

Concluding Thoughts

Future Environmental Challenges for Asia

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This century is the ‘Asian century’ of that there can be no doubt. Indeed, as Asia regains its primacy in the world economy, a position it has occupied for much of human history (certainly from 1 AD) barring the last 300 years, it is more meaningful to speak of the re-emergence of Asia. A key motivation for this volume is this re-emergence, centred on the rapidly growing economies of China and India, but in no less measure on other already developed as well as rapidly growing economies of Japan, Singapore, Malaysia, Indonesia and Vietnam, to name a few. In fact, with regard to rapid economic transformation, countries such as Singapore and China have in recent times, witnessed the most dramatic rise in per capita incomes in human history, with the former going from a third world to a first world country within the span of one generation.

The key question Asia faces is whether this gravitational shift can be sustained. With almost 60 per cent of the world population, the aspiring Asian countries generate about 30 per cent of global GDP. In another 20 years or so this share is expected to be around 50 per cent. But this achievement is far from assured--these countries face several challenges which if not successfully met “could lead to economic, social and even political instability and, in turn, derail economic development and growth” (ADB, 2011: xv). Two centuries ago, a rapidly growing country invoked its ‘Manifest Destiny’ to expand across a continent from one ocean to another. In doing so, it deployed human ingenuity and effort to overcome a number of challenges, albeit in a far less complex world. The emerging Asian countries already spanning oceans as they do must similarly meet and surmount challenges to achieve their own destiny.

In this volume the challenge under consideration is that of environmentally sustainable growth. As mentioned in the Introduction by Huang Jing, after accounting for the costs of environmental degradation, Asian growth rates look less impressive. He rightly flags a long-term and serious concern whether Asia is ‘eating up’ its natural capital (forests, biodiversity, mineral wealth, water resources and so on) and converting it into Gross Domestic Product (GDP) growth that will not sustain into the future. But on the flip side, given the economic, institutional and environmental diversity of countries, Asia offers a crucible of experience

and policies within which the way forward can be forged and the challenge of environmentally sustainable development met.

It was with this in mind that the papers in this volume considered a variety of environmental issues in seven Asian countries from the perspective of various stakeholders. Common themes that resonated across all papers were the key role of sound institutions, of sensible policies and of good governance. While these findings are intuitive and hardly surprising, it is important to note they cut across countries at very different levels of economic and institutional development and also across a range of environmental issues from industrial pollution and natural resource degradation to climate change. Further, these findings are based on careful and detailed studies by well-regarded experts of specific environmental issues within a range of Asian countries.

Looking Ahead to the Future - Four Major Environmental Challenges for Asia

So where do we go from here? The papers in this volume describe environmental conditions and challenges in the Asia of today or in the near future. But just as the Asia of 2013 looks vastly different from the Asia of the 1990s, less than a quarter century ago (and very much within living memory of many Asians), the Asia of 2030 or of 2050 will be again very different. It will be (in all likelihood) a more prosperous continent and certainly with many more people, doing very different things from what they do now and living in different ways.

It may be useful to gaze into the crystal ball to discern major environmental challenges Asia will face and how these might be met as well as the underlying drivers of these challenges. In doing so, we transcend national boundaries and instead develop broad brush assessments of these challenges. Looking at the future, this is helpful as Asian countries converge in their development pathways as well as in levels of economic development. Sharing of best practices and experiences and evolving a common approach to global and regional environmental problems is imperative if Asia is to continue its re-emergence.

We begin this look into the future by first examining the underlying trends and drivers of these environmental challenges, namely, a burgeoning Asian population increasingly concentrated in towns and cities and with rising income and consumption levels. Thus, in the year 2050, while Asia's share of world population is likely to remain in the vicinity of 60 per cent, this percentage will be of a much larger total: at least 9 billion people on the planet as compared to 7.1 billion now. Despite the inherent uncertainty of long range population projections, it may then be safely assumed there will be at least a billion more Asians than as compared to now. In other words, by 2050 there will be total of 5.2 billion Asians. A majority of them will live in towns and cities which will absorb all the additional one billion or more Asians on the planet. Worldwide far more people will live in urban than rural areas and Asia will be no exception—according to the United Nations (2012) Asia's urban population will soar from 1.9 billion to 3.3 billion (whereas it will see 480 million fewer

people in rural areas). In fact, urbanisation and its attendant challenges and opportunities will be a defining feature of the Asian century.

Given their population density, “cities are where the pressures of migration, globalisation, economic development, social inequality, environmental pollution and climate change are most directly felt. Yet at the same time they are the engines of the world economy and centres of innovation where many solutions to global problems are being piloted” (United Nations, 2012). While this unprecedented increase in urban population will provide opportunities to improve education and public services in Asia, as more concentrated populations become easier to reach, this will also pose new challenges of providing jobs, housing, energy and infrastructure to mitigate urban poverty, expansion of slums and a deterioration of the urban environment.

The largest increases in global urban population are expected in India, China, Nigeria, the United States and Indonesia. Over the next four decades (2010 to 2050), India will add another 497 million to its urban population; China - 341 million, Nigeria - 200 million, the United States -103 million and Indonesia - 92 million. Thus, there will be about a billion or more Asians living in cities.

Accompanying this defining feature of the Asian century will be a series of major environmental challenges at least in the medium term up to 2030. A study commissioned by the Asian Development Bank grouped them under four themes: *climate change, water management, deforestation and land degradation and air pollution* (Howes and Wyrwoll, 2012) and we draw on it in the discussion that follows. While other issues such as marine ecosystems and resources, biodiversity, waste management, etc. are also important, these four areas present the most pressing challenges to Asia’s development over the next two decades and perhaps beyond.

What these environmental challenges have in common is their complexity. Borrowing from the social planning literature, they can be thought of as “wicked problems” (Howes and Wyrwoll, 2012). One characteristic of wicked problems is there are no easy solutions. And these problems may worsen as Asia grows—the ‘environmental Kuznets curve’ (EKC)¹ may not work—though more resources may become available to tackle them as incomes rise. This once again underscores the importance of sound institutions, of sensible policies and of good governance that the papers in our volume highlight.

Climate change subsumes global warming in that an increase in global surface and ocean temperatures is accompanied *inter alia* by a rise in sea levels, melting of polar ice caps, ice shelves and glaciers and an increase in the frequency of extreme weather events such as cyclones and floods. Climate change is caused by emissions of heat trapping gases (greenhouse gases or GHGs), largely carbon dioxide but also methane and other gases. The implications of climate change have been discussed in several papers in the volume including those on China, Vietnam and Japan. At a regional level Asia is highly vulnerable to the effects of climate change and this vulnerability is likely to increase with a large number of

cities in low-lying and coastal areas.² In addition, Asian agriculture is at particular risk from higher temperatures, more erratic rainfall, rising sea levels and also stresses on the water sector. For example, it is estimated yields of important crops will decline in parts of Asia by 2.5 per cent to 10 per cent by the 2020s and 2030s (IPCC, 2007; Lobell et al., 2008). Similarly, a study by International Food Policy Research Institute (IFPRI) on behalf of Asian Development Bank (ADB), of climate change impacts on Asian agriculture has predicted a fall in both irrigated rice production and wheat production by 2050 with concomitant rise in global food prices (ADB and IFPRI, 2009).

The resource requirements for adapting to climate change will be massive and will run into billions of dollars. This will undermine other important areas of expenditure required for Asia's growth. For agriculture alone, the ADB-IFPRI study has estimated adaptation costs over the next ten years to be US\$24 billion. This refers to investments in adaptation measures only and does not take into account losses from lost agricultural output or impacts on food prices. As mentioned above these latter impacts will be substantial as well. The big question thus Asia faces is how are these costs to be financed? How can Asian countries, particularly those struggling to reduce existing poverty and inequality, possibly afford the adaptation investments required to protect and 'climate proof' their economies? A coordinated strategy by Asian countries to secure and deploy climate finance in this regard is called for. More important, a new development paradigm is needed; one that holistically takes account of the physical, economic and political impacts of climate change.

In the long run, Asia will also play a decisive role in the mitigation of climate change. This is irrespective of how the intractable problem of 'common-but-differentiated-responsibility' of mitigation is resolved since GHG emissions from Asia, especially China and India, will be significant. In this context, it is clear that the process of lifting standards of living throughout Asia cannot follow the carbon-intensive trajectory of today's high-income economies: the limits of the climate system render such replication infeasible.

Switching to a 'green growth' or low carbon development path will reduce the impact of potentially major stumbling blocks for Asia arising from climate change, such as food and water insecurity, environmental refugees and conflict, among others. Not only does avoidance of major climate damages provide a firmer base for Asian growth beyond 2030, but there are significant economic opportunities in the short-term from Asia leading the way in areas such as renewable energy. Indeed, China and, to some extent, India and ASEAN countries are moving towards exploiting these opportunities. Asia has to lead the way in mainstreaming climate change adaptation and mitigation into economic development.

The *management of water*, its quantity and quality is another key environmental challenge for Asia. Water pollution generates huge economic costs through increased mortality and morbidity and lost productivity. As Asia adds a billion people to its cities by 2050, the demand for adequate and clean water for competing uses such as human consumption, industrial processes and agriculture will grow. Already by the year 2030, under current management policies demand for water will exceed supply in China and India by 25 per cent

and 50 per cent, respectively (WRG, 2009). Given that the population will be increasingly concentrated in cities often far from sources of water the problem will be compounded.

On the supply side the challenge is also one by overexploitation and degradation of surface and groundwater resources. Excessive groundwater extraction, pollution from human waste and industry, poor infrastructure and dam-building are major factors contributing to degradation of Asia's fresh water sources. For instance, 28 per cent of rivers and 48 per cent of lakes in China are unfit for any use including industrial and approximately 300 million people in its rural areas depend on unsafe drinking water (World Bank, 2006). In India, over 200 districts in 19 states have severely contaminated groundwater (GoI 2009). Though major improvements have taken place with regard to water access and sanitation in Asia over the last two decades, large numbers still have inadequate facilities.

The impact of climate change will also be directly felt on the global water cycle including key Asian weather systems such as the Indian and East Asian monsoons (IPCC, 2007). Within the next three decades, the pattern of increasing glacial melt during the dry season is likely to reverse and transform the major rivers originating in the Himalayas such as the Brahmaputra, Ganges, and Yangtze into seasonal rivers (Asia Society, 2009; Immerzeel et al., 2010). In other words, the fragility of the water sector in Asia will be exacerbated by climate change.

The challenge thus will be of managing both demand and supply through better policies and through better implementation of these policies. These include a gamut of measures such as more rational pricing, reduction of transmission losses, sensible allocation among competing uses, better coordination across different sectors and levels of government and treatment of wastewater. The example of an Asian city, Phnom Penh capital of Cambodia, shows how millions of Asian city dwellers could actually benefit through good governance (Biswas and Tortajada, 2010). In that city a previously decrepit and war-torn water supply system was changed radically, from one with incompetent management which lost both water and customers, into a model public water utility providing 24 hour drinking water, subsidies to the urban poor and dramatic reduction in water losses (Chan, 2009; Chan et al., 2012). Other successful examples such as Manila "illustrate that setting the right policies and strategies coupled with changes in behaviour (in terms of valuing water both physically and fiscally) and financial resources to implement these goals are tripartite keys to success – but the final piece that is always needed to complete the puzzle is, undoubtedly, *good management*." (Gunawansa, et al., 2013: 32, emphasis added).

Widespread *deforestation and land degradation* in Asia are highly visible examples of the unsustainable use of natural resources and constitute yet another important environmental challenge. Natural resources are what Dasgupta and Mäler (1995) term 'natural capital' or 'natural resource base' of an economy. They have convincingly argued for inclusion of this form of capital in the overall capital stock that comprises manufactured and human capital (buildings, bridges, roads, plants, machinery, knowledge, R&D and so on) and constitutes the productive base of an economy. Further, they argue natural capital should be properly

measured, valued and its depreciation should be accounted for in national income. This is something that those Asian countries which are richly endowed with forests, biodiversity and fertile land (and from which they derive great benefit) should take heed.

In Asia deforestation is unfortunately happening apace in the biodiversity rich countries of Indonesia and Malaysia. This is especially tragic since as mentioned in the introductory chapter these countries are ‘megadiverse’ countries (a select group of 17 countries that harbour the majority of the world’s plant and animal species). But deforestation is also happening in other countries such as Cambodia and Myanmar (FAO, 2011a). With regard to land degradation, 23 per cent of the total area of China and 18 per cent of the area of India is considered degraded (Bai et al., 2008). Interestingly for India, official estimates put the figure even higher at nearly half of the country’s land as degraded (GoI, 2009). The figures for Thailand and Indonesia are also alarming—60 per cent and 54 per cent, respectively (Bai et al., 2008). For ASEAN as a whole, Food and Agriculture Organization (FAO) estimates that in two-thirds of countries (excluding Singapore) 40 per cent of land is suffering either severe or very severe degradation due to human activities (FAO 2011b).

Looking into the future these trends could exacerbate in a business-as-usual-world and epitomise the concern articulated by Huang Jing in the Introduction as to whether Asia is ‘eating up’ its natural capital and converting it into (ephemeral) GDP growth that cannot be sustained.

Deforestation and land degradation are intrinsically linked³—unsustainable forestry practices such as clear felling lead to soil erosion and salinity and also affect the groundwater table. In dry lands, deforestation leads to transformation of fertile areas into barren land, a process known as desertification (which can also be caused by unsustainable farming practices such as intensive cropping). Once land is sufficiently degraded, it may be unable to support forests again, or even the agricultural use that often drives deforestation in the first place.

The causes of deforestation and land degradation in Asia include demand for timber products and palm oil, intensive farming, and urban sprawl. Poor regulation and corruption allow unsustainable practices to arise and persist. It is, however, increasingly apparent throughout the region that the long-term economic costs from unsustainable land-use ultimately outweigh more immediate gains. Once sufficiently degraded these ecosystems require time and large expense to recover (if at all), effectively eliminating future sources of wood and causing other problems that reduce the productivity of the natural resource base. Over cultivation of agricultural land is increasingly leading to declining soil productivity and, consequently, lower output and, in some areas, food insecurity.

The final major environmental challenge is *air pollution* a primary cause of illness and death both in the growing cities and the poorer rural areas of Asia. Air pollution comprises both indoor air pollution due to burning of biomass based fuels and outdoor particulate air pollution from industries and vehicles. The ubiquitous nature of this problem undermines the

productivity and income of the labour force, exacting a heavy economic toll. For instance, a recent study estimated that in 2005 the annual welfare loss associated with air pollution in China amounted to US\$ 151 billion (2010 dollars) (Matus et al., 2012). Air pollution commonly exceeds standards across the cities of developing Asia. Emissions of noxious gas and particulate matter from motor vehicles, industry and other causes plus the rising urban population exposed to these emissions are increasing the regional burden of respiratory illnesses and cancer (HEI, 2010). In the year 2000 it was estimated 65 per cent of deaths from urban air pollution occurred in Asia (Cohen et al., 2005). More recent estimates show developing Asia continues to contribute over 2/3 of the air pollution-attributable global burden of disease due to regional increases in pollution levels (The Lancet 2012).

More important, as Asian economies grow, as its cities expand, as incomes rise and with more Asians owning vehicles (initially two wheelers and eventually cars) these problems could get further compounded unless appropriate policies and measures are put in place.

Should we be optimistic or pessimistic?

The purpose of recounting the major environmental challenges Asia faces now and into the medium term future is to show what might be but then again what might not if it can ‘get its act together’ so to speak. Indeed, climate change may happen but with sound planning and finance the region can become more climate-resilient. Similarly it is not inevitable that water shortages and water pollution, deforestation and land degradation and air pollution proceed apace. The present is not always a guide to the future and history need not be destiny.

To avoid and mitigate some of these problems especially with regard to air and water, Asian countries need to put in place governance and regulatory structures that internalise the environmental externalities, so to speak. Inclusive growth and a green economy are possible as Asia looks to the future. The need is to restructure economic and financial systems, expand the use of market-based instruments to control pollution, introduce and implement legal and institutional reforms and above all strive for good governance.

Notes

¹ The eponymous Kuznets curve (after Nobel Laureate economist Simon Kuznets) postulates a stylised fact—as a country’s per capita income rises (income) inequality first rises then falls in an inverted U shape. The EKC postulates a similar phenomenon for several environmental problems such as air pollution where concentrations of pollutants first rise and then decline as per capita incomes increase. This empirical generalization has spawned a vast literature in environmental economics especially because of its controversial policy implication that countries can ‘grow their way out’ of environmental problems or by corollary ‘pollute-now-clean-up-later’.

² For example, 40% of Ho Chi Minh City lies within 1 metre of current sea levels, and by 2050 as many as 11 million people will be at risk from sea level rise and extreme weather events.

³ This discussion and the following one on air pollution is based on Howes and Wyrwoll (2012).

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