The Status of the Water-Food-Energy Security Nexus

in Asia and the Pacific region

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Position Paper on the Status of the Water-Food-Energy Nexus in Asia and the Pacific region

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1. EXECUTIVE SUMMARY

CONTENTS

2. BACKGROUND

2.1. The debate on resources scarcity

Scholars have debated the central role of natural resources for economic development and human survival for more than two centuries. The general argument goes: as extraction rates of resources increase, the horizon of scarcity shortens (see Norgaard 1990). In the last decades the concern over resource depletion not only continues but seems more polarized than ever. Scientists contend that the earth cannot for long continue to support current and projected levels of demand for exhaustible resources. For them, resource scarcity may compromise the welfare of future generations, hence, posing a threat to sustainable development. The famous book *The Limits to Growth* produced a scenario analysis of 12 possible futures from 1972 to 2100, and concluded that continued growth in the global economy would lead to significant resource scarcities in the first decades of the 21st century (Meadows et al 1972). Committed conservationists then demanded a lowering of the environmental impact per unit of gross domestic product.

However, in the 1980s real energy and mineral prices fall, producing little evidence of looming shortages (Tilton 1996). This vindicated the position of those unconcerned about resource depletion, who claimed with equal conviction that natural resources can amply provide for Mankind's needs with the help of new technology and appropriate public policies. These technological optimists argue that there are no limits to growth in ingenuity. The future, they believed, will be better than the present and the past. As a result, quantitative growth continued apace after the "lost decade" of the 1980s. The "roaring" 1990s saw a further increase in global integration in goods, services and investment flows. The material ramping up of the world economy brought not only prosperity but also unprecedented environmental change.

Of late, the debate on natural resource scarcity is reignited. According to a study by the McKinsey Global Institute there has been 147% increase in real commodity prices since the turn of the century (Dobbs et al 2011). Fresh scientific findings suggest that humanity is now approaching limits in global resource availability and sink strength. Many indicators point to the unprecedented planetary changes such as biodiversity loss, climate change and nitrogen removal from the atmosphere (Rockstrom et al 2009). Consequently, the 21st century has been hailed as the century of the environment. Humanity is now considered as a geological force that has ushered in a new epoch called the Anthropocene. Today, an estimated 60 per cent of the world's ecosystem services have been degraded since the mid-20th century.

Resource problem was mainly a local (or national), but in recent years, problems crossing boundary had scaled up. The focus of concern shifted slightly, from resource exhaustion *per se* to the environmental damage and geopolitical security implications associated with the current global resource scramble. This report argues that the idea of scarcity is currently being revisited both in the policy and academic domains. Specifically, the strategic resources of energy, water and food (EWF) are

considered to be inextricably linked. The Asia Pacific region is considered to be an important site for this contest.

2.2. New resource realism

Five attributes characterize the recent perception of resources scarcity. *First*, a lack of undeveloped resource zones and preserves which is driving the pursuit of vital materials in the Arctic, the deep seas, and other resource frontiers. "The race for what is left", according to security expert Michael Klare, "presents a new stage in humanity's persistent hunt for critical materials" (Klare 2012: 15). This realization has also encouraged countries to 'dematerialize' their economic development by reducing and circulating resource usage. Examples are the policies of *Circular Economy* in China and Japan's *Low Material Society* policy.

The *second attribute* has to do with technical, social and environmental challenges on the exploitation of new resources in remote and marginal areas. One example is the recent trend of 'land-grabbing' which is intensifying clashes between foreign investors and the communities who occupy these areas (Pearce 2012). Another case is shown in the move by the European Commission to identify 14 economically important raw materials that are defined as critical due their importance in technology development, and are subject to a higher risk of supply disruption. In addition, planetary global warming is set to amplify the existing environmental challenges. The Working Group on the Economics of Climate Adaptation projects that some regions are at risk of losing 1 to 12 per cent of GDP annually as a result of existing climate patterns.

The unprecedented demand for more and new natural resources makes the *third attribute*. It is powered by the sudden emergence of insatiable new consumers as a result of surging economic growth in China, India and other Asian economic powerhouses. Up to three billion middle-class consumers will emerge in the next 20 years compared to 1.8 billion today (Dobbs et al 2011). The market distortion of resource pricing for populist reasons is deepening the scarcity crisis. According to McKinsey up to $1.1 trillion is spent annually on resource subsidies.

As opposed to only confronted with the physical scarcity of single natural resources, the world is now grappling with multiple resources scarcities. The dwindling natural resource stocks began to send shocks to the global economic system as reflected in the market. From 2007 to 2008, food prices rose sharply. Their persistence and high volatility since then have resulted in far reaching implications. The World Bank stated that 44 million people were driven into poverty by rising food prices in the second half of 2010. The main causes included greater demand for biofuels and trade decisions by exporting countries. The food crisis also sparked riots in over 30 countries and arguably precipitated the fall of governments in the Middle East. In July 2008, oil prices reached US$147 per barrel. The oil price hike has destabilized economies and threatened basic securities of the people. Its rise in 2008 and 2009 convinced some that the peak in oil production was already looming. Such interconnectedness (of price volatilities) underlines the *fourth attribute*, with energy, water and food resources gaining more traction in policy discourses.

The *fifth attribute* has to do with the broadening of actors in governing resources beyond governments. In addition to international institutions and regimes is the role of commercial interests in governance. One example of private sector influence in public policy is seen in the *CEO Water Mandate* whereby leading corporations asked governments to assert more control on water resources. Similarly in the food sector, the Sustainable Agriculture Initiative (SAI) which includes big businesses such as Danone, Nestle, Unilever, Kellog's Kraft, McDonalds and PepsiCola has been engaging other stakeholders involved in influencing food policies (Lang and Barling 2012). However, the presence of state prevails. Recent years saw the rise of resource nationalism as a strategic response to the perceived resource exhaustion (e.g. state-owned petroleum companies).

2.3. Rationale to integrate water-energy-food

The idea of 'limits' as propagated in the 1970s and 1980s did not simply fade into obscurity despite its limited adoption in public policy. Rather, it is becoming more complex. For development activities to be sustainable, the following limits must be taken into account (United Nations 2011: 54):

- Biophysical limits – what is possible within planetary limits and according to the laws of nature?
- Economic limits – what is affordable?
- Scientific-technical limits – what is doable technically?
- Socio-political limits – what is acceptable socially and politically?

Of all natural resources, energy, water and food are most needed to sustain life on earth. These three strategic resources share many comparable characteristics: billions of people without access to them; they are rapidly growing global demand; all face resource constraints; all three are 'global goods' 'involving international trade with global implications; each have different regional availability and variations in supply and demand; and all operate in heavily regulated markets (Bazillian et al 2011). Moreover, global water cycles, carbon energy cycle, food production, and climate change are inseparably linked. Because of these reasons, they present deep security issues as they are fundamental to the functioning of society.

Figure 1: The Water-Energy-Food Nexus and Its Drivers

The three resources are tightly interconnected, forming a policy nexus. A macro argument is in order here. 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 (Hoff 2011).

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%. Therefore, our economy cannot run on the same finite energy, water and food resources far into the future.

Water, energy and food are inextricably linked. Water for energy currently amounts to about 8% of global water withdrawals. Food production and supply chain is