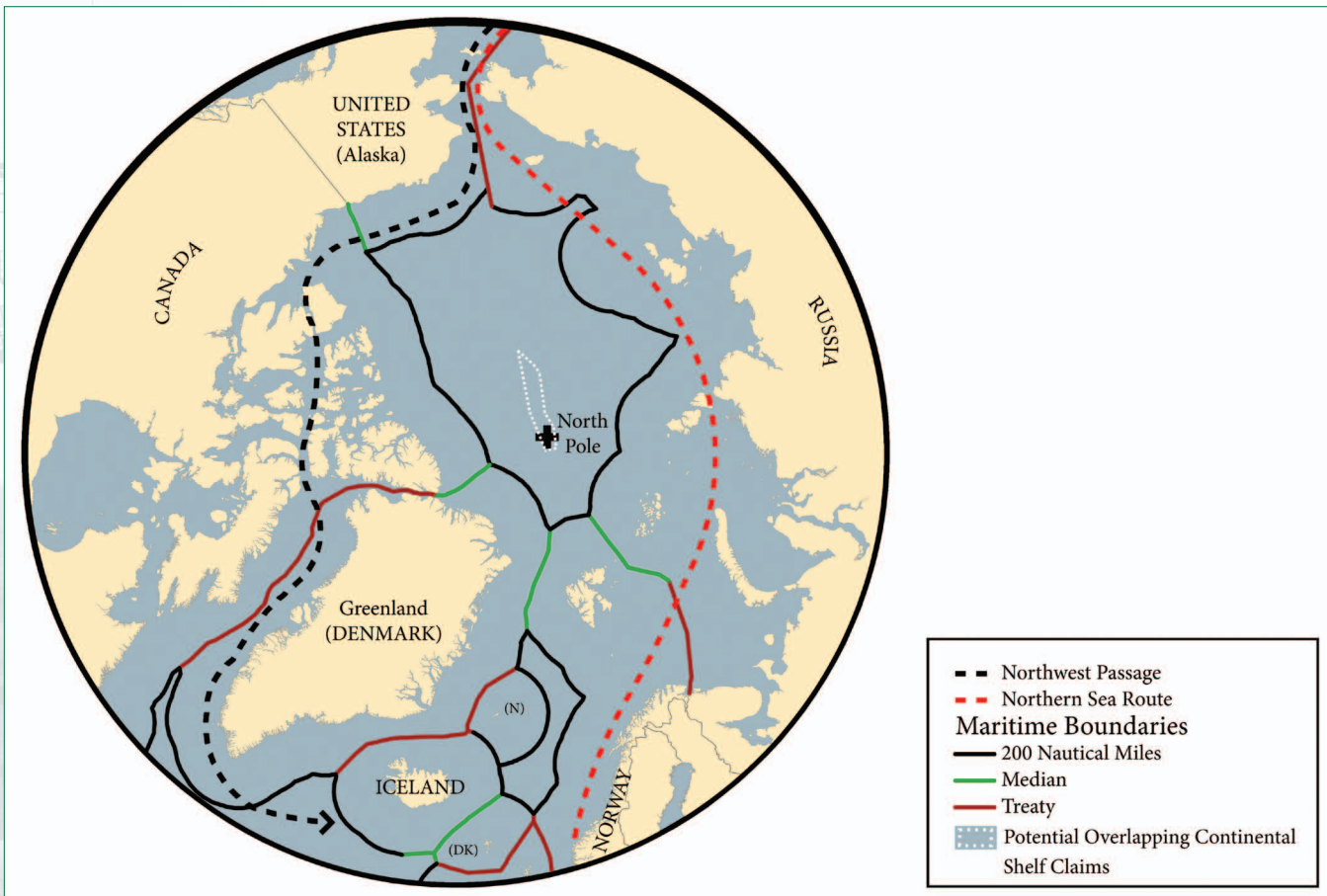
Conflict and Cross-Border Migration

If global warming continues to change weather patterns in central and eastern Africa, an increase in the evaporation of fresh water sources, together with greater periods of drought, can put at risk more and more arable land at the very time that demand for agricultural products is growing. In parallel, the demand for fresh water for both agriculture and energy generation is also reaching new heights. In regions such as the Nile and Mekong basins, disputes over access to fresh water are growing at the very time that the productive capacity of the arable land is threatened by climate change. The direct consequences are that, absent efforts to achieve greater cooperation among the states who share the water, unilateral efforts to secure access could well lead to further conflict.

Indirect consequences of climate change and depleted water and food supplies are most evident in the increasing numbers of people migrating across Africa in the hope of finding refuge and employment in countries to the North, primarily in the oil states



Map 11: The Arctic



of the Gulf and Europe. (Until the Libyan civil war, Libya was another destination for those seeking employment.) Predictably, the chosen route for many migrants is through those countries that have few effective barriers or check points. Yemen is a case in point: it has become a dangerous but open route for ultimately reaching the Mediterranean and then onto Europe or into Israel via the Sinai desert.

While migration itself is a coping strategy, wealthier destinations also have pursued a variety of strategies to limit and otherwise regulate the arrival of economic migrants, sometimes preemptively, but these strategies are not without their own risks. The first decade of the 21st century, for example, saw more kilometers of border fortification being built along international borders than during the entirety of the Cold War.⁵¹ Fences and walls along borders between the United States and Mexico and Israel and the West Bank receive ample media coverage, but others have been built more or less under the radar.

Starting in 2003, for example, Botswana began constructing a 500 km long, 2.4 meter tall fence on its border with Zimbabwe. For reasons related to its status as a pariah white settler state (1965-79) and then as a troubled single party state under the rule of Robert Mugabe (since 1980), Rhodesia, now Zimbabwe, has actively discouraged

⁵¹ S. Rosière and R. Jones, "Teichopolitics: Re-considering Globalisation Through the Role of Walls and Fences," *Geopolitics* 17/1 (2012) pp. 217-34.

the international mobility of its citizens. At the same time, the country has faced near economic ruin that has propelled large numbers of Zimbabweans — men as itinerant laborers, women mainly as traders of small cash items — to seek opportunities abroad, mainly in neighboring Southern African countries. Meanwhile, Botswana, as a result of a prosperous mining sector, was the fastest growing economy in the world for many years from the 1970s to the 1990s. As such, it became a favored destination for skilled and unskilled migrants from throughout Southern Africa. In a situation that mirrors in certain ways developments in North America, liberalization of trade via formal institutional arrangements, such as the Southern Africa Development community (SADC) and the SADC Free Trade Agreement of 2008, was accompanied by increasing regulation of irregular migration. Irregular migration is viewed by many in Botswana as a significant and growing problem as confirmed by recent survey data. Official justification for the electrified border fence and the 10 km buffer zone is the threat of foot-and-mouth disease spilling over from Zimbabwe and devastating Botswana's lucrative cattle export industry.

And then there is India. While many reasons underlie India's construction of a fence along its border with Bangladesh, prominent among them is the Indian government's concern about instability that future climate-induced migration could present for India. The World Bank estimates that a relatively modest rise in sea level could put nearly 20 percent of Bangladesh's delta land under water, potentially dislocating hundreds of thousands. IPCC models of climate change predict that cereal grain production in the country could fall by between 10-30 percent.⁵² Heavier monsoons will be compounded by increased Himalayan glacial melt, causing higher, more frequent floods. While the government of Bangladesh has put billions of dollars into making the country less vulnerable through flood management and protection schemes, shelters, and agricultural improvement, the realities of what is required to address the challenges adequately are overwhelming.

Migration need not cause instability — indeed European and North American cases suggest that migration can be mutually beneficial. However, predictions of a massive increase in migration due to environmental stresses should give pause to policymakers. Climate change-induced scarcity is a major factor in prompting Sahelian Africans to move northward to Europe, causing EU entryways such as Lampedusa and Melilla to highlight Europe's inability to cope. Border enforcement in the EU is being increasingly supra-nationalized, through the creation of Frontex, which has been charged with coordinating enforcement among the member states and sharing best practices.

Conclusions

From the perspective of the traditional transatlantic community (the North Atlantic), the good news is that virtually all the latent quarrels between states over ownership, access, and monitoring of on-shore and off-shore resources have been resolved peacefully. This includes potentially divisive off-shore boundary disputes, access rights to North Atlantic fishing areas, and procedures for assuring the safety of maritime traffic in congested areas such as the North Sea. Nevertheless, there are two potential resource problems that could become serious issues involving Europe and the United States. Both require continuous diplomatic attention. Most urgent is the

⁵² http://www.americanprogress.org/issues/2009/12/on_the_move.html.



Table 2: Twenty-Five Barriers Erected or Substantially Fortified Since 2000. Most of these are officially justified by the initiating countries as targeting immigration, terrorism, or both.*

Year Started	Initiating Country	On Border With
2000	Israel	Lebanon
2001	Uzbekistan	Afghanistan
2001	Turkmenistan	Uzbekistan
2002	India	Bangladesh
2002	Israel	West Bank
2003	India	Pakistan
2003	China	North Korea
2003	Botswana	Zimbabwe
2003	Saudi Arabia	Yemen
2004	India	Burma
2004	Thailand	Malaysia
2004	Kuwait	Iraq
2005	Brunei	Malaysia
2005	United Arab Emirates	Oman
2006	United States	Mexico
2006	Kazakhstan	Uzbekistan
2006	Saudi Arabia	Iraq
2007	Pakistan	Afghanistan
2007	Iran	Pakistan
2009	Uzbekistan	Kyrgyzstan
2009	Burma	Bangladesh
2010	Israel	Egypt
2010	Iraq	Syria
2011	Greece	Turkey
2011	Azerbaijan	Armenia

* R. Jones, *Border Walls: Security and the War on Terror in the United States, India, and Israel* (New York: Zed Books forthcoming).

situation in the Eastern Mediterranean where the discovery of abundant off-shore gas and maybe oil has triggered a serious political problem with the potential for military confrontation between Turkey and Cyprus and also between Israel and Lebanon. This case is similar to many in Asia and Africa where pre-existing territorial disputes become embroiled in new confrontations over potentially rich resources. If Turkey and Cyprus had settled their long-standing disagreements over Cyprus and the demarcation of its off-shore EEZ, this part of the dispute would be eminently solvable. More difficult is the potential confrontation between Israel and Lebanon over the off-shore boundaries since both countries have been in a state of war with each other since 1948. Ensuring that these disputes do not escalate to the point where military conflict is possible must be a top priority for the transatlantic community.

Of less immediate concern, but nevertheless potentially troublesome, is the future of the Arctic where global warming is offering the prospects of new sea routes to Asia and a potential treasure trove of off-shore resources including oil, gas, minerals, and fish. To date, the contentious disputes about boundaries have been resolved, especially between Norway and Russia, and any outstanding questions about the North West passage between the United States and Canada are not going to upset the close ties between the two countries. However, it is not only the Arctic powers that are involved. The Arctic Council already admits three non-Arctic members,

Sweden, Iceland, and Finland. China is seeking an association, which suggests the potential for a more international approach to the management of the region. But for the next decade or so, it is likely that while important, the region will not command the high priority that other resource areas do.

The Persian Gulf remains the tinderbox that draws in all the key players and where the importance of its fossil fuels shows no sign of diminishing. Any conflagration in

the Gulf, whether over Iran's nuclear activities or conflict spreading from Yemen, would put at risk the vital oil transport sea lanes that have now become essential to the economic well-being of both the region, the OECD countries, and, increasingly, the emerging great powers of Asia. The clearest barometer of the level of tension in the Gulf is the huge sums of money all the local states are spending on their security needs. This includes not only arms procurement but massive investments in defenses for infrastructure and the protection of sea lanes. Of less importance for its resources but equally dangerous as an arena for conflict are the China Seas, through which so much of the sea-borne trade with the rest of the world flows. This is a region where disputes over access to resources could become a catalyst for wider conflict given the many unresolved issues between the neighbors and the determination of both China and the United States to assert their respective interpretations of freedom of the seas as well as the parallel high levels of military expenditure from all the local powers.

In the future, access to fresh water may replace fossil fuels as the primary source of potential conflict in Asia and Africa. The main reason is the extraordinary growth in demand for fresh water by two-thirds of the world's population, who are experiencing unparalleled economic growth, putting great demands on not only water, but also on food, agricultural land, fertilizers, and hydroelectric power. As outlined above, the problem is that there are no binding agreements between upstream and downstream states on the fundamentals of water management, but there are many unsettled territorial disputes that in many cases are not directly related to water issues. But as in the case of the China Seas, pre-existing conflicts can turn relatively minor disputes over water into matters of intense nationalism.

The problems raised by the impact of climate change on regional security are only just beginning to be fully understood. But if there are more and more incidents of severe weather caused by global warming together with rising sea levels, the worldwide impact will be great but it is in the poor regions of Asia and Africa that it will first manifest itself in a potentially catastrophic manner. As sea coasts, islands, and land become victims to climate change, the potential for mass migrations of peoples will increase and with it the parallel security concerns of countries who fear they will be overwhelmed by such migrations. Hence the growing number of barriers and fences being built are to keep people out.

The transatlantic community will have to work with the key Asian, Middle Eastern, African, and South American countries to help resolve their resource disputes. But as the influence of Western "hard power" gradually diminishes and they cut back on military budgets, more and more security issues outside the North Atlantic will be the responsibility of others. Efforts to facilitate regional conflict resolution must be given high priority while the West still has power and influence. The priorities for Europe should be the Eastern and Southern Mediterranean, the Horn of Africa, and sub-Saharan Africa. It is in these regions that Europe still has influence and is directly threatened by escalating conflict and increased illegal migration. For the United States, with its more global agenda, the security of the Persian Gulf, the Indian Ocean, and the South and East China Seas must remain a priority. However, it must be accepted that financial deficit, war fatigue, and priorities back home will make the application of U.S. hard power less likely in the most critical areas in Asia, especially where the United States and China have very different goals and objectives.



CHAPTER 4

RETHINKING HUMAN SECURITY: THE NEXUS ON THE GROUND

It has been described as the “world’s worst commute.”⁵³ In much of the world, the daily slog by millions of people to provide themselves and their families with the necessities of everyday life takes many hours a day, and provides some of the rawest evidence of competition for natural resources. In parts of the Global South, the burdens of fetching water, firewood for cooking, and transporting harvested food home or to market take up much of a day’s work, sometimes an eight hour ordeal that dwarfs any imaginable transit ordeals of Washington or London. Often this work is gendered; in many parts of sub-Saharan Africa, for example, the vast majority of these tasks is carried out by women and girls, and as much as eight hours per day can be spent simply getting water, leaving little time for girls to attend school. The effects of deforestation in Africa mean that gathering fuel for cooking involves ever longer commutes, usually by foot. Climate change, changing property rights regimes, and a growing population increase stresses on systems of provision that provide the daily essentials to about 3 billion humans who are outside of the formal labor markets and social safety nets of wealthier societies.

Were this daily slog simply an “over there” problem, it would be tempting to ignore as beyond the core interests of the transatlantic community. The reality, though, is the nexus on the ground is at the center of many of the security challenges facing the Global North, and argues that the “everyday politics” of resource consumption and allocation form a crucial part of the nexus.⁵⁴ Moreover, the daily allocation and misallocation of resources in highly localized contexts has an impact on the largest number of people in the world and also pose risks for the transatlantic community. To look at the nexus on the ground, three arenas of particular concern are addressed:

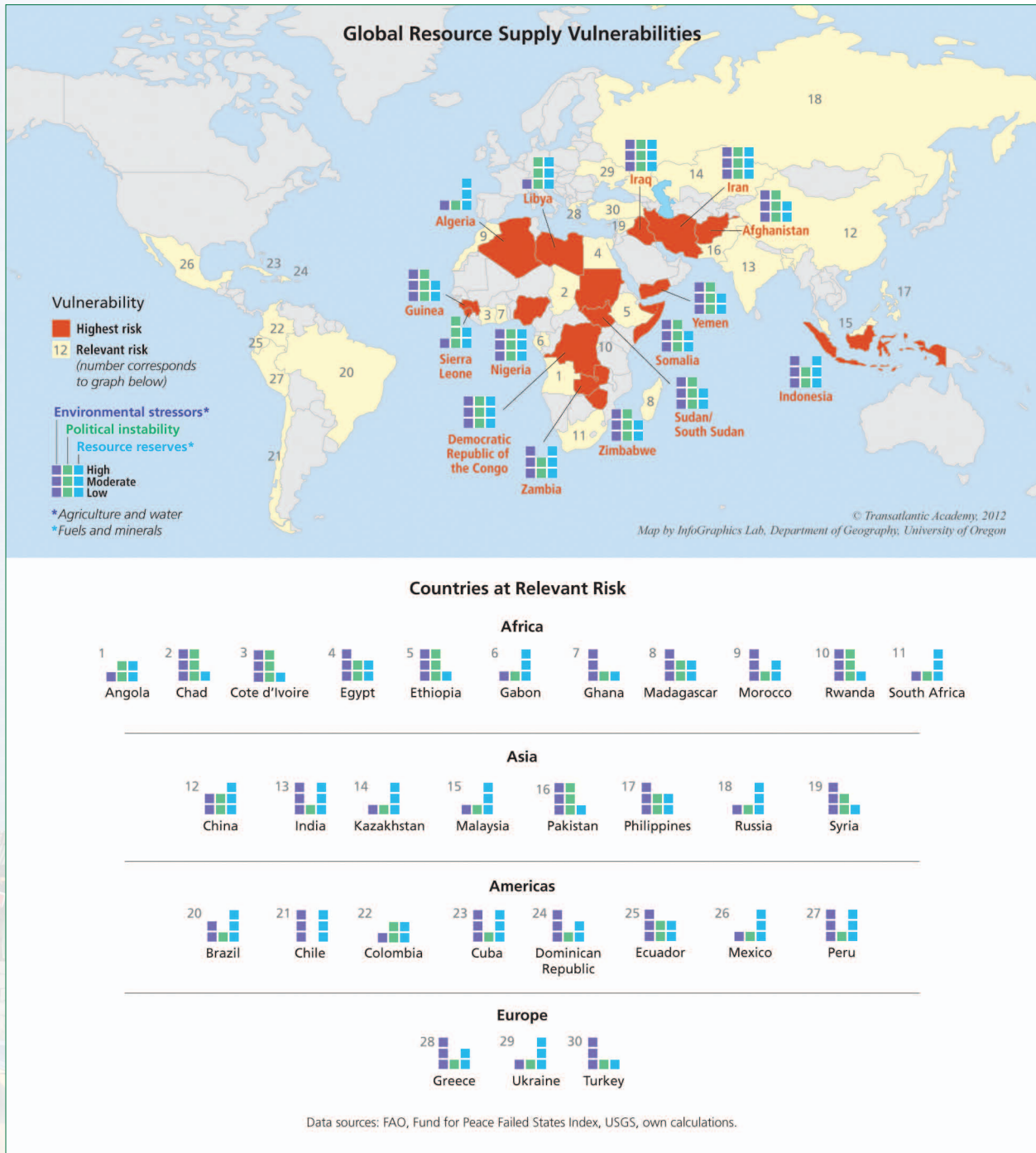
- Migration as a mechanism for coping with the resource nexus;
- Urban spaces where the resource nexus will become more pronounced as cities continue to grow; and
- Ungovernable spaces on the fringes, where struggles over resources are most pronounced and the ability of government to intervene is least (see Map 12 and Figure 6).

⁵³ <http://anzacart.org/>.

⁵⁴ B.J.T. Kerkvliet, “Everyday politics in peasant societies (and ours),” *The Journal of Peasant Studies* 36/1 (2009) pp. 227-43.



Map 12: Global Resource Supply Vulnerabilities



Conflicts starting as intrinsically local or regional processes of resource competition are important to the transatlantic community for two reasons: first, and most obvious, small-scale conflicts have the potential to blow up and become issues of transnational concern; and second, viewed in the aggregate, the daily resource conflicts impact a high percentage of the world's population on any given day, yet they have received far less attention from policymakers than headline events such as the Arab Awakening or the Gulf crisis. They have the potential to impact Europe and North America in

Box 10: Subsistence Crises: “Famines are not what they used to be”¹

Just as interstate wars have become much less common in preceding decades, large-scale famines caused by poor harvests rarely occur anymore. Less than 8 percent of the victims of hunger die during food emergencies. Instead they die from the daily risks associated with not having enough nutrients. These silent victims include the elderly, babies whose mother cannot produce enough milk, and rural residents whose ability to produce food have been curtailed for a variety of reasons.

Given the increasingly localized nature of hunger, where are the solutions to be found? Is the answer further liberalizing an already global system of food production and distribution where sudden price shocks can very quickly cause hunger in local communities? Or is it in “localizing food power” and putting the tools for food sovereignty in the hands of individuals? The literature provides no easy answers to this. What is clear is that vulnerability to hunger results from poverty, plain and simple, and poverty exists throughout the world. One-third of the world’s population does not get enough essential micronutrients, though 85 percent receives adequate protein and energy and a good number get far too many calories. While agricultural outputs will likely increase in Latin America, Asia is expected to experience additional food stress. All of this suggests that the 21st century may be one characterized by “global subsistence crises,” where the ability to put food on the table differs family by family, but when you add up all of those families, you have a crisis. Resilience strategies for coping with subsistence crises entail integrated land and water planning, more effective local governance institutions, and improved market access for farmers.

¹E. Vanhaute, “From famine to food crisis: what history can teach us about local and global subsistence crises,” *The Journal of Peasant Studies* 38/1 (2011) pp. 47-65.

the form of supply chain interruptions, terrorism, and uncontained regional resource conflicts.

Against the backdrop of prevailing megatrends such as the accelerating effects of climate change, the increasing mobility of the world’s population, rapid urbanization, and a shifting center of gravity in global power away from the North Atlantic, the 21st century is also likely to be one in which access to and competition over natural resources presents governance challenges from global to local scales. These challenges raise very difficult questions: What are the tipping points from local stresses resulting in violent conflicts? What institutional arrangements have been successful in tackling such issues? In spite of their importance, the means at the disposal of the transatlantic community to intervene in these challenges are often limited.

Drivers of Local and Regional Conflict: So What’s New?

Environmental change, in particular climate change, and urbanization will be major drivers of the conflict over natural resources at local and regional scales.⁵⁵ Extreme weather events in recent years — such as heat waves in France (2003) and Russia (2010) and the worst single year drought on record in Texas in 2011 — have been linked to a confluence of previously known contextual weather patterns *and* global

⁵⁵ World Economic Forum, “More with less: Scaling sustainable consumption and resource efficiency,” Report; P.H. Gleick, ed. *The World’s Water, volume 7: Biennial Report on Freshwater Resources* (Washington: Island Press 2012).



warming.⁵⁶ Food and fiber production, energy production, minerals production, and the availability of water can all feel potentially negative impacts from climate change in many regions around the globe; well-worn livelihoods in particular places will become untenable, forcing adaptation or migration. While crop yields could increase at mid- and high latitudes, negative effects are expected in many of the poorest parts of the world, which are often found at low latitudes. The poorest countries can anticipate overall a 5-10 percent loss of cereal grain production, with some marginal areas experiencing upwards of 20 percent lower cereal production.⁵⁷ This has implications for both incomes and nutrition. Local and regional resilience strategies will therefore be key to deal with the shocks associated with environmental change. Urbanization has multiple impacts not only on environmental change, but also on the capacities for humans to adapt to environmental change. Cities present different, but no less difficult, challenges for coping with resource scarcity.

In addition to the threats to major food producing deltas from sea level rise, “dustbowlification” is likely to occur in many areas well away from the oceans, decreasing food production by depleting water availability. Forty-one percent of the earth’s land is considered drylands, and 38 percent of humans live in dryland areas.⁵⁸ Humans have been coping with the nexus on drylands for all of their history — living at the margins of agricultural productivity, water, and energy availability. More recent changes to the climate system combine with poor land use practices and population pressures to make dryland populations some of the most consistently ecologically, socially, and politically vulnerable populations.

The impacts of changing climate are not limited to outside the transatlantic community. In places such as California, where the delicate and complex system of water provision, electricity generation, and food production are perhaps most apparent, climate change is likely to have devastating economic ripple effects. Those most vulnerable to environmental changes are rural agriculturalists, pastoralists, wage laborers, urban poor, refugees, and destitute groups not capable of work. But also any industry dependent upon water or energy, given the well-documented water-energy nexus, will see increasing challenges due to a changing climate system. In drought-prone Texas, semiconductor makers Intel and Texas Instruments used 11 billion gallons of water in 2007 — a drought-induced shutdown of these manufacturers could cost hundreds of millions of dollars with numerous value chain effects.⁵⁹ The nexus is also apparent for energy producers in Texas, where the state’s worst drought on record in 2011 forced oil and gas producers to cut production and buy water from farmers and ranchers, who were already hard-pressed for it. Some estimate that one-third of counties in the contiguous U.S. states will face additional water stresses by mid-century (see Map 13).⁶⁰

⁵⁶ http://www.ipcc.ch/pdf/special-reports/srex/SREX_FD_SPM_final.pdf

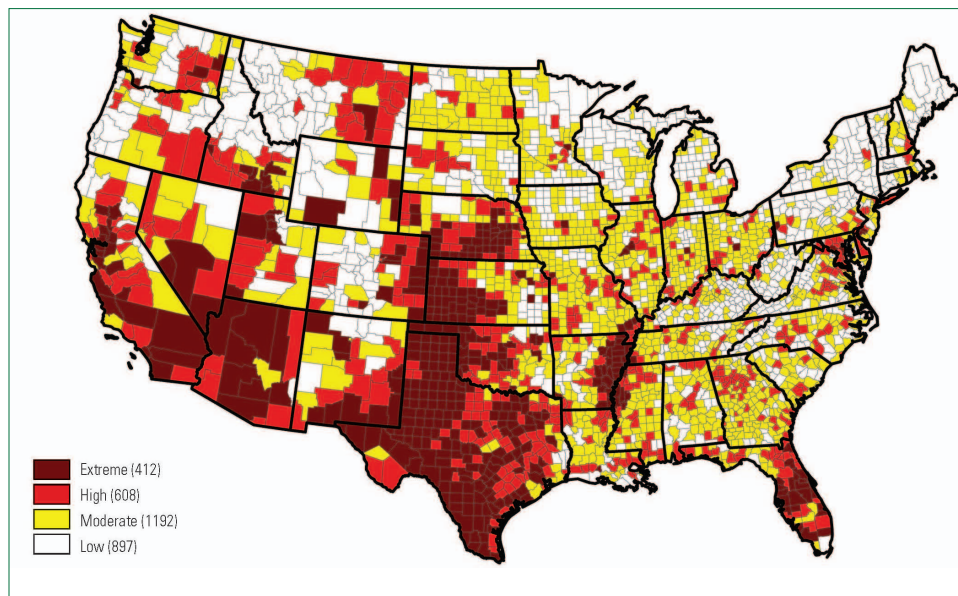
⁵⁷ A.J. McMichael, et al., “Food, livestock production, energy, climate change, and health,” *The Lancet* 370/9594 (2007) pp. 1253-63.

⁵⁸ J. Romm, “Desertification: The next dust bowl,” *Nature* 478/7370 (2011) pp. 450-51; J.F. Reynolds, et al., “Global desertification: building a science for dryland development,” *Science* 316/5826 (2007) pp. 847-51.

⁵⁹ Pacific Institute, “Water Scarcity & Climate Change: Growing Risks for Businesses & Investors,” Pacific Institute and Ceres Report (2009).

⁶⁰ <http://www.nrdc.org/globalwarming/watersustainability/index.asp>.

Map 13: Water Supply Sustainability Index (2050)
With Climate Change Impacts¹



¹ <http://www.nrdc.org/globalwarming/watersustainability/index.asp>.

In addition to climate change, demographic and geographic changes in population will profoundly alter the landscape of competition for natural resources in local and regional contexts. The 21st century will be an urban century. In 1800, 2 percent of the world's population lived in cities; by 1900, it was 14 percent.⁶¹ By mid-2009, more of the world's population lived in urban areas than in rural areas. There were nearly 600 cities of at least 750,000 people in 2009, and by 2050, more people are likely to live in cities than were in the entire world in 2004. Most of the growth will be occurring in the Global South. By 2025, for example, while Tokyo is still projected to be the most populous urban agglomeration, three cities in South Asia will be in the top five (Delhi, Mumbai, and Dhaka), each with over 20 million inhabitants. For Dhaka, that would represent a 46 percent increase in population over 2009. And like Dhaka, many megacities in Asia tend to be located on megadeltas. In other words, population growth is occurring in the places most vulnerable to, and least able to cope with, environmental change.

The Nexus on the Ground: Risks and Threats

The local and regional-scale dynamics of resource competition present an almost endless set of possibilities for risks, threats, and opportunities. To illustrate, the following section presents three arenas where the resource nexus at local and regional scales potentially creates human insecurity, fosters knock-on effects for political and economic stability, and exacerbates existing intergroup rivalries or conflicts.

Picking Up and Moving: Resource Competition and Migration

People migrate for many reasons. Political repression, fear for physical safety, ethno-religious violence and tensions, environmental pollution, and other factors can play important roles, but most decisions to migrate center on very basic questions of

⁶¹ Reuben Abraham, http://voices.washingtonpost.com/davos-diary/2011/01/welcome_to_the_urban_century.html.

Box 11: Land Rush

Large-scale land acquisition in the global South for agriculture, mineral extraction, tourism, and forest conversion has a number of implications for local food supply routes and livelihoods. Driven by population growth and disproportionate consumption by a global minority, the land rush is likely to continue well into the future. The nature of these investments involves mainly agricultural land (bought at bargain basement prices), the lion's share of which is intended to be used for biofuel production. The Land Matrix project estimates that 40 percent of acquired land is for biofuel crops, versus 25 percent for food crop production. Since biofuel crops are typically intense water users, the lands being sought are those with reliable precipitation or in irrigable river basins (Niger, Nile), which creates not only competition for land but also freshwater. The Land Matrix project reports that between 2000 and 2010, over 200 million hectares of land were involved in sales for such purposes (about the equivalent of one Greenland, or just short of 50 Netherlands in land area). Most of these deals occurred in Africa.

As one would expect, it is the rural poor that receive the disproportionate impacts of such deals, through outright evictions or loss of customary uses of grazing areas, forests, etc. For the 2 billion humans dependent on small-land holdings, tying up land in a global market creates additional incentives for migration since the promised jobs on new croplands rarely materialize because of the highly mechanized nature of agro-production. The land rush is hardly a purely "local" phenomenon, as it is driven by global food prices, European and North American biofuel legislation, and other commodity markets. But the impacts are very local. The absence of effective governance at local and regional levels, moreover, helps to ensure that the potential benefits of this land rush are not felt by these populations.¹

¹W. Anseeuw, et al., "Land Rights and the Rush for Land: Findings of the Global Commercial Pressures on Land Research Project," International Land Coalition Report (2012); J. Guinan, et al., "Filling in the Gaps: Critical Linkages in Promoting African Food Security, An Atlantic Basin Perspective," German Marshall Fund of the United States Report (2012).

making a living. In much of the world, making a living is quite literally about putting food on the table. When circumstances coalesce to make providing for one's family increasingly difficult, one's propensity to pick up and move grows. The threshold for migrating differs individually, of course, and depends also on political and cultural contexts. And while some migrate to cities within their country, others migrate transnationally. The combination of circumstances can include:

- changing land tenure regimes, which change the ability to grow food and could force farmers off land they had have been using;
- local environmental changes that may increase scarcities of water and lower crop yields;
- sea level rise and land being taken out of productivity due to submersion or salinization;
- instability of prices for basic foodstuffs; and
- human perceptions of certain places being lands of opportunity.

Of particular concern here are “environmental migrants,” a category that is expected to increase in the future. A U.K. government report has concluded that natural hazards pressures will increase the desire or need of vulnerable populations to migrate, just as their ability to migrate is more constrained.⁶² In Syria, for example, climate change and severe water shortages have displaced some 500,000 members of the Inezi tribe, many of whom now inhabit the restive suburbs of the major cities in the west of the country.⁶³

Fence-building and securitization practices are not just limited to international borders. The “gated urbanism” in cities throughout the world, where elite enclaves are separated from poorer surroundings, is a growing phenomenon linked to the same differentiation processes that cause states to fortify borders. Cities are wheels of innovation and progress, but also places of yawning, and often growing, inequalities. Such differences manifest themselves in the physical landscape in places as diverse as Cape Town, Washington, DC, and Moscow; in all three cities, and indeed in most of the world’s cities, the elite cope with inequality by building walls to separate themselves from the “dangerous” outside.

Cities, Water, and Food: The Future of Urban Conflict?

In 2010, of the 3.5 billion living in cities, 900 million lived in slums.⁶⁴ Urban design and planning are overwhelmed by the sheer number of new urban residents. The growth of cities will not be primarily in the transatlantic community and many these megacities’ names will not even ring familiar to most residents of Europe and North America (e.g. Chongqing, Ahmedabad, Chittagong, Belo Horizonte, Foshan).

By virtue of their densities — of population and built environment — cities tend to magnify and accelerate many of the challenges of the nexus. Massive land uses changes associated with urbanization impact not only human health, but also species diversity, hydrology, and local climate (the well known urban heat islands). The OECD predicts that places such as Kolkata, Dhaka, Shanghai, Miami, and Rotterdam will be some of the most vulnerable to sea-level rise, with a tripling of the population at risk from coastal flooding by 2070 and a tenfold increase in global GDP exposed to the risk.⁶⁵ Cities also have an impact on global climate: they are the main source of greenhouse gases in the developed world.⁶⁶ Cities are also most vulnerable to the impacts of climate change. Yet planned and well-managed cities can also be part of the solution to the challenges faced, and cities are also sites of innovative solutions.

Water provides an excellent entryway into the urban resource nexus. For a variety of reasons, water infrastructure has not kept up with the pace of urbanization, while drought, contamination, and other forms of scarcity mean that needs are not always met. Water leakages in municipal systems are the cause of huge amounts of waste

⁶² Foresight: Migration and Global Environmental Change, “Final Project Report,” The Government Office for Science Report (2011).

⁶³ A.J. Al-Tamimi, “Chaos: The new ‘status quo’,” *Ha’aretz* (February 17, 2012).

⁶⁴ The annual rate of population growth in cities is projected at 1.8 percent, almost double that of overall population growth, taking the total urban population from 3.5 almost 5 billion in 2030. While the percentage of people living in slums decreased over the last decade, the actual number of slum dwellers increased due to urban population growth. Of this 1.5 billion growth, 50 percent will occur in Asia and 30 percent in Africa.

⁶⁵ S. Hammer, et al., “Cities and Green Growth: A Conceptual Framework,” OECD Report (2011).

⁶⁶ N.B. Grimm, et al., “Global change and the ecology of cities,” *Science* 319/5864 (2008) p. 756.

Box 12: From Chinatown to a Quantum of Solace

The growth of Los Angeles was driven by massive engineering projects designed to move freshwater from other parts of California and the U.S. West to the city. Roman Polanski's film *Chinatown* brilliantly captured this history. Past may be prologue and LA's past hydrological struggles could be a primer in what to expect in the future, not only in other southwest U.S. cities such as Las Vegas and Phoenix, but also in many other parts of the world.

The politics of water in cities will become more charged in the future as users of water become ever more spatially congregated in cities, particularly in those cities expanding across vast stretches of desert. Cities such as Merida, Bangkok, and Dakar, which rely on pumped water from aquifers, face diminishing returns as water tables are recharged slower than withdrawals, while pollutants from urban areas such as nitrates and chloride contaminate groundwater. In South America, as many as 100 million people depend on glacial melt waters, but those glaciers are melting fast.¹ Several cities in Bolivia are faced with the prospect of not having enough water for daily needs. "Water wars" in Cochabamba (2000) and El Alto (2005) pitted angry citizens against the politics of water privatization schemes promoted by the World Bank and other institutions (these stories provided the seeds for the James Bond film *Quantum of Solace*). While corporations such as Bechtel received much-deserved ire for sweet, closed-door deals and 40+ percent rate hikes in Cochabamba for the poorest residents of the city, the underlying problem, of course, is the fact that you have in Cochabamba and El Alto, as well as La Paz large and growing cities and dwindling sources of fresh water. This perfect storm is repeated in many other parts of the world. Competing with domestic consumption are uses such as agriculture and mining; to those urban residents lacking reliable access to fresh water in La Paz, it is of little solace when precious water is pumped away for other uses.

¹ E. Rosenthal, "In Bolivia, Water and Ice Tell of Climate Change," *New York Times* 13 (December 14, 2009).

of this precious resource. Governance failures common in global South occur when failure to consider needs of poor lead to disincentives for water utilities to connect certain neighborhoods to network.⁶⁷ In Jakarta, for example, unofficial estimates suggest that only 25 percent of population is connected to a water supply, while a mere 2 percent is connected to sewer, resulting in contamination issues. In 19th century London, New York, or Berlin, the "bacteriological city" — rising awareness of water-borne pathogens and better hygiene and epidemiology to address the risks — resulted in water revolutions and massive infrastructural investments for the public good.⁶⁸

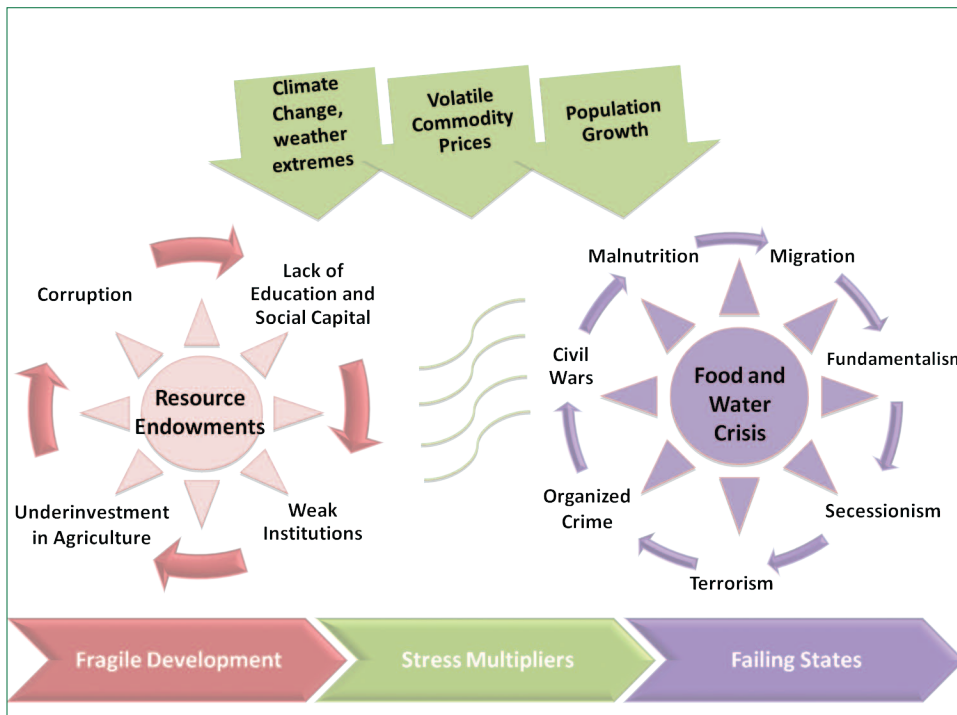
Water transfers and appropriation of water from agricultural to urban uses in places such as Hyderabad, India, present further evidence of the nexus in cities.⁶⁹ In the slums of the Global South, meanwhile, residents can pay as much as 10 times more per liter of water than the wealthy in the same city. In parts of India and elsewhere,

⁶⁷ K. Bakker, et al., "Governance failure: rethinking the institutional dimensions of urban water supply to poor households," *World Development* 36/10 (2008) pp. 1891-915.

⁶⁸ M. Gandy, "Rethinking urban metabolism: water, space and the modern city," *City* 8/3 (2004) pp. 363-79.

⁶⁹ M. CELIO, et al., "Urban-agricultural water appropriation: the Hyderabad, India case," *The Geographical Journal* 176/1 (2010) pp. 39-57.

Figure 6: The Wheels of Fire



Source: Transatlantic Academy

industrial scale wells draw groundwater out at rates that cause community access well to dry up, centralizing control of water in the hands of the state or private sector and denying it to poorer locals. Irrigation is widely mismanaged in India, leading to large amounts of waste while presenting a key opportunity for water savings. In cities from Brazil to Indonesia, internationally backed attempts to privatize urban water and “price it right” have produced broad social conflict (see Box 12). Finally, water, and particular bodies of it, are viewed by many across countries and continents as sacred and culturally meaningful. This, too, has often complicated the privatization and centralization of its allocation and use, making normative agreement on its governance all the more difficult.

Moreover, “urban” water is usually not sourced locally, which means that competition for access to water in cities can potentially spill over into regional or even interstate issues. Take the case of Johannesburg. The city exists because of a particular geology that caused a gold-bearing reef to be exposed.⁷⁰ Unlike most agglomerations of its size (11 million), Johannesburg is not located on a river, lake, or ocean; in fact, it is perhaps the largest city without a waterfront of any sort. This major city, in a relatively dry climate, was built around a mining industry heavily dependent on water. Currently, the water supply is provided by inter-basin transfers from the two major watersheds (Orange and Limpopo), which the city straddles. Worth noting is that the Southern African Hydropolitical Complex involves four key states, and at least with respect to water, there has been mainly cooperation in the past over water. But growth coupled with increasing scarcity raises questions as to whether Johannesburg’s water supply can be maintained as it has for more than a century.

⁷⁰ A. Turton, et al., “Gold, scorched earth and water: the hydropolitics of Johannesburg,” *Water Resources Development* 22/2 (2006) pp. 313-35.

Weak and Failing States: The Problem of “Ungovernable” Spaces

Humans are increasingly mobile across long distances. Migration is indeed a coping strategy for many, but it cannot and will not be a universal solution to the problem of a lack of access to resources. There will also be those who for whatever reason choose to cope with resource scarcity *in situ*. For them, the lack of effective institutions in their communities and at the regional and national levels have an impact on a daily basis the effective allocation of natural resources such as land, water, food, and energy. In places lacking effective state control, a Hobbesian dynamic of bare existence can emerge, one in which life is nasty, brutish, and short.

Those in the transatlantic community who “benefit” from hundreds of billions of dollars in subsidies for energy, food, water, and fisheries are seeing the rewards of overconsumption; those in the global South where governance is weak and ineffective see few of these benefits and pay disproportionately for their basic needs.

Large parts of Afghanistan, Pakistan, Sudan, and Somalia see these impacts, but also sections of large cities such as Mumbai, Sao Paulo, and Lagos. Not just central state authority is implicated here, but also urban governments unable to cope with rapid growth. Ineffective taxation regimes — a common governance failure — create a situation in which investments in infrastructure do not occur and mean that farmers cannot get their crops to market efficiently. While interventions by well-meaning NGOs may assist market access, a road is something that only the state is in a position to build. is the same is true for the lack of clear property rights.

Table 3: Types of Property-Rights Systems Used to Regulate Common Resources⁷¹

Property rights	Characteristics
Open access	Absence of enforced property rights
Group property	Resource rights held by a group of users who can exclude others
Individual property	Resource rights held by individuals (or firms) who can exclude others
Government property	Resource rights held by a government that can regulate or subsidize use

It must be noted that it is not only bandits and terrorists who are attracted to the ungovernable regions. In some of the most remote parts of Latin America, Asia, and Africa, a lack of effective regulation can lead to local labor, including children, being recruited to work at low pay in appalling conditions to extract high value gold, diamonds, ores, and phosphorus.

Human security is basically an individual concern, but the factors that enhance or undermine individual security and access to resources and services are often externally driven including upstream use of water, polluters making livelihoods untenable, and mining and extraction substituting for agriculture. Common resources, or those natural or human-made goods for which use by one reduces the availability of the resource for another, under some circumstances foster cooperation, but can and often do lead to conflict in others. Governance of common resources

⁷¹E. Ostrom, et al., “Revisiting the Commons: Local Lessons, Global Challenges,” *Science* 284/5412 (1999) pp. 278-82.

Box 13: Energy Security, Energy Poverty

Energy security has traditionally been framed in terms of states. The reliance of a state's domestic consumption of energy and how much of that energy is sourced domestically is supposedly a measure of broader security in an international system. Of course, people experience vast differences in their access to energy within states, too. Energy security at the human scale is more a question of energy poverty: am I able on a daily basis to access the energy I need to cook and complete all of the other tasks that require energy such as transport, lighting, heating, and telecommunication? The International Energy Agency estimates that 20 percent of the world's population (1.4 billion) does not have access to electricity, and 40 percent uses extremely inefficient biomass burning for cooking (wood, dung, charcoal, crop residues, etc.).¹ Moreover, this situation is not likely to improve in the future. Traditional biomass usage results in an estimated 1.45 million premature deaths from inefficient combustion, and the number of these deaths is projected to increase over the next few decades. In hydrocarbon-rich places, such as Nigeria, some residents resort to tapping pipelines — at great risk to their health and safety — to gain access to fuel. While the problem of energy poverty is most pronounced in the Global South, North America and Europe are by no means immune. In the United States, energy poverty is often about lacking adequate sources of fuel to keep the home at a comfortable temperature. This phenomenon is still widespread in spite of government efforts to assist those in poverty, such as Low Income Home Energy Assistance Program (LIHEAP), which has been targeted for cuts by recent austerity measures. Particularly in the United States, inefficient homes often combine with general poverty to make this a perennial challenge.²

¹ International Energy Agency, "Energy Poverty: How to make modern energy access universal?," IEA & OECD Report (2010).

² C. Harrison and J. Popke, "Because You Got to Have Heat": The Networked Assemblage of Energy Poverty in Eastern North Carolina," *Annals of the Association of American Geographers* 101/4 (2011) pp. 949-61.

in local areas typically involves attempts to mitigate the tragedy of the commons by managing property rights and limiting free access, and there is much debate over whether this is an effective governance response. The legal and regulatory contexts around property rights vary widely across space, just as the ability to adapt to scarcity also varies widely, and are particularly problematic in transboundary contexts.

All of this underscores a trend notable for the transatlantic community: "small wars" will be more common in the future than the major conflagrations of the 20th century.⁷² In such Clausewitzian small wars, it is often incredibly difficult to isolate causes of conflict, since the micro-foundations often are multiple, ongoing, and thus difficult to resolve. As such conflicts are typically not orchestrated by clear terms of engagement, the locations of small wars also tend to be spread out in difficult terrains such as mountainous areas or urban areas. Small wars can and have spread to neighboring jurisdictions, since by definition they are not fought on the formal basis of sovereign states. They also typically provide impetus for migrating, with refugees crossing borders to escape war and the associated economic ruin. As the drug wars on the streets of some U.S. cities illustrate, such migrants can bring their home conflicts with them. While causes are not easy to discern, what is clear is that resource conflict is

⁷² B. Korf, "Resources, violence and the telluric geographies of small wars," *Progress in Human Geography* 35/6 (2011) pp. 733-56.



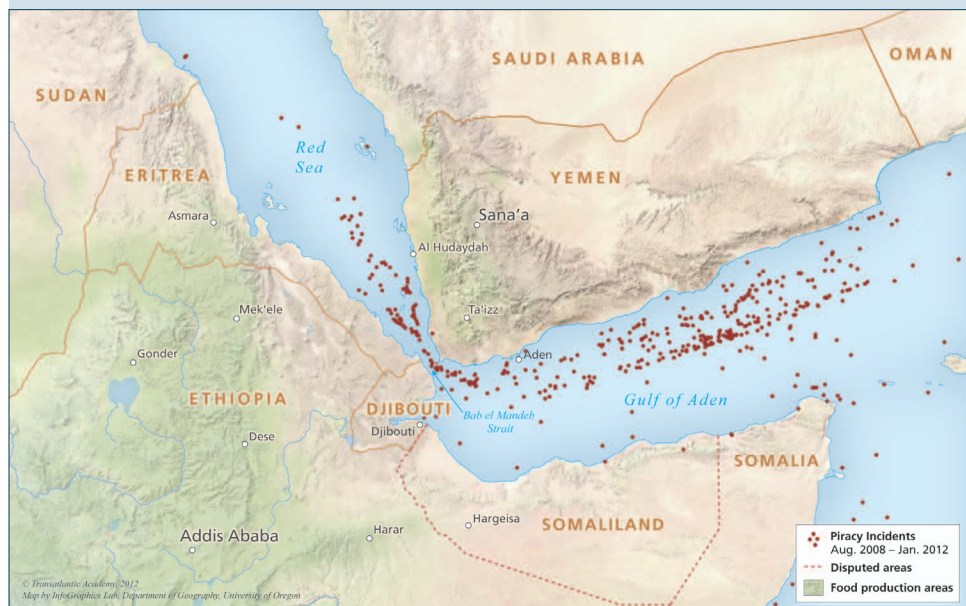
Box 14: Yemen - The Next Failed State?

With a population of 24 million and a high birth rate, Yemen's fresh water supplies are running out. Its primary export earner, oil, is running out, and high food prices have pushed over 7 million to the brink of starvation. The interaction of these nexus issues is taking place against a backdrop of illegal migration, sectarianism, terrorism, smuggling, piracy, and highly contentious regional geopolitics.

Yemen sits astride the Bab el Mandeb Strait, through which all sea traffic the between Europe and Asia via the Suez Canal must travel. With Somalia — a truly failed state — to the south, it is not difficult to appreciate the great geopolitical stakes involved if Yemen fails. It has become a favored transit route for illegal immigration from African countries as migrants seek refuge from famine and political repression and try to find their way to Europe. Put all these factors together — resource depletion, civil war, terror, geography, and immigration — and you have a case study of how the resource problems of Africa impinge on Yemen. Now Yemen poses a threat to its neighbors, especially Saudi Arabia and Oman.

The capital, Sana'a, is literally running out of fresh water. The underground natural aquifers have been depleted by wasteful usage for agriculture. The preferred cash crop in Yemen is a mild narcotic leaf called qat. It is profitable, and farmers can sell it for cash in markets in one day. However, it needs a great deal of water to flourish. To try to get the Yemenis to stop producing qat will take far more than hand-wringing. There have been many studies on how to solve the water crisis, particularly in Sana'a. Aside from reducing qat production, there is no other way to bring fresh water to Sana'a that is cost effective. Eventually, the entire city of Sana'a may have to be moved. This would cause huge political and social upheavals at a time when Yemen is already in the throes of political mayhem and its population is one of the most heavily armed in the world (after the United States and Serbia).

Map 14: Piracy Incidents around Yemen



If Yemen fails, the consequences for the region and the security of the vital sea lanes will be in jeopardy. In addition, it is unclear where, if Yemen fails, the millions of refugees should go. Neighboring countries have failed (Somalia), could be on the verge of regional conflict (Eritrea/Ethiopia), have their own hands full with domestic problems (Saudi Arabia), or have no interest since other issues have not been solved (e.g. border disagreement with Oman). This is a classic case where poverty, geography, and internal violence, together with a large population that is underfed, undernourished, and running out of water, can have a profound impact on one of the most critical regions of the world. This is also why it is so important that Yemen establish a new government that has the support of the people as quickly as possible.

If Yemen joins Somalia as a failed state, they will, between them have 4,931 kilometers of unsecured coast line. It would be an anarchical arena adjacent to some of the most important shipping lanes connecting Europe to Asia. And it would pose a major threat to Saudi Arabia and the security of the Gulf, which remains vital for the economic well-being of the Atlantic powers.

often central to small wars — either as a mechanism of contention or in perpetuating a conflict begun primarily for other reasons. Resource endowments in tradable commodities such as oil and diamonds can fuel and foster conflict, but it is less clear how the nexus of small scale resource competition — the daily struggle for survival — is related to conflict. It is an area that merits more study from researchers and policymakers alike.

Governance Opportunities

The resource nexus challenges described in this chapter arise from a variety of governance deficiencies and failures. At one extreme lie the failed states in which national government is effectively absent and civil conflict has destroyed local institutions for managing common pool resources (e.g. Yemen, Somalia). Once peace and physical security can be secured, these cases require basic state-building measures accompanied by institution-building at the local level. At the other extreme lie well-governed spaces where sophisticated governance institutions are stretched by the challenges posed by the resource nexus, most notably in the tension between the supply of energy or minerals, on one hand, and food or clean water, on the other. Governance deficiencies often arise from silo/stovepipe governance structures in which each resource is managed by separate agencies with little communication between them. Very different social conditions and norms in different parts of the world, such as in terms of norms of water governance, are often simply irreconcilable, making one-size solutions untenable.

In between these two extremes lies a spectrum of situations in which local populations struggle to meet basic needs in states that are, more or less, well run. In addition to the problem of silo governance, there are four further distinct sources of governance deficiency relating to the resource nexus:

1. Unintended consequences of economic or social policies. The most common examples relate to the pricing of water and food. If water is priced too low, then it is wasted, particularly by the agricultural sector, but also in domestic uses that

Box 15: Urban Mining — Mining Anthropogenic Stocks

Cities are full of recyclable materials. “Urban mining” is an approach that looks at existing urban areas as a potential mine of the future. Following the observation that the concentration of materials in urban areas and in other anthropogenic stocks comes close to raw material concentration in traditional mining areas, the idea translates into business opportunities.

- Identification of anthropogenic stocks of materials, be it at disposal sites that can be re-opened, in urban areas, in infrastructures or capital goods;
- Engage recycling companies in this process, including public administrations; and
- Recover materials from various areas and products.

Austria, Switzerland, and Germany have assembled congresses and demonstration projects on the issue. Researchers at Yale University and elsewhere undertake estimations of such anthropogenic stocks. Good prospects exist in urban areas of Asia where the first wave of housing becomes outdated around the year 2025.¹

Map 15: Estimated anthropogenic stocks of aluminum worldwide

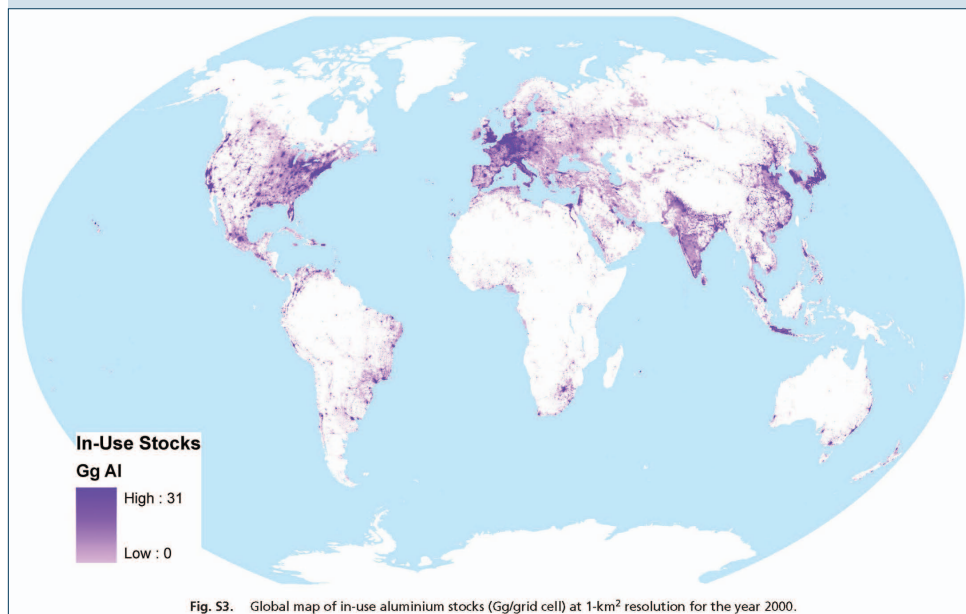


Fig. 53. Global map of in-use aluminium stocks (Gg/grid cell) at 1-km² resolution for the year 2000.

Source: Jason Rauch, Yale University.

¹<http://www.urban-mining.com/>.

are taken for granted (long showers, washing machines, etc.). If food is priced too low, farmers have no incentive to produce.

2. The inability of the existing governance structures to react to events or new trends. Many of the major trends mentioned repeatedly in this report have impacts on nations and local communities: population growth, urbanization, climate change, and commodity price volatility. The speed of change in many

cases is so fast that existing governance structures are unable to react to these changes, let alone anticipate them.

3. Actions by higher levels that disrupt long-standing local institutions for resource governance. In many parts of the world, communities have age-old practices and informal rules for managing land and water, which continue to be relatively effective. National governments have a tendency to replace these traditional patterns of land tenure with modern, legalistic approaches. These steps may be taken in a belief that modern practices will result in the more sustainable use of land and water (often drawing on advice from international organizations and aid agencies), but in many cases they result from actions taken by elites to gain control of the resources for themselves or to attract large-scale foreign investors. Either way, sudden changes of land tenure disrupt living patterns and damage livelihoods.
4. The failure of higher levels of government (national or provincial) to provide frameworks for local communities to manage their resource challenges. Although many communities apply traditional practices and technologies to manage their natural resources, population growth and the desire to improve standards of living result in a need to adapt these practices and technologies. Instead of imposing solutions from above, national governments should instead create the governance space for communities to develop their own solutions. This will include providing access to finance, technology, and advice. The Natural Resource Charter is a good example of an internet-based governance tool that could be employed to address some of these issues.

In many ways, cities are emblematic of all of these governance deficiencies and opportunities. But cities need not be this bad, as they have a number of intrinsic advantages that lend themselves to the efficient use of natural resources, on account of the high density/intensive use of land and resources, short distances for transport, and the opportunity to inter-mix living, work, and retail space.

Sustainable urbanization principles as applied in “eco-cities” or “smart-cities” could combine the best resource-efficient materials with the best IT technologies to deliver carbon neutral, zero-waste cities. These would be built with locally sourced and environmentally sound materials, utilizing emission-free, smart transit and road systems, ecologically sound housing, and urban food production methods. They should also include suitable systems for social support and integration. Although a few such cities are being designed and built (e.g. Songdo in Korea and Masdar in the UAE), the practice is not widespread. Even if it were, the greater challenge is to retrofit or adapt existing cities that suffer from a very high degree of path-dependency.

The direct threats from the poor management of natural resources and infrastructure, and from the poor human conditions in many cities include:

- The inability to attract investment to support economic development, and the movement of wealth creators to other locations, leading to a vicious cycle of under-investment and growing poverty;

- This in turn will lead to a growing sense of injustice among much of the population, with the consequent risk of political unrest; and
- Human suffering for most marginalized groups with attendant risks for violent conflict.

Rethinking Human Security

The European Union's effort to rethink its security doctrine for the 21st century in 2004 resulted in the Barcelona report, whose first line read: "Many people in the world lead intolerably insecure lives."⁷³ This was recognition of what this chapter argues: biopoverty and the daily slog to secure resources are major security concerns in and of themselves. The Barcelona report was perhaps a high water mark for attempts to rethink the risks, threats, and opportunities around human security. To refocus a security doctrine on the small scale, individual feelings of security and insecurity that humans around the globe feel on a daily basis was revolutionary. It is precisely attention to the small scale questions of "just getting by" that have the potential to make the greatest advancements in well-being for the most people. Security with a capital "S" — geopolitical praxis as described in the previous chapter — is deeply interrelated with small "s" security of the quotidian variety as described in this chapter.⁷⁴ These challenges are made even more pressing by demographic trends, urbanization, and environmental change. The resource nexus reveals itself at both scales, but in different ways. Rethinking human security can occur in a variety of ways, some of which are listed below.

- Reconnect ideas of human progress and economic development with the biosphere.⁷⁵ A planetary boundaries approach is just what is needed in light of the billions of people who are the verge of becoming part of a global middle class, with all the additional consumption that comes with such a shift. Attention should be given to human-environment interactions related to climate change, how our activities impact biodiversity, and how threats to biodiversity profoundly affect humans.
- The security and insecurity of humans is globally interconnected. National security, global security, and individual security are inseparable concepts. The question of power is crucial here: who has the power to act, where, and under what authority. Focusing only on states — waiting for central authorities in world capitals to act in the face of conflict over resources, hunger, lack of access to water, etc. — neglects the possibilities for action on the ground that stand to prevent very real suffering. Redoubling efforts to promote the international development communities programs on access to water, sanitation, and hygiene would do a great deal in promoting global security.⁷⁶ Cities should create a global urban learning community, learn from each other how best to provide the basics to the most people, and take appropriate action. The transatlantic community can act specifically in this regard by coordinating its development aid, investment, and

⁷³ http://eprints.lse.ac.uk/40209/1/A_human_security_doctrine_for_Europe%28author%29.pdf.

⁷⁴ C. Philo, "Security of geography/geography of security," *Transactions of the Institute of British Geographers* 37/1 (2012) pp. 1-7.

⁷⁵ C. Folke, et al., "Reconnecting to the Biosphere," *AMBIO: A Journal of the Human Environment* 40/7 (2011) pp. 719-38.

⁷⁶ Roberts, *Global governance and biopolitics: regulating human security*.

trade policy in the broader transatlantic community (i.e. including the Southern Atlantic).

- The path to development has historically entailed an ever-growing consumption of natural resources. Only when development and resource intensiveness are decoupled will the world be on the path to a sustainable, safe, and secure future.⁷⁷ The transatlantic community can offer guidance in statecraft and global governance, but a great untapped potential lies in our shared expertise in urban planning. Our global future is an urban one; planning sustainably for cities as the home to most of the population will be essential to addressing the fundamental challenges faced. As China has discovered recently, planning for urban growth is expensive and requires investments and incentives. The Dutch Environmental Assessment Agency (PBL) has likened this to creating an “energetic society”: by recognizing the planet’s urban future, and capitalizing on the creative potentials, agglomerative advantages, and sustainability potentials in urban areas, urbanization can be an opportunity to create a better future. The world cannot afford multiple replications of Phoenix, Arizona, but there are also great untapped opportunities for developing energy production, for example, through residential solar arrays and windmills.
- Land, water, and energy management are fundamentally interlinked with livelihood management. Suitable land for agriculture is limited locally and globally, just as fresh water and available forms of energy are limited. This does not have to mean that there are hard limits to growth, as has been proposed in the past. But it does mean that how growth is defined will inevitably need to be revisited. Efficiency improvements are sometimes hard won, but the rewards are worth the price, as the example of urban mining suggests.

This chapter makes the case that the everyday politics of resource consumption and allocation on the ground form a crucial part of the nexus. Coming up with specific policy recommendations to address the nexus on the ground is perhaps the most daunting challenge in the report, since this scale of the nexus is least amenable to the governance tools available to the transatlantic community. Nevertheless, there are sensible steps that can be taken to reduce the impacts of the nexus on the ground.

A New Hanseatic League of Urban Governance

The urban future described throughout this report presents an unparalleled opportunity for global policy learning originating in cities and spread through the networks that link those cities globally. “Transnational municipal networks” (TMNs) create the potential for addressing many of the challenges of the resource nexus, from managing scarce water resources to sharing sustainable urban and design practices and pollution remediation best practices. Examples of formalized TMNs include the Climate Alliance, Cities for Climate Protection, and Energie-Cités. Such networks contribute to effective governance by shaping debates and informing strategies for addressing common challenges. The potentials for ground-up, progressive learning centered on sustainable resource futures are great. For best practices to be shared, a global learning community of cities — a new Hanseatic League of urban governance — should emerge, one that encourages interchange between municipal governments

⁷⁷ PBL, “The energetic society. In search of a governance philosophy for a clean economy,” PBL-Netherlands Environmental Assessment Agency Report (2011).



and civil society alike. Particular emphasis should be put on the second- and third-tier cities that will experience explosive growth in the next decades, and where the most positive impacts can be made by planning effectively for that growth. Both the United Nations and global NGOs can play an active role in facilitating such a development (UN Habitat has extensive programming on information sharing), but there is much more that can be done on the resource nexus.

Establish Global Food+Water+Energy Facilities

There should be a global food and water financial facility to increase the level of capital investments to expand local food production, especially to eradicate hunger and poverty, combined with infrastructure development programs. This facility should leverage private money, micro-credits and corporate equity. It should establish regional roadmaps to support technology development and applications in areas that are increasingly suffering from droughts and a lack of local food production and distribution facilities. Furthermore it should develop mechanisms to stimulate large-scale rollout of applications to address food/energy/water challenges at the local level, such as introducing solar cookers, reducing food waste and municipal water leakages, and establishing better irrigation management. In addition, the transatlantic community should actively support existing initiatives to address energy poverty, such as the UN's Sustainable Energy for All.

Code of Conduct/Model Agreement on Land Use and Purchase

The international governance of natural resources and of transnational investment is supported by a number of codes of conduct and model agreements that are used by governments and international companies. Examples include the many model contracts and agreements produced by the Association of International Petroleum Negotiators, and well-established agreements for sharing freshwater and fisheries, as well as various codes of conduct and guidelines on transnational investment produced by such organizations as the UN, OECD and the International Chambers of Commerce. These codes and models aim to provide standards for investor behavior, frameworks for managing shared or disputed resources, templates for foreign investment conditions, and pathways for dispute resolution. But none of these codes of conduct or model agreements explicitly address large-scale foreign investments in land for commercial agriculture. This absence has resulted in investor-state arrangements that threaten the sustainability of resources and the livelihood of communities. The transatlantic community should persuade the UN to draw up appropriate codes and models, and should encourage the host and home state governments to enforce them.

Multi-Stakeholder Forum

The transatlantic community should take the initiative to develop a multi-stakeholder forum to monitor the extraction and use of resources worldwide, to discuss opportunities for better management and resource efficiency, to exchange experiences of handling transboundary management of water, to articulate concerns over migration and other resource disputes, and to discuss long-term perspectives. This forum would include public and private sector actors as well as civil society.

CHAPTER 5

MEETING THE CHALLENGE: TRANSATLANTIC RESPONSIBILITIES AND OPPORTUNITIES

This report highlights both the policy relevance and the complexity of resource nexus challenges, from the governance of markets at many levels, international to local, to the reduction of geostrategic risks between states to the pressing needs associated with human security and the risks of local and urban conflicts. Resource-related constraints, and the effectiveness and fairness of the governance of multiple resources, underpin broader challenges at global, regional, national, and local levels. Each of the three previous chapters — on markets, international security, and human security on the ground — concludes with a set of agenda items and recommendations for actors within and beyond the transatlantic community.

The interconnectedness of global resource challenges present threats to transatlantic actors and interests, including those associated with supply chain interruptions and increased economic volatility, risks of interstate and local conflicts and violence, and increased poverty and declines in human security. Yet, a host of opportunities for transatlantic leadership are also identifiable, such as potentially significant gains in resource efficiency; the conversion of resource endowments into more sustainable development, increased prosperity, and greener growth; and myriad opportunities to address persistent political and security conflicts through engaged cooperation and institution building. This report clusters analysis under four broad themes, seeking to speak to policy audiences inside and outside the transatlantic community. Four areas for further analysis are suggested: 1) “Getting our own house in order” focuses on responses within and among the EU, United States and Canada; 2) Engaging “the wider Atlantic” seeks to expand our notion of trans-Atlanticism where resource issues are concerned; 3) “Working with new players” offers ideas about how to better integrate transatlantic interests and concerns with those in rapidly growing developing countries and the many critical resource exporting states; and 4) “strengthening global cooperation” argues that transatlantic actors must reinvest and reinvigorate some aspects of global institution building to address the many resource-related challenges.

Transatlantic Options: Meeting Global Challenges Starts at Home

For North Americans and Europeans, meeting the challenges of governing the resource nexus starts at home. Certainly there are plenty of differences across the Atlantic, and among actors on each side, Europe has moved faster to develop clean technologies and markets for renewable energies and resource efficiency, while the



Figure 7



Source: Transatlantic Academy

United States and Canada are at the forefront in the production and distribution of unconventional energy resources. Yet both sides share many interests and values, and all are deeply integrated economically and socially. Putting the transatlantic house in order means accepting responsibility and taking action, by redoubling our efforts to learn from each other, better coordinating policies, creating new markets, and working to set positive examples in a more global world. Financial and economic crises in recent years have strengthened the case for joint leadership; establishing a barrier-free transatlantic market place for trade and investment along the lines below should be a long-term objective.

As listed in Figure 7, the report supports initiatives in several broad areas including doubling resource efficiency in less than 20 years; working together to transition toward sustainable energy systems; coordinating efforts to properly price resources by reducing unsustainable subsidies and pricing carbon and other wastes and pollutants; rethinking our ideas of “the good life” and economic growth based on ever-increasing resource consumption; working together to resolve disputes in the transatlantic neighborhood; and reinvesting in global leadership by ratifying treaties and reforming transatlantic and global institutions. If any one of these sets of tasks were simple, they would have been accomplished already. Together, this set of conclusions seek to reframe and reassert transatlantic leadership based on shared economic, security, ecological, and humanitarian interests.

Engaging the Wider Atlantic

The Atlantic Basin — North and South — is endowed with substantial reserves of energy fuels and minerals, and opportunities to increase sustainable agricultural production and food security.

Vast and increasing amounts of natural and financial resources (legal and illicit) flow within and across the wider Atlantic region. Brazil is emerging as a powerhouse for biofuels, and, like much of South America, it is rich in agricultural, mineral, and fossil fuel commodities. Geographically, it is relatively close to West Africa, where countries such as Morocco, Nigeria, Angola, and South Africa are now significant players in the commodity markets. Transatlantic leaders should actively promote policy platforms for wider Atlantic cooperation that recognize resource development trends and potential, as well as the environmental and social consequences of such development. Improved cooperation across the wider Atlantic could enhance technology development and transfer and human and administrative capacities, and could leverage market access among the increasingly integrated countries around the region.

In practice, engaging the wider Atlantic requires building shared knowledge and shared forums in which to learn jointly and cooperate. Early-stage projects might include establishing knowledge centers for coordinating mapping of resources reserves and extraction rates and agricultural production, fisheries management, and water trends. Other initiatives may include improved coordination of development initiatives, international and domestic, aiming toward more sustainable growth and development, as well as the construction of a wider Atlantic technology policy platform to better align biofuels-related research, development, production, and trading goals. Finally, a host of inter-state disputes and transnational security challenges need sustained, high level attention and increased cooperation between leaders across the wider region, from the Falklands/Malvinas and Morocco/Western Sahara issues, to the burgeoning set of problems associated with the drug trade, human trafficking, and other illicit markets.

Engaging New Players

The major players in world commodity markets and international resource politics consist of the G20 states, a number of additional key suppliers (for example, Malaysia, Peru, Zambia, Kuwait, Iran, the UAE, and Central Asian energy producers) and large private and state-owned multinational firms. To date, transatlantic leaders have often failed to coordinate their engagement of these countries, or to engender common standards among firms in various resource sectors. Done sustainably, mutually beneficial development of natural resources can yield tangible economic benefits, technological advances, and societal well-being. Indeed key industries should participate, and their experiences should be used to formulate better policies. Though the governance opportunities are legion, the preceding chapters call attention to a small set of priority tasks. First, transatlantic leaders must redouble their efforts to engage China and India across the spectrum of resource nexus challenges. China and India are global powers and persistent interest-based and value-based differences between the United States, the EU, China, and India may remain, but nexus challenges necessitate greater cooperation and engagement. Simply put, the challenges associated with governing global resource competition, scarcity, and sustainable development cannot be adequately addressed without U.S., EU, Chinese, and Indian cooperation. Thus, transatlantic leaders must improve their abilities to identify and construct shared interests with China and India around key issues, including the need to rapidly and significantly improve energy and resource efficiency, WTO-compliant governance of resource markets, financial and governance transparency in resource exports and resource imports, minimum environmental and humanitarian standards



around resource extraction and processing, and the resolution of ongoing sea lane and resource access disputes.

Secondly, public and private actors in the transatlantic region have a host of shared interests in better integrating emerging market states and firms into effective institutions for supply chain management and a host of schemes for increased transparency, certification, and standards harmonization. Examples include efforts to improve transparency and accountability among extractive industries on a country-by-country basis, promulgating OECD-style guidelines for resource efficiency, or working with private sector associations to set minimum environmental and worker safety standards within commodities markets. Also, if U.S. and EU regulators are to curb the trade (legal and illicit) in conflict minerals, they will need to deepen their engagement with private, public, and civil society actors in the regions whose governance they hope to shape. Thus, this report recommends establishing new partnerships to enforce supply chain due diligence on raw materials in combination with recovery of critical materials, recycling, and better management of all resources. Other such partnerships might include greater support for efforts such as the Natural Resources Charter and the Mining Model Agreement, which seek to improve governance in resource extraction and exporting countries. Similarly, while incidents of “land grabbing” have made the headlines, the transatlantic community should initiate and support a code of conduct on land use. If all such partnerships (in treaties and other bilateral and multilateral agreements) focus on both infrastructural development and governance capacity for resource nexus challenges that connect critical mineral and energy resources to food, water, and land-related issues, the resource endowments can be turned into development opportunities for many more countries.

Finally, engaging the new players offers opportunities to enhance cooperation on related security challenges, including the ongoing global expansion of nuclear power (and its related security, water, and environmental and safety challenges), the growing problem of securing and policing sea lanes from piracy and other threats, and the need to resolve festering interstate resource disputes offshore, around unsettled borders, and in shared river basins. Examples abound of the construction and use of shared institutions (such as the Arctic Council) to resolve and manage similar disputes within and outside the transatlantic community. More sustained efforts to adapt and replicate such successes elsewhere are needed.

Strengthening Global Cooperation

Transatlantic investments in global institutions in the post-World War II era have helped to successfully reduce inter-state conflict, create wealth and expand free trade, and increase human life-spans and other development indicators. Resource nexus challenges in an age of accelerating human impacts on the global ecosystem and rapidly growing human demands on the earth’s resource base and our governance systems requires greater investment in global cooperation. Governing the resource nexus involves myriad actors “on the ground” and a complex set of national and international actors in the public, private, and civil society sectors. It is therefore not merely a matter for “global governance” if this is only a reference to international organizations populated by representatives from states. Rather, it requires global-scale coordination at multiple levels of governance. The return on international engagement in global governance by the transatlantic community is manifold. Since

most opportunities of resource efficiency are likely to be in developing countries, there will be many tangible benefits on the ground. Resource-consuming industries could deliver innovations that lead to savings for consumers, greater resource efficiency, and less resource dependence. If such savings are invested in, for example, sustainable agriculture and water systems and innovations for mobility, housing, and energy, the transatlantic community and global development could benefit. Potentially, the more than 90 countries in the developing world that currently depend on commodity exports, and the many countries that cope with the food and water crises and other environmental stress multipliers can reduce risks and violent conflicts and instead experience more sustainable development.

The preceding chapters argue for a number of investments in knowledge creation, and globally networked, participatory governance. A top priority is the need to establish an international data hub to provide harmonized geological data, geo-spatial data, data on the resource nexus, and the use of resources in economies and across industries and environmental impacts as well as to establish scenario analysis about future use. Similarly, a global food and water facility capable of helping to increase capital investments to expand food production, clean water, and sanitation in combination with other infrastructure development programs is much needed. The burgeoning initiatives around food security, sustainable extraction, and resource efficiency could benefit from a high-profile network of training centers. Similarly, concerns about international buying and leasing of large tracks of land likely will remain on the international agenda, and an identifiable assessment and training center on this issue and a set of guidelines could improve land-use governance and reduce the risks of social and political conflict in the years to come. Also, the urban future presents an unparalleled opportunity for global policy learning originating in cities and spread through the networks that link those cities globally — a kind of league of cities aimed at improved governance for sustainable human security. Such networks should not be exclusive to urban officials, of course, but would need to further engage international organizations and NGOs in shared human security goals. Finally, transatlantic leaders should initiate the development of a global multi-stakeholder forums in collaboration with regional forums to raise the profile of the growing and interconnecting challenges associated with resource nexus governance. Such forums should serve to improve monitoring of extraction and use of resources, to debate opportunities for better management and resource efficiency, and drive learning and future research and innovation.

The ideas and suggestions outlined in this report point to the multitude of resource challenges facing the planet, and peoples and governance institutions around the globe. A continuing priority must be to increase public awareness and public debate about the seriousness of these problems and the consequences of inadequate political action to address them. Fortunately, the transatlantic community is institutionally well-equipped to take a much stronger lead in the public diplomacy necessary to highlight these issues. It is hoped that this report contributes to more enlightened discussions in national and international forums in the months and years ahead. Much is still not well understood about the challenges of the resource nexus. However, enough is known to make the argument that the matter requires more urgent attention by policymakers, researchers, industry leaders, and others than has been the case to date.



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