The Global Resource Nexus and Its Relevance to the Asia-Pacific Region

Philip Andrews-Speed

THE APR SERIES
E-Monograph

The Global Resource Nexus and Its Relevance to the Asia-Pacific Region

Philip Andrews-Speed

The APR Series
E-Monograph

Institute of Strategic and
International Studies (ISIS) Malaysia

Published by
Institute of Strategic and International Studies (ISIS) Malaysia
1 Pesiaran Sultan Salahuddin
PO Box 12424
50778 Kuala Lumpur
Malaysia
www.isis.org.my

The Global Resource Nexus and Its Relevance to the Asia-Pacific Region

Introduction

Global consumption of nearly every resource — oil, gas, metals, construction materials, agricultural commodities, water and land — increases each year. The material throughput of the global economy, and the consumer lifestyles driving it, rise inexorably but unevenly. Meanwhile, most resources are wasted in staggering amounts along their supply chains, as illustrated by food markets, water and fertilizer use, energy and other raw materials. As global demand for most resources grows and the supply of some of these resources diminishes, the interconnections between energy, minerals, water, food and land become more complex and more difficult to understand and anticipate.

The nexus approach in itself is not new, but most studies have focused on two and sometimes three resources and their linkages.[1] The approach applied in this paper studies the nexus across five different sets of resources: land, energy, food, water and minerals. What is also new is the explicit analysis of governance challenges, as well as the intersections between resource efficiency, security and development.[2]

[1] For example: H. Hoff (2011) *Understanding the Nexus*, Background paper for Bonn 2011 Conference: The Water, Energy and Food Security Nexus, Stockholm Environment Institute; UN ESCAP (2013) *The Status of the Water-Food-Energy Nexus in Asia and the Pacific*, United Nations Economic and Social Commission for Asia and the Pacific, Bangkok; PBL (2011) *Scarcity in a Sea of Plenty?*, PBL-Netherlands Environmental Assessment Agency, The Hague.

[2] This paper draws on the findings of a project hosted by the Transatlantic Academy in Washington, D.C. in 2011/2012 which have been published as a short report at and as a recent book: P. Andrews-Speed, R. Bleischwitz, T. Boersma, C. Johnson, G. Kemp and S. VanDeveer (2015) *Want, Waste or War?: The Global Resource Nexus and the Struggle for Land, Energy, Food, Water and Minerals*, London: Routledge.

What is 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 worries 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 that markets and new technologies will change or transcend ecological limits.

Demand for all resources is indeed expected to increase over the coming years and decades. However, evidence suggests that there is enough oil, natural gas, 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. The shortage of land, water and food probably is more serious, particularly in specific localities. Yet analysts note that food is globally plentiful, but much wasted. However it is not the physical amount of such resources that cause them to be globally scarce. The challenge is to govern access, allocation and use in a more sustainable, equitable and effective manner; in other words, to govern resources across countries and companies within the absorptive capacity of the planet.

Twenty-first century resource nexus concerns are different from earlier debates for three main reasons: (i) the scale and rate of global ecological change resulting in our era being referred to by some as 'the Anthropocene'; (ii) the structure and trends in the global economy; and (iii) the structure and trends in world politics.

The concept of the Anthropocene is based on the idea that the human impact on the global environment and the earth system as a whole is now large enough to denote a new geological epoch. Humanity is now a

geophysical force, as influential on the earth ecosystem function as other major ecosystem functions. For example, it is estimated that humans now put more nitrogen into the global system each year, than does the global ecosystem on its own; thus, earth system scientists speak about 'planetary boundaries'. The scientific literature is filled with such indicators, including those related to carbon dioxide emissions, land-use change, annual earth moving, water use, rates of biodiversity loss, 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.

In the ten years before the 2008 financial crisis, the world economy almost doubled in size in purchasing-power parity terms with annual real gross domestic product (GDP) growth rates in the range 3–4 per cent. 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 European Union and Turkey, as well as Asian members, Latin America states, South Africa and Saudi Arabia. This economic growth was assisted by a rapid expansion in world trade which saw the value of global trade rise three-fold from USD 5.5 trillion in 1998 to USD 16 trillion in 2008. 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 globalisation of western lifestyles. This 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 twenty years. During the previous global resource 'crises' in the 1970s, the international political discourse and

organisations were dominated by the Organisation for Economic Co-operation and Development (OECD) states and, in the case of oil, by the 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 global resource nexus

The resource nexus comprises the numerous linkages between different natural resources and raw materials that arise from economic, political, social and natural processes. This nexus can be conceptualised 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: land, energy, food, water and minerals.

Many challenges relating to the governance of natural resources can no longer be addressed effectively by only focusing on a single resource. Actions directed at one type of natural resource will increasingly have knock-on effects for other types of resources and for the people, places and institutions reliant on them. Many previous accounts draw attention to the linkages between groups of two or three resources, most notably water-energy-food, as the governance of this nexus has direct consequences for many societies. However, few have highlighted the nexus of five resources by adding land and minerals to this trio. Land is a critical resource in many ways, as it underpins most human productive activity and forms the basis for many different types of resource. Competition for access to land is being intensified by population growth, urbanisation, extractive industries and large-scale commercial agriculture. Minerals, in their processed form, are key inputs to modern living and have links with a range of other natural resources. Things only become more complex, when we consider the need to grapple with biodiversity and the climate system as addition and important sets of resources in need of better governance in the 21st century.

The nexus of land, energy, food, water and minerals occurs in a large variety of forms and at different scales, from global to local. At one extreme lie the poorly-monitored global supply chains where the destructive effects of poor resource governance at one end of the chain are quite invisible to those at the other end. At the other lie unsustainable practices in stressed environments which destroy the livelihoods of individuals. At a scale between these two extremes, regional inter-state conflicts are often triggered by or exacerbate multiple resource problems. In all these various forms, poor governance of the resource nexus is creating waste and exacerbating want.

In order to illustrate the vast array of linkages in the global resource nexus, we have identified three realms of the nexus that are not mutually exclusive:

- A nexus driven by markets at local, but predominantly at regional and global scales. These markets transmit effects between resources and between regions in an unprecedented way. Decisions made in one place about a certain resource can be transmitted to a different resource at a location on the other side of the world. A switch to biofuels in Europe can affect agriculture, land and biodiversity in Asia. The growth of electric vehicles in Asia will promote lithium mining in Peru. Demand for tantalum to be used in wind turbines drives illegal mining and consequent damage to land, livelihoods and biodiversity in Central Africa.

- A nexus driven by state interests and inter-state relations. Many resources straddle international boundaries and powerful state actors may choose to exploit one or more of these resources with damaging consequences for resources and peoples in neighbouring states. The construction of hydro-electric dams in the upper reaches of a river can undermine water flows, food production and livelihoods downstream. The exploitation of hydrocarbon and fishery resources can exacerbate unresolved maritime boundary disputes.

- The nexus on the ground relating to human security. Resource depletion and environmental degradation can lead to local competition for resources, migration, violence and terrorism with the potential for international repercussions. Such failures are triggered or exacerbated by different combinations of weak state capacity, population growth, poverty and urbanisation.

Relevance to the Asia-Pacific region

If we take the Asia-Pacific region as extending from Korea in the northeast down to New Zealand in the southeast and across to India in the west, the region is home to about 50 per cent of the world's population and 40 per cent of its GDP (in purchasing power parity terms). More importantly in the context of the resource nexus, much of this region will continue to undergo sustained economic growth and urbanisation for the foreseeable future, which, in turn, will lead to an increasing demand for resources of different types. Although rich in some natural resources, the growth of net imports is set to persist for most raw materials, putting additional pressure on already busy sea lanes. Finally, the region is host to numerous, long-standing and unresolved tensions and disputes relating to land, maritime boundaries and transboundary rivers. As a consequence, the effective governance of the global resource nexus provides a set of pressing challenges for the Asia-Pacific region.

Arguably, the most urgent nexus challenge for many countries in the region relates to the resource nexus on the ground. Much-welcomed economic growth, development and urbanisation, often accompanied by population growth, is necessarily driving demand for energy, minerals, water and food to sustain the improving lifestyles and infrastructure. Whilst a growing proportion of these needs may be satisfied by imports, a substantial share will be extracted or produced within the country or the region. The risk in some countries is that a combination of weak state capacity and powerful vested interests (possibly combined with illegal extraction or production) results in poor production practices that lead in

turn to unacceptable social and environmental costs, including loss of agricultural land, displacement of populations, pollution of waterways, destruction of biodiversity and the waste of the resource being exploited. Such developments can exacerbate pre-existing social and political tensions that can spread across borders. The key responsible parties to address the risks arising from the resource nexus on the ground are the relevant national and sub-national governments along with the participating corporations.

Some countries in the region are also significant exporters of raw materials of different types such as palm oil, natural gas, coal, bauxite, metallic minerals, technology materials such as rare earth metals, and precious stones. The nexus driven by markets can create or accentuate symptoms identified in the previous paragraph, but the international dimension requires measures to be taken by corporate actors along the full length of the international supply chains to ensure that best practices are applied, resource efficiencies maximised, and transparency provided.

The nexus driven by state interests and inter-state relations is of particular relevance to parts of the Asia-Pacific region. One cannot open an international newspaper these days without reading about the maritime disputes in the South and East China Seas. Whilst a combination of inter-state relations, domestic politics, history and sovereignty underlie these disputes, the presence of hydrocarbon resources and rich fisheries exacerbate the tensions. In addition, these sea lanes are the busiest for maritime trade, with more than 50 per cent of the world's tonnage of seaborne trade, more than 50 per cent of traded crude oil and about 70 per cent of global LNG supplies. Whilst the United Nations Convention on the Law of the Sea (UNCLOS) provides a framework for resolving maritime disputes which has been applied in a few of cases in the region, a number of countries have yet to follow this path. A second source of inter-state tension occurs along transboundary rivers where upstream nations exert their locational advantage to exploit energy and other resources to the disadvantage of downstream populations in neighbouring countries.

Needless to say, model frameworks exist for transboundary cooperative river basin management, but have yet to be applied in many cases in the Asia-Pacific region.

Whilst national governments have a key role to play in governing the resource nexus in the Asia-Pacific region, their efforts in isolation will not be enough. Cooperation is required across the region and with other regions to involve international organisations, corporations and civil society as well as national and sub-national governments.

Governing the global resource nexus

The resource nexus approach not only provides insights into the nature and origins of many problems relating to natural resources, but it also demonstrates the sources of governance failure. At the heart of this failure to govern the resource nexus lies the silo or stove-pipe character of organisation structure and policy making, in government, in industry and in international organisations.

Although an increasing number of academics and policy analysts are drawing attention to the resource nexus, most governments lack structures and coordinating systems to address the challenges arising from the resource nexus. Companies may be more deeply engaged with environmental and social issues than before, but they lack the incentive to effectively analyse and modulate their role in the resource nexus. International and regional organisations appear to be no better equipped to address the intensifying challenges arising from the resource nexus. Either they are formally bound by their remit to restrict their attention to specific sectors, resources or issues, or, if their remit is wide, their internal structures constrain policy thinking across multiple resources. The result of this silo thinking and structuring is that there is a widespread lack of recognition of the linkages between different resources, of the nature and scale of the threats that are arising from the poor governance of the resource nexus, and of the urgent need to act.

Also of great importance has been the idiosyncratic nature of the creation and evolution of transnational institutions that has resulted in a complex and fragmented system of global resource governance. This complexity has been exacerbated by the proliferation of numbers and types of actor in international energy markets. As a consequence, the framework of global resource governance is characterised by gaps, overlaps, tensions and conflicts which impede effective governance and raise the risks of governance failure.

Set against these deficiencies are many institutions which have met with a degree of success. UNCLOS has provided the basis for resolving a number of maritime disputes, even though the United States has not ratified it and China prefers to negotiate bilaterally. Many treaties which seek to constrain specific types of behaviour have met with considerable success, for example the Montreal Protocol of 1987 to protect the ozone layer, and a number of treaties designed to control the treatment of hazardous wastes, including the Basel Convention of 1989. Another source of success has been the ability of parties to create positive interaction between different treaties or regimes which overlap in their scope through what has been termed 'interplay management'.

Most of these formal treaties and instruments were established in the 1980s and 1990s, but the recent trend has been to develop non-binding, voluntary frameworks. Examples relevant to the governance of natural resources include: the Extractive Industries Transparency Initiative; the Kimberley Process set up to manage the spread of conflict diamonds; the International Energy Forum which promotes consumer-producer dialogue; the Arctic Council; voluntary certification scheme such as 'Fair Trade'; and a large number of regional forums and associations of industrial forms and regulators. The advantage of the voluntary nature of these initiatives is that it encourages a larger and more diverse membership but, conversely it can take a long time for them to build sufficient authority, legitimacy and capacity to fulfil their aims.

Moving forward, frameworks for governing the resource nexus should meet the following criteria in their design:

- The frameworks must be multilevel and polycentric with a focus on long-term solutions to resource competition. A multi-level framework comprises distinct levels of formal governance from global and regional to national and subnational. Polycentricity implies the flexibility of the framework to incorporate self-organised groups of citizens to play a role in governing resources at the different scales.

- The frameworks should include a mix of binding and non-binding agreements, the former to ensure and the latter to encourage compliance, as well as a blend of economic and administrative instruments.

- The frameworks should be as inclusive as reasonably possible, drawing on representatives of different interest groups, public and private, commercial and non-commercial from around the world.

- Finally, the frameworks should be persuasive in their diagnoses of the problems and in the credibility of the proposed solutions, as was the case with the Montreal Protocol and the Basel Convention.

Moreover, these frameworks should fulfil a number of key functions. They should inform, enhance collaboration, promote the resolution of disputes, and incentivise the desired behaviours.

The need to inform is fundamental to the entire undertaking. At the most basic level, the principle task is to continue to raise awareness of the complexity and urgency of the task ahead in managing the world's natural resources and environment. Most educated people know about climate change, even if they do not believe it, but few understand resource consumption in general and the consequences of their own behaviour on resources and the environment. Public and private sector entities need to

be much more aware of the links between different resources and to be more industrious in gathering and analysing data relating to the resource nexus at local, regional and global levels. The transparency and accountability rules for extractive industries of the United States and the European Union are recent examples of how policies can support information systems.

Collaboration in many forms is needed in order to reduce resource use and to better manage the resource nexus. Public sector organisations at international, national and sub-national levels should promote communication and cooperation between different agencies and departments in the gathering and analysis of information and in policy making. Public sector organisations and corporations need to be pro-active in opening channels of communication with each other and with civil society in order to identify local problems and formulate solutions. Finally, corporations must work together to improve information flows along commodity supply chains, and to develop new technological and management approaches to enhance resource efficiency.

The need to resolve disputes is apparent in many parts of resource supply chains and involves different types of actor. Disputes between governments can relate to trade, the transboundary rivers or to sovereignty, and international mechanisms exist to support the resolution of these kinds of dispute. However, many disputes are not international. Rather they occur between parties within a country. Such disputes may relate to land ownership or use, water or mineral rights, or to environmental damage. In many countries, the mechanisms to settle these differences equitably are poorly developed, at best, or non-existent, at worst. Sustained efforts are required to ensure the economic development is accompanied by legal reforms that constrain the power of elites and promote the rights of citizens.

Finally, we must develop new ways to incentivise these desired behaviours, for these behaviours will not emerge of their own accord or

just through the power of rhetoric. Institutions must find new ways to incentivise collaboration and the implementation of commitments by providing support for compliance and disincentives or sanctions for non-compliance. Governments must continue their ongoing efforts to adjust taxes and subsidies and to develop new economic policy instruments. These are needed to encourage the reduction of consumption and waste, to enhance material efficiency along supply chains and to address external environmental and social costs.

zzzzz

Dr Philip Andrews-Speed
Head & Principal Fellow,
Energy Security Division, Energy Studies Institute,
National University of Singapore (NUS)

Philip Andrews-Speed is Head and Principal Fellow at the Energy Security Division of the Energy Studies Institute of the National University of Singapore. He has 35 years in the field of energy and resources, starting his career as a mineral and oil exploration geologist before moving into the field of energy and resource governance. Until 2010, he was Professor of Energy Policy at the University of Dundee and Director of the Centre of Energy, Petroleum and Mineral Law and Policy. Recent books include *The Governance of Energy in China: Transition to a Low-Carbon Economy* (Palgrave MacMillan, 2012), and *Want, Waste or War? The Global Resource Nexus and the Struggle for Land, Energy, Food, Water and Minerals* (Routledge, 2015) with five co-authors.

Institute of Strategic and International Studies (ISIS) Malaysia

The Institute of Strategic and International Studies (ISIS) Malaysia was established on 8 April 1983 as an autonomous, not-for-profit research organisation. ISIS Malaysia has a diverse research focus which includes economics, foreign policy, security studies, nation-building, social policy, technology, innovation and environmental studies. It also undertakes research collaboration with national and international organisations in important areas such as national development and international affairs.

ISIS Malaysia engages actively in Track Two diplomacy, and promotes the exchange of views and opinions at both the national and international levels. The Institute has also played a role in fostering closer regional integration and international cooperation through forums such as the Asia -Pacific Roundtable, the ASEAN Institutes of Strategic and International Studies (ASEAN-ISIS), the Pacific Economic Cooperation Council (PECC) and the Network of East Asian Think-Tanks (NEAT). ISIS Malaysia is a founding member of the Council for Security Cooperation in the Asia-Pacific (CSCAP) and manages the Council's Secretariat.

As the country's premier think-tank, ISIS Malaysia has been at the forefront of some of the most significant nation-building initiatives in the nation's history. It was a contributor to the Vision 2020 concept and was consultant to the Knowledge-Based Economy Master Plan initiative.

INSTITUTE OF STRATEGIC AND INTERNATIONAL STUDIES (ISIS) MALAYSIA
No. 1, Persiaran Sultan Salahuddin,
P. O. Box 12424, 50778 Kuala Lumpur, MALAYSIA

Tel : +603 2693 9366 | Fax : +603 2691 5435 | Email : info@isis.org.my
+603 2691 3210 | Web : www.isis.org.my


Institute of Strategic and
International Studies (ISIS) Malaysia


ISIS_MY