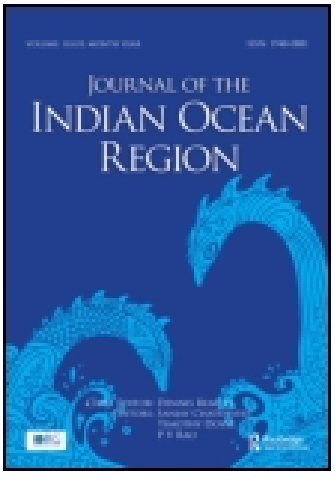

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Indian Ocean maritime security: energy, environmental and climate challenges

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Indian Ocean maritime security: energy, environmental and climate challenges

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For a comprehensive and meaningful understanding, the maritime-related security challenges facing the Indian Ocean littoral states need to be looked at broadly. Non-traditional security issues – from energy security and climate security to transnational terrorism and environmental degradation – are as important as traditional maritime security issues such as freedom of navigation, security of sea-lanes, maritime boundary and domain security, proliferation of weapons of mass destruction and challenges to law and order (including piracy and sea robbery, criminal activities like drug, people and arms smuggling, illicit, unreported and unregulated fishing, illegal immigration, and maritime terrorism). The non-traditional issues extend to the maritime aspects of economic security, food security, environmental security and human security.

Keywords: maritime security; non-traditional security; climate change

1. Introduction

The Indian Ocean Region (IOR) is far away from becoming a community of common values or even developing shared concerns over maritime security-related issues. Political initiatives are necessary to help build a shared sense of a community by identifying maritime security-related issues and challenges as well as policy choices to help deal with them. This is a region where the old order coexists with the new order. In fact, in no part of the world is the security situation so dynamic and in such flux as in the Indian Ocean Region.

Yet the reality is that the IOR has emerged as the world's major energy and trade seaway. Furthermore, the region is now the centre of the challenges of the twenty-first century world – from terrorism and extremism to piracy and safety of sea lanes of communication (SLOCs). In fact, the IOR covers the entire arc of Islam – from the Horn of Africa and the Saudi Arabian desert to Malaysia and the Indonesian archipelago. Given the linkage between the rise of Wahhabism and the rise of terrorism, it is not an accident that the vast majority of terrorist attacks in the world are concentrated in this Region. As Robert Kaplan (2009, p. 18) has pointed out:

> Although the Arabs and the Persians are known to Westerners primarily as desert peoples, they have also been great seafarers. In the Middle Ages, they sailed from Arabia to China; proselytizing along the way, they spread their faith through sea-based commerce. Today, the western reaches of the Indian Ocean include the tinderboxes of

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> Somalia, Yemen, Iran, and Pakistan – constituting a network of dynamic trade as well as a network of global terrorism, piracy, and drug smuggling. Hundreds of millions of Muslims – the legacy of those medieval conversions – live along the Indian Ocean's eastern edges, in India and Bangladesh, Malaysia and Indonesia.

The IOR also symbolises the global non-traditional security challenges – from environmental pollution (as illustrated by the brown cloud of sooty haze hanging over South Asia) and the degradation of the coastal ecosystem to a mercantilist approach to energy and the juxtapositioning of energy interests and foreign-policy interests. In other words, this is the region where old and new security challenges meet conspicuously. The region indeed serves as a case study of how international security challenges have fundamentally changed. Further, the IOR will also have a decisive role in determining whether we will see the rise of a multipolar Asia or a Sino-centric Asia. It is in the IOR that this issue will be decided, not in East Asia, where the power balance is more or less clear.

2. Energy and maritime security

Piracy and energy security concerns have become important drivers of the on-going profound and potentially far-reaching transformation of the security environment in the Indian Ocean Region. At a time when the assertive pursuit of national interest has begun to replace ideology, idealism and morality in international relations, there is a danger that interstate conflict in the coming years could be driven by competition not so much over political influence as over scarce resources. Energy has taken centre stage in such considerations.

Growing piracy, for its part, has contributed to heightening maritime security concerns. After all, much of the global oil export supply passes through two constricted passageways in the Indian Ocean rim region – the piracy-plagued Strait of Malacca, which is barely 2.5 kilometres wide at its narrowest point between Indonesia and Singapore, and the 89 kilometre wide Strait of Hormuz between Iran and Oman. More than 50,000 ships pass through the Malacca Strait alone each year.

The security of these main oil arteries is integral to the security of energy supplies for the oil-importing countries. In fact, the security of the two main oil arteries is also linked to the security of the Indian Ocean – the link between the Strait of Hormuz and the Strait of Malacca. Little surprise the rising attacks on oil tankers by pirates in the Gulf of Aden – the eastern rim of the Indian Ocean Region – has brought Indian, Chinese and Japanese naval patrols to the Region, besides the US, European and Russian navies.

Given that some parts of Asia are energy-rich and others are energy-poor, the intra-Asian competition to secure oil and gas resources has become increasingly intense. Spiralling demand in China, India and elsewhere in Asia indeed has made the prospect of sharpening interstate competition over resources look real. Global energy demand, particularly for oil and natural gas, is projected to increase sharply in the next 20 years – from 75 million barrels per day in 2004 to 120 million barrels in 2025. Asia alone is expected to consume 80% of the added 45 million barrels.

The Asian energy-importing states are deeply concerned about their vulnerability and thus keen to find ways to safeguard supplies, both in terms of security of assured, uninterrupted supplies and the security of vital sea lanes of communication.

Asia's key stake in Persian Gulf security can be seen from its heavy dependence on Gulf oil. About 17 million barrels of oil are exported daily from the Gulf in giant tankers – 20% of all oil traded around the world. Two-thirds of this Gulf oil goes to Asian states, and 11% and 16% to the United States and Europe respectively.

The on-going power shifts in the world are manifest just from the changes occurring in the energy and materials sectors, with the growth in demand moving from the developed to the developing world, principally to Asia. Although the total consumption of energy in the Asia-Pacific has grown by 70% between 1992 and 2005, per capita energy consumption is still relatively low by international standards: 749 kg of oil equivalent (kgoe) in 2005, compared with the global average of 1071 kgoe. Not only will per capita consumption grow sharply in Asia, 'on the supply side, Asia's strong demand environment for energy and basic materials, coupled with its low labour costs, means that the region will increasingly become a global producer of aluminium, chemicals, paper, and steel' (Bozon *et al.* 2007, p. 48).

Energy thus has become crucial to the continued economic expansion in Asia and the IOR, and the spectre of inadequate energy supply has intensified geopolitical rivalries in oil-rich Central Asia, the Caspian Sea basin, West Asia and the East China Sea. The maritime security threats, however, are centred on a narrower issue: the security of trade arteries and energy shipments. Asia indeed serves as a reminder that an imperial energy age may be dawning, reflected in: (i) the emergence of a twenty-first-century, energy-related Great Game; (ii) attempts to assert control over energy supplies and transport routes; (iii) the building of interstate energy corridors (which also serve as strategic corridors) involving the construction of pipelines to transport oil or gas sourced from third countries; (iv) strategic plans to assemble a 'string of pearls' in the form of listening posts and special naval-access arrangements along the great trade arteries; and (v) foreign-aided port-building projects along the vital sea lanes of communication, such as those in the Indian Ocean Region and beyond. Against this background, the building of interstate pipelines has become increasingly embroiled in murky geopolitics.

Mercantilist efforts to lock up long-term supplies act as a damper to efforts to build institutionalised cooperation on energy. Energy thus is not only becoming intertwined with IOR and Asian geopolitics, but is also influencing strategic thinking and military planning. For some states, a rising dependence on oil imports has served to rationalise both a growing emphasis on the seas as well as a desire to seek greater strategic space. Concerns over sea lane safety and rising vulnerability to the disruption of energy supplies and other imports are also prompting some countries to explore avenues for joint cooperation in maritime security.

For example, India's energy security interests are spurring on its navy to play a greater role in the Indian Ocean Region, a crucial international passageway for trade and oil deliveries. In addition to safeguarding sea lanes, the Indian navy has been tasked to protect the country's large energy infrastructure of onshore and offshore oil and gas wells, liquefied natural gas (LNG) terminals, refineries, pipeline grids and oil-exploration work within India's vast Exclusive Economic Zone (EEZ). Furthermore, India is attempting to build a web of strategic partnerships with key littoral states in the Indian Ocean Region as well as with outside players like the United States, Japan, Israel and France.

These partnerships, principally aimed at safeguarding the various 'gates' to the Indian Ocean, incorporate trade accords, military exercises, energy cooperation and

strategic dialogue. India's primary focus is on states adjacent to chokepoints such as the Strait of Hormuz (Iran), the Strait of Malacca (Singapore, Indonesia and Malaysia), the Bab el Mandab (Djibouti and Eritrea) and the Cape of Good Hope and the Mozambique Channel (South Africa and Mozambique). India has also encouraged the much larger Japanese navy to play a role in the Indian Ocean, and has signed an agreement with Tokyo in March 2005 to jointly explore for natural gas in the strategically sensitive Andaman Sea.

The growing link between energy and security was reflected in India's 2003 US-encouraged action in providing naval escort to commercial ships passing through the vulnerable, piracy-racked Strait of Malacca. The action followed rising concerns that international terrorists might target vessels using that strait. That six-month Indian undertaking, codenamed Operation *Sagittarius*, was primarily designed to safeguard high-value US cargo from Japan passing through the Strait of Malacca on its way to Afghanistan. It was much later, after the Lloyd's Market Association's Joint War Committee listed the passageway as a 'war risk zone' in 2005, that Indonesia, Malaysia, Thailand and Singapore agreed – under intense US pressure – to initiate joint naval patrols in the Malacca Strait. India's efforts to build strategic ties with Iran – a sore point in its warming relationship with the United States – have also been influenced by its energy and security interests.

China, for its part, is working hard to position itself along the vital sea lanes from the Persian Gulf to the South and East China Seas. It has helped Iran upgrade its Bandar-e-Abbas port. It is building a deep-water naval base and port for Pakistan at Gwadar, situated at the entrance to the Strait of Hormuz – the only exit for the Gulf oil. It has strategic assets inside Burma, a well-positioned country abundant in natural resources. The Irrawaddy Corridor between China's Yunnan province and the Burmese ports on the Bay of Bengal is designed as a key economic and strategic passageway involving road, river, rail and harbour links.

Add to the scene China's agreement to build a port at Hambantota in Sri Lanka and its aid to the Bangladeshi port of Chittagong. Besides eyeing Pakistan's Chinese-built port of Gwadar as a naval anchor, Beijing has sought naval links with the Maldives, Seychelles, Mauritius and Madagascar. Other moves by China include its stepped-up presence in the South and East China Seas through oil drilling platforms and ocean survey ships, and a proposal for a $20 billion canal that would cross Thailand's Kra Isthmus, thereby allowing ships to bypass the Strait of Malacca and permitting Beijing to set up port facilities there.

Such projects epitomise how an ambitious China, brimming with hard cash from rapid economic growth, is building new transportation, trade, energy and naval links in Asia to advance its long-term strategic interests. It was an internal Pentagon study that first drew attention to the Chinese policy to fashion what it called a 'string of pearls', centred on a chain of bases, naval facilities and military ties between the Indian and Pacific Oceans. Sponsored by the Pentagon's director for net assessment and prepared by defence contractor, Booz Allen Hamilton, the report titled, 'Energy Futures in Asia', stated: 'China is building strategic relationships along the sea-lanes from the Middle East to the South China Sea in ways that suggest defensive and offensive positioning [not only] to protect China's energy interests, but also to serve broad security objectives.' It said China's strategy to underpin its interests along vital sea-lanes was 'creating a climate of uncertainty.' (Gertz 2005, p. 1)

In 2009, China made its first-ever deployment of a naval task force beyond the Pacific by dispatching battle-ready warships to the Indian Ocean Region under the anti-piracy banner. This development, along with Beijing's attempts to project the Western Pacific as its maritime sphere of influence, underlines the Chinese aim to build and project naval power. The start of Chinese patrols in the pirate-infested Gulf of Aden was intended to extend China's naval role and presence far from its shores while demonstrating, under United Nations rules of engagement, a capability to conduct complex operations in distant waters. After all, didn't the need to combat pirates along the so-called Barbary Coast of North Africa in the early nineteenth century help spur the rise of a powerful US navy?

Today, taking on pirates under the banner of internationalism offers China a welcome opportunity to add force to its global power ambitions. The anti-piracy plank earlier was useful for Beijing to agree to joint patrols with Pakistan in the Arabian Sea and to extend cooperation to Association of South-East Asian Nations (ASEAN). Another Chinese objective is to chip away at India's maritime dominance in the Indian Ocean – a theatre critical to fashioning a Sino-centric Asia. If China can assert naval power in the Indian Ocean to expand its influence over the regional waterways and states, it will emerge as the preeminent Asian power. As the state-run *China Daily* put it, quoting a military analyst, a 'key goal' in battling pirates in Indian Ocean waters off Somalia 'is to register the presence of the Chinese navy' (PRC 2008).

Asserting naval presence in the Indian Ocean Region is very much part of the high-stakes game of maritime chess that China is now ready to play. Historically a major land power, China is now placing an emphasis on building long-range maritime power to help underpin geopolitical interests, including winning new allies and safeguarding its energy and economic investments in distant lands. China has been in the lead in avariciously acquiring energy and mineral assets in Sudan, Nigeria, Iran, Venezuela, Burma, Chad, Equatorial Guinea, Gabon, Republic of Congo, Zimbabwe, Ethiopia and other states that have a record of showing scant respect for international contracts. Through naval power-projection force capability, Beijing intends to dissuade such states from reasserting control over Chinese-held assets.

More significantly, rising naval power arms China with the ability to pursue mercantilist efforts to lock up long-term energy supplies, assert control over transport routes, and assemble a 'string of pearls'. In fact, a 2003 article in the *Liberation Army Daily* by two navy officers had asserted that the contiguous corridor stretching from the Taiwan Straits to the Indian Ocean's western rim (including the Anglo-American base of Diego Garcia) constitutes China's legitimate offshore-defence perimeter (Hong and Yuejiang 2003). Furthermore, a May 2008 paper published by the military-run Chinese Institute for International Strategic Studies (CIIS) pointed to the inevitability of Beijing setting up naval bases overseas. It warned that without naval assets overseas, 'China's maritime fleet will face an extremely dangerous situation', adding: 'Most of the world's major powers have overseas bases, and China can be no exception' (Strategic China CIISS 2008).

In the coming years, the voracious appetite for energy supplies in the IOR and Asia, coupled with mounting maritime security concerns, is likely to make regional geopolitics sharper. The present geopolitical manoeuvring is an indicator of that. A challenge for regional states is to manage their energy needs through more efficient transport and consumption and more cooperative import policies. Multinational cooperation on the security of sea lanes is essential to avert strategic friction in the

IOR. In fact, the building of greater IOR economic and energy interdependence will certainly help improve the regional geopolitics.

3. Threats to environmental and climate security

The IOR is a reminder that, despite the rise of unconventional transnational challenges, the international community is still struggling to fashion a response to such threats – from global warming to transnational terrorism. Efforts are needed to bridge the divide between traditional security threats and the new unconventional threats that are increasingly the focus of international attention and concern. The challenge thrown up by global warming, much like other unconventional challenges, can be met only by building and maintaining a broad international consensus. Indeed, the on-going power shifts in the world have made such consensus-building a *sine qua non* for the success of any international undertaking.

Climate change, unfortunately, has become a divisive issue internationally before a plan for a low-carbon future has evolved. At a time of greater international divisiveness on core challenges – from disarmament and terrorism to the energy crisis and the Doha Round of world-trade talks – the world can ill afford political rancour over the climate crisis, which carries the seeds of exacerbating security challenges.

Climate change will carry varied security implications for IOR states, depending on their geography, population density and state capacity, as well as the extent to which environmental degradation has occurred. The effects of global warming in the IOR will also vary depending on the proximity to the sea. Several studies on the expected impact of climate change have shown that warming will be the least in the islands and coastal areas (including throughout Indonesia, the Philippines and the coastal parts of southern Asia and the Indo-China peninsula), and the greatest in the inland continental areas of the Indian subcontinent, south-eastern Asia and eastern Africa, except during the June to August monsoon period when reduced warming is likely to occur in the hinterland.

Climate change is expected to aggravate existing security challenges, without necessarily creating a new category of threats. While it is easy to exaggerate or underestimate the likely impact of climate change owing to the continuing gaps in scientific knowledge, three broad strategic effects can be visualised in the IOR on the basis of studies that have been done so far. First, climate change will likely intensify interstate and intrastate competition over natural resources, making resource conflicts more likely. A new Great Game over water, for example, could unfold, with IOR and Asia as the hub, given China's control over the Tibetan plateau – the source of all of Asia's major rivers except the Ganges. Accelerated melting of glaciers and mountain snows would affect river water flows, although higher average temperatures are likely to bring more rainfall in the tropics. Several studies have shown that global warming is likely to actually strengthen monsoon circulation and bring increased rainfall in the monsoonal seasons, although it is still difficult to assess changes in dry-season rainfall (Climate Impact Group 1992; Suppiah 1994; Watson *et al*. 1997; Whetton *et al*. 1994).

Several studies, including by the Climate Impact Group (1992), Suppiah (1994) and the Intergovernmental Panel on Climate Change (2007), in assessing the impact of global warming on the two main rainfall seasons in Asia – the Southwest Monsoon in the summer and the Northeast Monsoon in the winter – have reported

that an increase in average temperatures is likely to bring more rain. Changes in non-monsoon, or dry-season, rainfall have been more difficult to assess. Other simulations of rainfall changes in southern and south-eastern Asia have also suggested an increase in wet-season rainfall in both the monsoonal seasons, with one study (Climate Impact Group, 1992) projecting changes ranging from −5% to +18%. The same study projected much heavier monsoonal rainfall in southern Asia, with the likely increase ranging from +17% to +59%. The latest Intergovernmental Panel on Climate Change (IPCC) study is not much different in its estimates.

In that light, to make up for the decrease in river water flows owing to the climate change-driven erosion of glaciers in the Himalayas, rainwater harvesting on a mass scale will have to be embraced to take advantage of the projected systematic increases in average rainfall intensity in the wet season in southern and south-eastern Asia. Rainwater capture also would have to become more common in Australia and eastern Africa. And to ensure continuing supplies in the dry season, the harvested water would have to be adequately stored. Water capture and storage, like carbon capture and storage, thus holds the key.

The good news is that rainwater harvesting is already being adopted by some IOR communities. For example, the Indian city of Chennai has made it mandatory for all new apartment buildings to harvest rainwater, while Singapore is using the centre of the island for large-scale rainwater harvesting to help reduce its dependence on neighbouring Malaysia for water. Water recycling and desalination of seawater are also becoming imperative in Asia. However, better and more cost-effective technologies need to be developed both to desalinate seawater on a large scale and to chemically treat wastewater, with the safe disposal of the effluents from the chemical treatment of polluted water itself posing a challenge.

The bad news is that water management is still not a major priority for most Indian Ocean governments, at the federal and state levels. Therefore, the dangers of sharpening intrastate and interstate competition over water resources should not be played down. The intrastate water disputes in the Indian Ocean Region are epitomised by the water-sharing sharing disputes within some Mekong River Basin states and the dispute in Pakistan over Punjab province's appropriation of water resources to the detriment of downstream Sind and Baluchistan.

Second, higher frequency of extreme weather events in the IOR (such as hurricanes, flooding and drought) and a rise in ocean levels are likely to spur greater interstate and intrastate migration – especially of the poor and the vulnerable – from the delta and coastal regions to the hinterland and also across the Ocean. Such an influx of outsiders would socially swamp inland areas, upsetting the existing fragile ethnic balance and provoking a backlash that strains internal and regional security. It should not be forgotten that many societies in the IOR are a potent mix of ethnicity, culture and religion.

Besides worsening droughts and increasing fires and flooding in Australia and New Zealand, global warming could threaten ecologically-rich sites such as the Great Barrier Reef and the sub-Antarctic islands. Saltwater incursion already threatens the Sunderbans National Park along the Bay of Bengal. The Sunderbans is the world's largest mangrove forest and home to the famous but dwindling Bengal tiger population. In the past three decades, rising sea has already swallowed about 100 square kilometres of the 9,630-square-kilometre mangrove swamps of Sunderbans, made up of hundreds of islands and criss-crossed by narrow water

channels. An oceanographic study has revealed that the sea is rising at 3.14 millimetres a year in the Sunderbans against a global average of 2 millimetres.

Ever since the IPCC in 1990 began releasing its assessments every five or six years, the panel has become gradually wiser, with its projected ocean-level increases due to global warming on a continuing downward slide. The IPCC remains on a learning curve. From projecting in the 1990s a 67-centimetre rise in sea levels by the year 2100, the IPCC has progressively whittled down that average projection by nearly half to 38.5 centimetres now.

The point is that the rise of average temperatures along with the rise of ocean levels could increase the severity, duration and the collateral impact of conflicts, besides triggering mass dislocation. For example, the South Pacific islands, as the Intergovernmental Panel on Climate Change said in the second of four reports in 2007, are likely to be hit by an increased frequency of tropical storms and be battered by rising sea levels, forcing the likely migration of many residents to Australia and New Zealand.

India, for example, could face a huge refugee influx from the world's seventh most populous country, Bangladesh, which is already losing land to saltwater incursion. Having been born in blood in 1971, Bangladesh, with more than 150 million citizens, now faces extinction from water, with the IPCC saying that country is set to lose 17% of its land and 30% of its food production by 2050. The headstone may read: 'Bangladesh, 1971–2071: Born in Blood, Died in Water.' Displaced both by saltwater incursion due to the rise of the ocean waters and by large-scale flooding owing to accelerated Himalayan glacier thaw, Bangladeshis would have only two choices — drown in the Bay of Bengal or relocate to India. But India already is home to up to 20 million illegally settled Bangladeshis. That number is far more than the number of Mexicans illegally in the United States.

Take another example, the Maldives – the smallest country in Asia in terms of population, and the flattest state in the world. Except where the level has been raised through construction, the ground level in the Maldives rises only up to 2.3 metres above sea level. When the 2004 tsunami hit the Indian Ocean Region, unfolding a disaster of epic proportions, the Maldives, although located far away from the epicentre, suffered extensive damage. Many of its 26 atolls were savagely pummelled by the tsunami, which inundated parts of the archipelago. The tsunami altered the contours of some of the 1192 Maldivian islets, less than a tenth of which are populated. Actually, the Maldives had already lost some territory over the past century due to the slow increase in sea levels.

What is common between Kiribati, a Pacific state of low-lying islands, and the Maldives? The presidents of both Kiribati and the Maldives are seeking a fund to buy a new homeland for their citizens should global warming raise sea levels at a dangerous pace. Both presidents say their country's citizens are prepared to pay for a new homeland, even though they seek international assistance. President Anote Tong of Kiribati, for example, called upon the international community in February 2009 to start thinking of ways to help entire states to relocate to higher ground. He called for an international fund to buy land for such mass migrations. Maldivian President Mohamed Nasheed, even before he formally assumed office in late 2008, expressed interest in establishing a national investment fund, with some earnings from tourism, so the Maldives could buy a haven for its citizens (Revkin 2008).

Nasheed's predecessor, in a published article, had bemoaned:

> In a world preoccupied with issues of national sovereignty, global security and human rights, it is surprising that the international community remains so ambivalent in the face of a phenomenon – climate change – that threatens to rewrite borders, cause conflicts and violate individual fundamental rights on a scale at least comparable with the major wars of the 20th century. It is also curious that in a world order built upon concepts of international law, solidarity and justice, the international community sits idly by while the Earth's greatest natural resource – the shared global ecosphere – is being critically undermined by the actions of a few privileged countries at the expense of the underprivileged many. (Gayoom 2008)

Observing that it is a 'tragic paradox' that the sea has emerged as an encroaching threat to the Maldives 'when one considers that throughout our history, the sea and the life that it supports has been the life-blood of the nation', President Maumoon Abdul Gayoom added that 'vulnerable countries like the Maldives bear almost no responsibility for a problem that threatens to consume them.' He called for 'climate justice' before it is too late (Gayoom 2008). A population explosion in the Maldives, with the number of citizens doubling to 400,000 in just 20 years, has increased environmental degradation and which has made the Maldives more vulnerable to the effects of climate change. Malé, the crowded one-square-mile capital, is ringed by sea walls, built with Japanese assistance.

Take yet another example, Madagascar, which has been wracked by political unrest and violence. Madagascar, the world's fourth-largest island, is strategically located in the Indian Ocean, controlling access to the Mozambique Channel. Only 5.3% of the island comprises arable land, even as deforestation and overgrazing have contributed to soil erosion and desertification. The popular uprising that led to the overthrow of Madagascar's president in March 2009

> was partly caused by water problems – in South Korea. Worried by the difficulties of increasing food supplies in its water-stressed homeland, Daewoo, a South Korean conglomerate, signed a deal to lease no less than half of Madagascar's arable land to grow grain for South Koreans. Widespread anger at the terms of the deal (the island's people would have received practically nothing) contributed to the President's unpopularity. One of the new leader's first acts was to scrap the agreement. (*The Economist* 2009)

The point to note is that the effects of large-scale refugee influx would be to undermine the political stability and internal cohesion of the states receiving the flow. And a refugee exodus will also have a destabilising effect on the state from where climate refugees are emanating.

Third, human security in the IOR will be the main casualty as climate change delivers a major blow to vulnerable economic sectors. Economic and social disparities, already wide in many societies, would intensify. The spectre of resource conflicts, failed states, large-scale migrations, rising food costs, growing extremism, and higher frequency and intensity of extreme weather events helps underscore the human security costs. The food price index of the Food and Agriculture Organization (FAO), based on export prices for 60 internationally traded foodstuffs, climbed 37% in 2007 alone.

In some cases, such trends could even foster or strengthen conditions making the state dysfunctional. In other words, climate change could create conditions that lead to failed states – the breeding grounds for extremism, fundamentalism and terrorism. Put simply, climate change is likely to heighten low-intensity military threats that today's conventional forces are already finding difficult to defeat – transnational terrorism, guerrilla movements and insurgencies. Let us not forget that the IOR is already is a region of international terrorism. The 'Afpak' belt — to use an American term — has already displaced the Middle East as the epicentre of transnational terrorism.

Unlike other unconventional challenges, climate change is caused not by hostile forces but by production and consumption patterns. While the reluctance of the rich to accept any diminution in their lifestyle comforts is understandable, there is a need to go beyond symbolic approaches. A strengthened international regime to combat global warming will have to be anchored in differential responsibility, a concept at the heart of the Climate Change Framework Convention and the Kyoto Protocol, but also embedded in international law through several other agreements – from the Montreal Protocol to the Maastricht Treaty. The concept of differential responsibility between developed and developing states ought to be further extended to differential responsibility between emerging economies, as in IOR and Asia, and the least developed economies, such as in sub-Saharan Africa.

In the IOR and Asia, the sharpening interstate competition over energy resources has helped obscure the fact that water shortages in much of the continent already are becoming a threat to rapid economic modernisation, prompting the building of upstream projects on international rivers. If water geopolitics were to spur tensions between riparian neighbours, the Asian renaissance could stall. In fact, no region better illustrates the dangers of water wars than Asia, which has less fresh water – 3920 cubic metres per person – than any other continent outside of the Antarctica, according to a United Nations report (United Nations 2006).

In that light, water has emerged as a key issue that could determine if Asia is headed toward mutually beneficial cooperation or deleterious interstate competition. No country would influence that direction more than China, which controls the aqua-rich Tibetan plateau – the source of most major rivers in Asia. Tibet's vast glaciers and high altitude have endowed it with the world's greatest river systems. Its river waters are a lifeline to the world's most-populous states. As water woes have aggravated in its north owing to environmentally unsustainable intensive farming, China has increasingly turned its attention to the bounteous water reserves that the Tibetan plateau holds. It has dammed rivers, not just to produce hydropower, but also to channel the waters for irrigation and other purposes. Presently, it is considering a number of massive inter-basin and inter-river water transfer projects. These inter-basin and inter-river water transfer projects, besides threatening ecology, carry seeds of interstate riparian conflict, as illustrated by the way the upstream damming of the Mekong has inflamed passions downstream in Vietnam, Laos, Cambodia and Thailand. An officially-sanctioned book, enlighteningly entitled, *Tibet's Waters Will Save China* (Ling 2005), has supported inter-basin and inter-river water transfer projects in Tibet and championed the northward rerouting of the waters of the Brahmaputra river (Yarlung Tsangpo to Tibetans, but Yaluzangbu to China).

Against this background, water has emerged as an issue in several important bilateral relationships in the IOR. In southern Asia, for example, interstate disputes have arisen over the sharing of the water resources of the

Ganges–Brahmaputra–Meghna basin (Biswas and Uitto 2001), a lifeline to 600 million residents and second only to the Amazon in its annual discharge and total drainage area. And there is some lingering disagreement between India and Pakistan over the interpretation or implementation of the 1960 Indus Waters Treaty – a model arrangement nonetheless that has survived crises and wars. Negotiated with World Bank assistance, the Indus Treaty is a generous pact on India's part, reserving 80% of the flows of the Indus-river system for Pakistan, with India receiving the remainder (Indus Waters Treaty 1960, Articles II and II). More recently, India even agreed to adjudication by a neutral expert from overseas after Pakistan took the Baglihar dam dispute to the World Bank. The neutral expert ruled in favour of the continuation of work on India's Baglihar dam with minor modifications.

4. Conclusions

At a time when a qualitative reordering of power is under way in the world, the security situation in the Indian Ocean Region is changing rapidly. The power shifts, propelled by Asia's rapid rise, are happening for the first time in history not because of battlefield victories or new military alignments but because of a factor that is unique to our modern world – rapid large-scale economic growth. When power shifts are occurring because of non-traditional factors, it is hardly a surprise that non-traditional security considerations are gaining weight.

The IOR is indeed a reminder that at a time when new unconventional threats are increasingly the focus of international attention and concern, there needs to be a better balance between traditional and non-traditional security threats. The real challenge is to integrate environmental security and climate security as essential components of national security, just as energy security has become part and parcel of national security for a number of countries.

This challenge is underlined by the serious nature of environmental degradation in the Indian Ocean Region, which, if seen as a whole, is home to the largest concentration of population in the world. As Indian Prime Minister Manmohan Singh put it while inaugurating the Indian Ocean Naval Symposium (IONS) in February 2008:

> Spanning 28 million square kilometres, the Indian Ocean is host to a third of the world's population. The littoral states of the Indian Ocean account for 25% of the global landmass and 40% of the world's energy sources. They have a rich heritage and share close socio-cultural ties. Above all, they are linked by a history of sea faring. A significant share of international trade passes through the sea-lanes of the region. Regrettably the Indian Ocean also accounts for 70% of the world's natural disasters. (Singh 2008)

The tsunami-warning system set up in the Indian Ocean region after the late 2004 tsunami ought to be extended to provide early warning of all natural disasters. Further, the need for counterterrorism cooperation in the IOR is being underlined by the fact that this region is the global epicentre of transnational terrorism, with the hold of jihadists extending from the Pakistan–Afghanistan belt to parts of Somalia. The rise of the maritime dimension of international terrorism was underlined by the amphibious terrorist assault on Mumbai in November 2008.

Environmental and energy issues, of course, must be at the centre of regional cooperation in IOR, given how energy, environmental and climate issues are

profoundly shaping the dynamics of the region. The IOR indeed has the most-adverse ratio or balance between land size, population and natural resources. Thus, environmental degradation in this region is not a surprise. The degradation is threatening to extend to even coastal ecosystems, which sustain diverse species of marine life and are the source of livelihood for many. The growing role of external states in overexploiting the marine resources in the Indian Ocean Region has underscored the need for the conservation and management of the biological diversity of the sea bed in areas beyond national jurisdiction.

There is a clear link, though, between population explosion and environmental degradation. This explosion has added demographic pressures on the environment and resources in the region. The relationship between environmental protection and national security was brought home by the 2004 Indian Ocean tsunami, which dealt the greatest blow to islands and coastal areas that had been denuded of their mangrove cover.

The brown cloud of sooty haze hanging over South Asia is another indicator of the environmental challenges in this region. A University of Stockholm study published in the journal, *Science*, blames the brown cloud on the burning of biomass, such as wood and dung that are used for cooking and vegetation that is burned when fields are cleared. Controls on agricultural burning and improvements in cook-stove technology to allow for more complete combustion, as well as reduction of pollution from power plants and automobiles, could help lighten the skies over South Asia.

As this paper brings out, the Indian Ocean Region is also on the frontline of climate change. The world now accepts that protecting our atmosphere, hydrosphere, lithosphere, biosphere and even cyberspace – the 'global commons' – is the responsibility of all countries. Enforcing that norm is proving the difficult part. And nowhere is the difficulty greater than in shielding our atmosphere from the build-up of planet-warming greenhouse gases. The reason for that is not hard to seek: effectively combating climate change demands fundamental shifts in national policies and approaches, as well as lifestyle changes, especially in the developed world. It is easier to visualise than to actually devise carbon standards that can protect continued economic growth in the developing world and also shield prosperity in the developed countries.

If future international climate change negotiations are to be successful, they must heed the lessons of the failed Copenhagen summit. The first lesson is that climate change is not just a matter of science but is also a matter of geopolitics. Without improved geopolitics, there can be no real fight against climate change. The expectation at Copenhagen that scientific research results would trump geopolitics was belied. The need to focus on improving the geopolitics is also being highlighted by the damage, however limited, to the independence of scientific research. The credibility of the Intergovernmental Panel on Climate Change has been questioned since the Copenhagen summit, to the delight of climate change sceptics. Just before Copenhagen we had 'climate-gate', as the publication of damaging e-mail and other documents from the Climate Research Unit at Britain's University of East Anglia became known, exposing politicised scientific research. After Copenhagen has come the IPCC's own 'glacier-gate' scandal over its bogus claim that the Himalayan glaciers are set to disappear by 2035, with dire consequences for the northern rim of the IOR.

A second lesson from Copenhagen is that to obtain a binding international agreement, we do not need all 194 states represented in the negotiating room. We do not need even a G20 on climate change. If a G2 is justified on any issue, it is on

climate change. For an international agreement to emerge, there must first be a deal between the United States and China. These two countries are very dissimilar, yet their carbon profile is alike: Each contributes between 22 to 24% of all human-induced greenhouse gases in the world. If a deal can be reached between the world's two greatest polluting states, which together are responsible for 47% of all greenhouse gas emissions, then an international accord on climate change would be easier to reach. Yet US President Barack Obama is hoping to shift the negotiations out of the UN format to the G20 process when a G2 would be enough. Without a US–China deal, a G20 format will not help.

A third lesson from Copenhagen, being reinforced by the present circumstances, is to devise a more realistic agenda. Too much focus has been placed on carbon cuts for nearly two decades, almost to the exclusion of other elements. It is now time to disaggregate the climate change agenda into smaller, more manageable parts. After all, a lot can be done without a binding agreement that sets national targets on carbon reductions.

Take energy efficiency, which can help bring a quarter of all gains in reduction of greenhouse gas emissions. Energy inefficiency is a problem not only in the Third World, but also in the developed world. The United States, for instance, produces twice as much carbon dioxide per person as Japan, although the two countries have fairly similar per capita incomes. Furthermore, given that deforestation accounts for as much as 20% of the emission problem, carbon storage is as important as carbon cuts. Each hectare of rainforest, for example, stores 500 tons of carbon dioxide. Yet during the 1990s, 15.2 million hectares of forests of all types were lost each year, according to the Food and Agriculture Organization (FAO)'s report, *State of the World's Forests* 2005. Between 1995 and 2005, roughly 8% of the total forest cover was lost.

The international community must also focus on stemming human-made environmental change. Environmental change is distinct from climate change, although there is a tendency on the part of some enthusiasts to blur the difference and turn global warming into a blame-all phenomenon. Human-made environmental change is caused by reckless land use, overgrazing, depletion and contamination of surface freshwater resources, overuse of groundwater, degradation of coastal ecosystems, inefficient or environmentally unsustainable irrigation systems, waste mismanagement, and the destruction of natural habitats, including mangroves and forests. Such environmental change has no link to global warming. Yet, ultimately, it will contribute to climate variation and thus must be stopped.

At Copenhagen, the spotlight was on the BASIC (Brazil, South Africa, India and China) bloc of four major developing countries. But the BASIC bloc is a partnership founded on political opportunism and is unlikely to hold for long. The carbon profiles of Brazil, India, South Africa and China are hardly similar. China's per capita carbon emissions are more than four times higher than India's. It rejects India's approach that per capita emission levels and historic contributions to the build-up of greenhouse gases should form the objective criteria for carbon mitigation. China, as the world's back factory, wants a different formula that marks down carbon intensity linked to export industries. Once criteria for mitigation action are sought and defined in future negotiations, this alliance will unravel quickly.

Global warming is a worldwide phenomenon, and it is difficult to analyse its ramifications for a region in isolation of the wider context. But it is true that because of its geography, population density, large low-lying areas and many coastal cities,

the IOR is especially vulnerable. It may bear the brunt of the effects of climate change – a probability further heightened by the environmental degradation that already has occurred in the ocean. That is why there needs to be regional discussion and cooperation on how to adapt to a climate change-driven paradigm.

There is a danger that interstate conflict in the IOR in the coming years could be driven by competition not so much over political influence as over scarce resources. Among resource issues, energy security concerns already have become an important driver of the on-going profound and potentially far-reaching transformation of the security environment in the Indian Ocean Region.

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