

# The global scramble for resources

**Rising interdependence of water, energy, food resources raises security concerns**

**Resource problems that cross boundaries have scaled up in recent years**

By Hezri Adnan



Dr Hezri Adnan is a Senior Fellow at the Institute of Strategic and International Studies (ISIS) Malaysia. He specialises in environmental policy and green economy.

As climate change adaptation increasingly replaces the hope of mitigation, the current global scramble for scarce resources – water, energy and food – may become more aggressive in the years ahead.

Undoubtedly, the increasing interdependence of these three strategic resources raises security concerns and creates geographical flashpoints for conflicts. Countries in the Asia-Pacific region are now beginning to feel the interlocking effects of the nexus.

Water, energy and food resources are needed to sustain life on earth. They are also tightly interconnected. You can't disturb one without affecting the others.

Food production is the largest user of water globally. It is responsible for 80–90% of consumptive water use from surface- and ground-water.

Water, however, is also used to generate electricity and about 8% of global water withdrawal is for this purpose. Energy, in turn, is needed to transport and fertilise crops. Food production and supply chains are responsible for around 30% of total global energy demand. Crops can themselves be used to produce biofuels.

In 2050, with a forecast 9.2 billion people sharing the planet, it is expected there will be a 70% increase in demand for food and a 40% rise in demand for energy. Yet by 2030, the world has to confront a water supply shortage of about 40%.

Can the economy then run on the same finite water, energy and food resources? The answer is no, unless policy makers and captains of industry balance the many competing demands of these interactions.

## New challenge or old wine in new bottle?

The debate on resource scarcity is hardly new. In the 1970s, the discussion on limits to growth was built around the idea of physical scarcity of a single natural resource, such as oil and minerals. Resource availability then was mainly a local or national challenge.

The current discussion on resource scarcity is inevitably broader. It includes market, governance and geopolitical concerns, while the question of physical scarcity remains. The reason is that in recent years, resource problems that cross boundaries have scaled up, and they also involved supply chain concerns. The food crisis in 2007–2008 and oil price hike in 2008–2009 are just two

examples of global shocks caused by resource scarcity.

The market distortion of resource pricing is partly to blame for these crises. According to a 2011 McKinsey study, there has been a 147% increase in real commodity prices since the turn of the century, and up to US\$1.1 trillion is spent annually on resource subsidies.

The problem of food security can be a source of socioeconomic problems. A World Bank study indicated that 44 million people were driven into poverty by rising food prices in the second half of 2010.

This situation led to the current global resource scramble. Asia and the Pacific region is an important site for this contest. Without effective policy frameworks, the scramble for

## Opportunities from crisis

**The nexus perspective** presents a window to put in place crosscutting changes that embolden integrated resource management. Innovative business solutions are already in place to deal with the nexus challenge. Here are some examples:

**Jain Irrigation Systems Limited** in India has improved water and energy efficiency for food production by 75–90% through the drip irrigation technique.

**The Theun Hinboun Power Company** in Laos confronted the controversial resettlement issues related to dam construction with a win-win solution. In building its 210 MW capacity dam, the company has allocated each household of the over 4,000 resettled populace with a house, 1,000 sq m plot for agriculture and livestock, a hectare for rice cultivation and half a hectare of upland fields for the cultivation of cash crops.

**Hamburg Wasser**, a water supply and wastewater utility, pioneered the development of green energy from on-site treatment of wastewater for a residential area in Jenfelder Au, Germany. Its Hamburg Water Cycle technology enabled sustainable energy production while reducing water consumption by up to 70%.





This 2010 photo shows a dam under construction at the base of the Hanging Monastery at Mt Hengshan outside of Datong city in Shanxi, China. China is engaging in a frenzy of dam building, with over 26,000 projects presently, more than any other nation in the world. In the last decade, more than 60% of all hydroelectric projects were completed in China

resources may drive land grabbing and resource nationalism. Japan, for instance, has three times more land abroad than at home to ensure its food security.

### Nexus problems in action

There are many areas in which the nexus presents situations of conflict. These are some of them:

**Biofuel:** Promotion of energy from biomass to reduce greenhouse gas emissions has led to increased usage of fresh water, especially during the cultivation of biomass. In China, the current level of bioethanol production consumes 3.5–4% of the country's total maize production, reducing market availability of maize for other uses by about 6%. It is projected that 5–10% of the total cultivated land in China would need to be devoted to meet the biofuel production target of 12 million tonnes for the year 2020. The associated water requirement would amount to 32–72 km<sup>3</sup> per year, equivalent to the annual discharge of the Yellow River.

**Hydropower:** Hydropower generation meets 16% of the world's electricity needs and has been one of the main driving forces behind the construction of 45,000 large dams worldwide. In the Greater Mekong basin, 12 hydropower dams will be built from 2011 to 2025. The estimated total peaking capacity is almost 13 GW.

By 2030, the dams in the Mekong tributaries will have a substantial impact on water security because the hydrological regime of the entire Mekong river basin will be altered. It will also result in significant changes in the ecology of Tonle Sap, affecting ecosystem and farming productivity, fish migration, and by extension, compromising food security in the region.

**Irrigation and food security:** Irrigation accounts for about 15–20% of India's total electricity use. Punjab has only 1.5% of India's land, but its output of rice and wheat accounts for 50% of the grain the government buys and distributes to feed more than 400 million poor Indians. A significant problem is that farmers are pumping aquifers faster than


## Nexus perspective

The water-energy-food nexus perspective focuses on the interdependence of the three strategic resources by understanding the challenges and finding opportunities. The nexus approach revolves around three objectives:

- Improve energy, water and food security
- Address externalities across sectors and decision-making at the nexus
- Support transitions sustainability.



they can be replenished, and, as water levels drop, increased pumping is sapping an already fragile and overtaxed electricity grid.

Moving forward, the challenge lies in creating synergies among organisations and policies in the three sectors to tackle the nexus. A bold shift in government policies is required to envision an economic model that is sensitive to water, energy and food security concomitantly. However, the government on its own cannot mobilise actions without strong support from civil society and business leaders. 



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Climate change activists highlight the enormity of government subsidies for agrofuel production, which can harm the environment, displace indigenous peoples and lead to food shortages

## Implications of water, energy and food resource security in APAC



**Water security** As population growth and urbanisation rates in the region rise, the stress on Asia's water resources rapidly intensifies. Already, as many as 635 million people in Asia lack access to safe water, and 1.9 billion people lack access to effective sanitation. This insecurity poses risks for public health, political stability, and continued economic growth both within Asia and abroad.

**Energy security** China's and India's energy demand has grown rapidly over the past decade. Most projections suggest their voracious thirst for energy will expand in the coming decades. The growth of energy use in the Asia-Pacific region will have major consequences for geopolitics, financial and energy markets, and pollution both regionally and globally.

**Food insecurity** Ensuring a secure supply of food is essential, given Asia-Pacific's growing population, high and volatile food prices, and increasingly scarce resources. With climate change, a 2°C increase in mean air temperature could decrease rain-fed rice yields by 5–12% in China and under one scenario, net cereal production in South Asian countries is projected to drop by 4–10% by the end of this century.