

# **Green growth, climate change, and the future of aid: Challenges and opportunities in Asia-Pacific**

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*Working paper*

## **Overview**

This paper reviews the opportunities and challenges for Asia Pacific in attaining “green growth,”<sup>2</sup> in particular to mitigate and adapt to climate change. The recommendations for green growth are presented based on the framework of LIIFTT<sup>3</sup>—**L**ow carbon growth; **I**nstitutional reform; **I**ntervention in ecosystems and agriculture; **F**acilitation of rural and off-farm migration; **T**owns and cities that are climate-resilient; and **T**ransitional support to shift to green growth by the international community. Together these add up to a low carbon revolution and what is now called “climate-resilient development.”

On the mitigation front over the last two decades, there have been positive signs of reductions in greenhouse gas emissions per unit of economic growth—reduced carbon intensity—in the developing countries of Asia-Pacific, particularly in the People’s Republic of China (PRC). This has historically arisen because of the generally high energy inefficiency of Asia-Pacific and structural economic changes leading to a larger services sector. More recently, many countries, including the key economies of the PRC and India, are seizing opportunities to increase exports and jobs by shifting to low carbon production. Nonetheless, the overall emissions from the region are rapidly increasing, reflecting high economic growth. A “low-carbon revolution” would be required for the region to make a significant impact in climate change mitigation. The challenge is compounded by the very unequal distribution of emissions within countries. Urban areas in the region are gaining importance in terms of emissions and the number of potentially affected populations.

The progress of a low-carbon revolution in Asia so far is mixed and varies by country. Asia needs to move fast if it wants to be a leader in the low-carbon revolution. Competition for low-carbon technologies is picking up in Europe and in the United States (US) as the private sector and governments start to proactively promote clean technologies. Asia has the skills, labor, technology base, and entrepreneurship to lead the low-carbon revolution. Asia’s private sector can seize the opportunity to lead the revolution of decarbonization just as it has seized the opportunities in the race for globalization.

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1 Please send comments to Paul Steele, UNDP Regional Centre, Bangkok.

2 Defined below.

3 Discussed further below.

But Asia's dynamic private sector needs governments to provide the enabling framework and incentives to make this happen.

In terms of adaptation and the crucial role played by ecosystems, almost all indicators of this aspect of green growth are moving in the wrong direction. Asia-Pacific, like the rest of the world, is pursuing economic growth by liquidating its natural resource base. This will not only undermine the long-term economic growth potential, but also reduce the adaptability to extreme weather events of the poor, who tend to be already more vulnerable to climate change than any other groups in society. As their poverty and welfare is often strongly affected by and dependent on the surrounding environment and natural resources, these "environment-poor" people will be especially vulnerable to climate change.

Evidence suggests that, on the one hand, climate change is likely to contribute to ongoing migration from rural to urban areas. On the other hand, however, there will be some people—the poorest of the poor and the most vulnerable—who lack the skills, networks, and ability to move away from rural areas. This dynamic transformation in mobility and immobility across different segments of populations requires support for those left behind, such as efficient and reliable remittance services and facilitating off-farm incomes, in order to reduce their dependence on an already distressed rural environment.

At the same time, while climate-induced migration may offer some initial escape to poor households from rural climate vulnerability, it is also likely to give rise to a new set of risks in urban areas directly through exposure to sea level rise and extreme weather events, but also indirectly through vulnerability to climate-induced food price rises and climate-induced vector-borne diseases.

In the face of high uncertainty in the extent of the impact and likely multi-dimensional consequences associated with climate change, the concept of green growth becomes all the more important. Green growth can address climate mitigation and adaptation together by enabling urban settlements that have lower carbon emissions per capita, reduced vulnerability to sea-level rise and greater security from climate-induced food price impacts and health impacts. In rural areas, new technologies for food production for the cities will be crucial in the face of climate ravages, and social protection and facilitated remittances will need to be provided to the chronic environment poor who remain in rural areas.

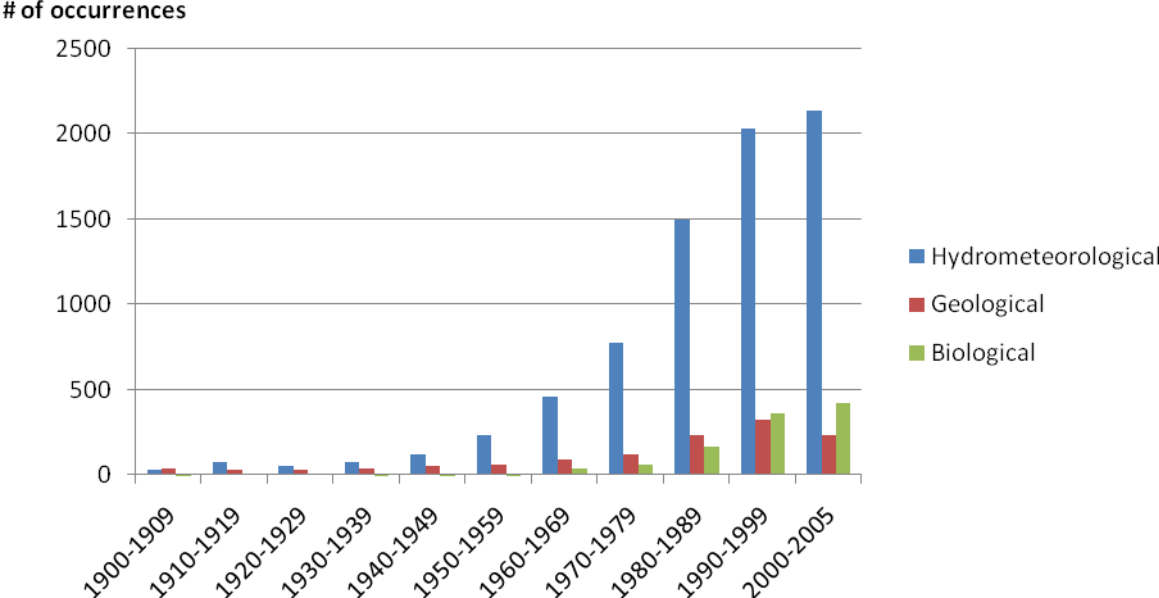
These actions to operationalize green growth will require funds, and for low-income countries some transitional support will be required. The international community will need to agree in December at the Copenhagen Conference of Parties of the United Nations Framework Conference on Climate Change (UNFCCC) to provide significant funds for developing countries to make the transition to green growth to address climate change. This is best achieved by raising funds from internationally coordinated mandatory levies (e.g., on bunker fuels or currency transactions according to the so-called Tobin tax) and then using agreed criteria to allocate these funds into the public budgets of eligible countries swiftly and with minimum bureaucracy. This will ensure that Asia and the world collectively move toward green growth as quickly as possible. However, despite its role as one of the leading centers of trade, Asia-Pacific's leaders have not fully contributed to the debate. If the PRC's currency eventually becomes a reserve currency like the dollar, the PRC's leaders need to develop and articulate a position on the Tobin tax and other pressing financing issues. This paper seeks to contribute to this debate in the Asia-Pacific context.

## Green growth and climate change: Some definitions

The term "green growth" is now widely used by policy makers. While it has many possible interpretations, in this paper, it is used to refer to making fundamental reforms in society both to

minimize the impact of economic activities on the environment, especially in relation to climate change, and to maximize the resilience to adapt to climate change. The concept of green growth has long been discussed in relation to general economic growth and decoupling environmental damage from economic activity (see, for example, Daly 2005, or Lawn and Clarke 2008). This partly contributed to the trend that, until recently, the focus of climate change responses was largely on mitigation of the effects of climate change. However, the already visible threat of climate change gives significant impetus to the formulation of the green growth concept, which holistically addresses both climate change mitigation and adaptation. Available evidence suggests that disasters are increasing in numbers and intensity, and causing significant damage to the current generation of the planet’s inhabitants, particularly in Asia-Pacific (Figure 1).

**Figure 1: Distribution of natural disasters, 1900–2005 (by decade)**



Note: Reproduced from data from the United Nations International Strategy for Disaster Reduction (<http://www.unisdr.org/disaster-statistics/occurrence-trends-century.htm>).

As evidence accumulates, there has been growing understanding that ecosystem goods and services act as nature’s “infrastructure” that underlies not only economic growth but also the ability of countries to adapt to a changing climate. The concept of green growth therefore embraces the promise of delivering continued prosperity while reducing the strains on natural environment and maintaining an ecosystem that helps build resilience to climate change.

The ongoing economic crisis poses new challenges, yet it can be taken as an opportunity for “green recovery.” Economic downturns in general have both positive and negative environmental impacts. While slumped economies reduce the overall burden on natural resources with fewer emissions, the policy response of promoting economic activity may mean that environmental safeguards are overlooked in favor of increased investment and production. In the current crisis, the return of migrants to rural areas may increase some pressure on natural resources.

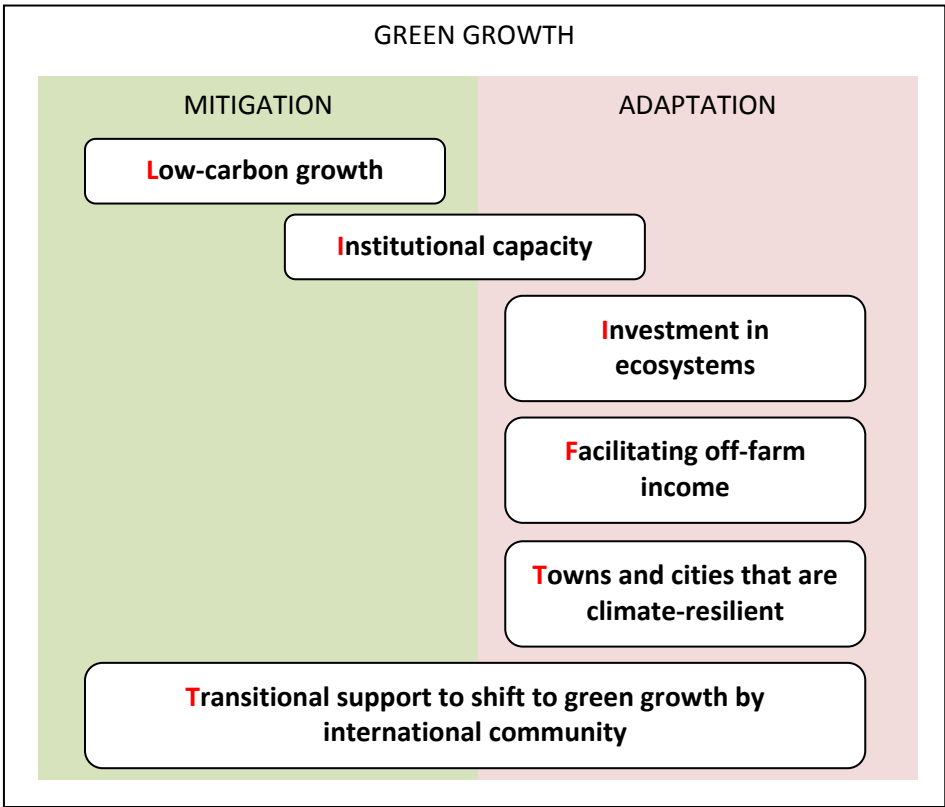
Whether the governments in Asia-Pacific take the path to return to business as usual after the crisis or to perceive this as an opportunity for reform has profound implications for the achievement of green growth. For attaining such growth, it is imperative that the recovery from the current crisis makes a diversion from the existing economic growth framework, in which economic growth comes only at the

expense of natural resources, and takes a radical detour to a low-carbon-growth model or what could be termed “a low-carbon revolution.” The People’s Republic of China (PRC), for example, has made initial progress in this direction, and it has been estimated that 20–30% of the PRC’s huge fiscal stimulus package of over \$500 billion is focusing on low carbon production. The challenge is how to ensure that the remaining 70–80% of the stimulus package in the PRC and those elsewhere does not simply promote the old-fashioned ecosystem liquidation model of economic growth.

## Operationalizing green growth for climate change mitigation and adaptation

Operationalizing green growth is presented according to the LIIFTT framework (Figure 2), which presents some of the most important elements for achieving climate resilient development: Low carbon growth; Institutional reform; Investment in ecosystems and agriculture; Facilitation of rural and off-farm migration; Towns and cities that are climate-resilient; and Transitional support to shift to green growth by the international community.

**Figure 2: LIIFTT framework**



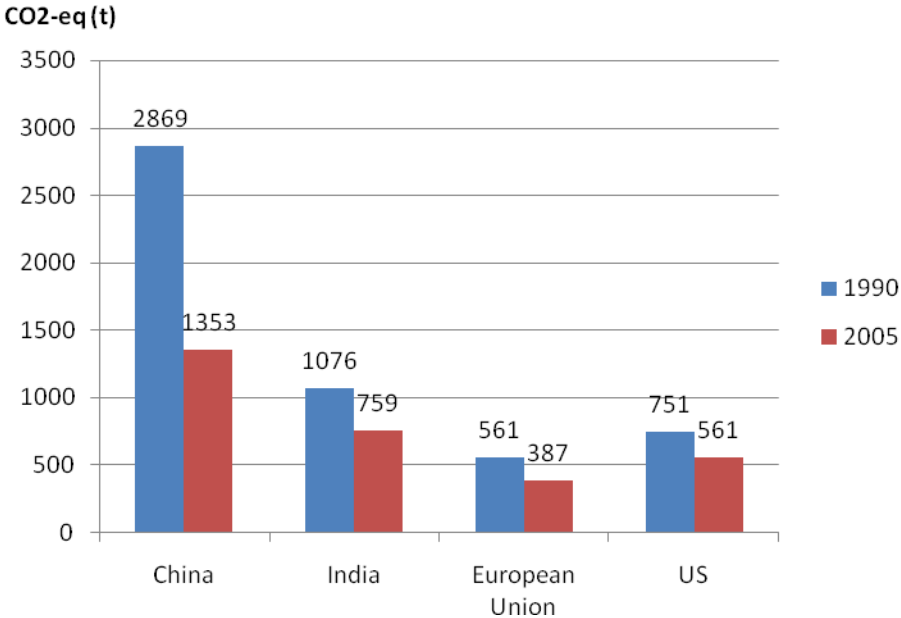
### Low-carbon growth: incentives and targets

Climate change, typically viewed as a threat, presents an opportunity for Asia-Pacific to lead the next industrial revolution as the world shifts to a low-carbon economy. Just as the United Kingdom (UK) dominated the world in the 18th century after it established its lead in the industrial revolution based on fossil fuels, Asia-Pacific could dominate the world’s politics and economics in the future by leading the

next shift away from fossil fuels toward low-carbon emitting fuels and technologies. This shift to a low-carbon economy will not only help to avoid long-term climate impacts, it will also create demand for new technologies and open new markets.

Switches to low-carbon economy in Asia-Pacific show some positive signs. Carbon emissions per unit of economic output are falling globally, with the PRC showing the fastest falls (Figure 3). This is partly because the PRC is still very energy intensive per unit of output due to large dependence on manufacturing and heavy industry, frequently using older technologies. Carbon intensity will also decline as the services sector grows and heavy industry declines. In other export-oriented economies such as Japan and the Republic of Korea, similar trends are observed, though to a lesser extent, as the private sector responds to opportunities and incentives to gain a comparative advantage in a competitive market.

**Figure 3: Greenhouse gas emissions per unit of gross national product**



Notes: Excludes land use emissions. US\$ in year 2000 from the Climate Analysis Indicators Tool, World Resources Institute.

The PRC already leads the world in many low-carbon technologies and the opportunities are increasing through strong policy signals. Investments there in clean energy technologies grew from \$170 million in 2005 to \$420 million in 2007 (UNEP 2009). The PRC is now the largest producer of solar water heaters and produces 80% of the world’s energy-saving lights. Its renewable energy sector produces output worth \$17 billion and employs a million people (UNEP 2009). These achievements have been encouraged by policy signals with targets for energy efficiency, renewable energy, and a focus on major industries.

In other countries, however, the shift to low-carbon has been slow and will likely be achieved through reforms for a more efficient and market-oriented economy. In countries that are less export-oriented, low-carbon export opportunities provide less incentive to move to low-carbon technology and economy. For example, India and Pakistan, whose industry is typically less efficient and more focused on the domestic market than the PRC’s, has been slower to move to invest in low-carbon technology.

However, total greenhouse gas emissions in Asia are predicted to more than double over the next 20 years as its economies continue to grow, undermining progress in reducing carbon intensity per unit of gross national product. Under business-as-usual assumptions, economic growth (and accompanying increases in energy use) will continue to drive up emissions more than offset the efficiency gains in carbon intensity. For example, energy consumption in the PRC is currently growing at 12% a year (UNEP 2009), while production in the PRC is estimated to grow by 400% to 2020. This would significantly outweigh the PRC's 4.9% annual average decline in carbon intensity.

In the PRC and elsewhere, there are a number of ways to radically shift to a lower energy and carbon intensity, but they require major changes. Key changes include big increases in renewable energy generation and energy efficiency in industry, which is the largest energy user, as well as changes in household and transport energy patterns, whose share of energy demand will grow as the economy develops (Wang and Watson 2009).

Intracountry disparities compound the complexity of addressing climate change. National averages present a distorted picture in terms of the contribution to climate change. A recent study (Dodman 2009) compared per capita greenhouse gas emissions in 12 cities with their respective national averages and found that city dwellers in general have lower per capita emissions than the national average. The exception is the PRC, where the residents of Beijing and Shanghai had much higher per capita emissions than the national average. Their contributions to climate change were comparable to other megacities such as New York or London.<sup>4</sup> A similar study from Bangkok suggests that its per capita emissions (7.1 tonnes of carbon dioxide equivalent) are higher than its national average (4.3 tonnes) and as high as those from London or New York (BMA et al. 2009). This implies that many developing Asian cities, where public transportation networks are less developed, are likely to be contributing more than rural areas to climate change. This is in line with an estimate that cities are responsible for as much as 80% of total greenhouse gas emissions (Tibaijuka 2009).

**Table 1: Per capita greenhouse gas emissions from selected cities**

City	Total GHG emissions (million tonnes of CO2 equivalent)	GHG emissions per capita	National GHG emissions per capita	Per capita city emissions as percentage of per capita national
Shanghai (1998)	n/a	8.1	3.36 (1994)	241.1
Beijing (1998)	n/a	6.9	3.36 (1994)	205.4
Seoul (1998)	n/a	3.8	6.75 (1990)	56.3
Tokyo (1998)	n/a	4.8	10.59 (2004)	45.3
New York (2005)	58.3	7.1	23.92 (2004)	29.7
London (2006)	44.3	6.2	11.19 (2004)	55.2
Barcelona (1996)	5.1	3.4	10.03 (2004)	33.9
Glasgow (2004)	12.5	8.4	11.19 (2004)	75.1
Washington, DC (2005)	11.3	19.7	23.92 (2004)	82.4
Toronto (2001)	37.1	8.2	23.72 (2004)	34.4
Rio de Janeiro (1998)	12.8	2.3	8.2 (1994)	28.0
São Paulo (2003)	15.7	1.5	8.2 (1994)	18.3

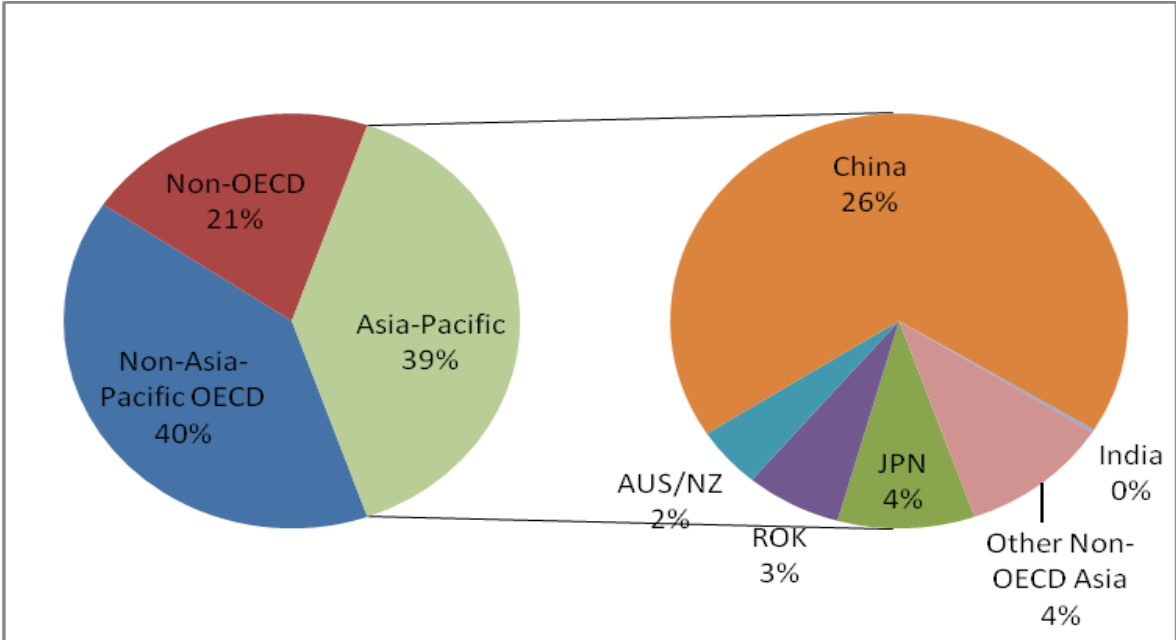
GHG = greenhouse gas.

Source: Dodman (2009).

<sup>4</sup> The methodology used for this study is still under development and disaggregating the level of contributions by city-dwellers from the rest of the country is both challenging and subject to several caveats.

Another study estimates that by 2030 there will be 1,126 million high greenhouse gas emitters with about 39% based in Asia-Pacific (Chakravarty et al. 2009).<sup>5</sup> This includes 300 million in the PRC compared to 267 million in the US. Since this study is based on estimates of emissions, the calculation shows surprisingly small contributions from India and therefore it warrants further work. Nonetheless, it reinforces the view that Asia-Pacific, especially a relatively small proportion of individuals, many of whom are likely to live in urban areas, will become an increasingly significant contributor to climate change in the next few decades.

**Figure 4: Distribution of high greenhouse gas emitters (world total = 1,126 million in 2030)**



Source: Chakravarty et al. (2009).

### Institutional reform for climate change and green growth

Climate policy needs to be led by the political and economic decision makers to determine a country’s approaches to both mitigation and adaptation to climate change and therefore set the path to green growth. Climate-sensitive planning and budgeting are needed to promote public investment in low-carbon technologies and climate-resilient infrastructure. As greenhouse gas emissions from households and the transport sector—“non-point sources”—gain relative importance as urbanization progresses, setting a proper institutional and policy framework will help make a smooth transition from a carbon-intensive to low-carbon economy. Many governments in Asia-Pacific have already established some institutional frameworks, such as National Adaptation Programs of Action, for climate. However, climate change is often perceived in isolation as “only” an environmental issue and so such programs’ frameworks are often led by the ministry of environment alone, which is relatively weak in setting a country’s policy.

<sup>5</sup> This is based on the assumption that the world total emission target is set at 30 gigatonnes of CO2 in 2030 and based on this target, the individual emission cap was set at 10.8tCO2. It estimated 1,126 million people will be emitting beyond this target.

It is essential that, in future, the climate institutional framework is led and coordinated by the president or prime ministers' office, ministry of finance, or ministry of planning. The PRC, India, and Indonesia are three countries that have made progress in institutional reform for green growth and climate change. The ministry of environment can still play an important role in providing technical inputs. The PRC has included climate under the leadership of the powerful National Development Reform Commission. In India, the Prime Minister's Council on Climate Change coordinates the cross-governmental strategy, while a similar role is played by the President's Office in Indonesia. In Indonesia, the United Nations (UN) has been requested to develop a joint UN program to promote green growth. Such initiatives enable governments to position climate change at the centre of the country's decision making and signal the level of commitment by the government to the private sector to stimulate further private investments in low-carbon or adaptation technology.

## Investment in ecosystems and agriculture

Most Asia-Pacific countries remain on a growth path that depends on converting ecosystems and natural capital, not investing in such capital. Natural capital is particularly important for growth in low-income countries, since it is estimated to account for 26% of the total wealth in there, 13% in middle-income countries, and only 2% in industrialized countries (World Bank 2006). In Cambodia, for instance, although agriculture represents only 31% of GDP, the sector employs 75% of the labor force. In India, the figures are 17.6% and 60%. Moreover, primary production represents a much higher share of production, exports, and national income in developing countries than in industrialized countries.

Within a country, particular groups of environment-poor people have their poverty especially linked to the environment and natural resources—especially those living in dryland, upland, coastal, or urban areas. These areas include the most marginal environments and Asia-Pacific is home to over half the 1.2 billion poor who live on fragile lands. These environment poor include 330 million people in South Asia and 469 million in East Asia and the Pacific (UNEP 2009). This compares with global estimates that 500 million people in developing countries live in arid regions without access to irrigation; another 400 million are on land with soils unsuitable for agriculture; 200 million are in slope-dominated regions; and more than 130 million live in fragile forest ecosystems (World Bank 2002). This concept of environment poor was developed by the Asian Development Bank and remains relevant for many low-income countries, and even middle-income countries such as Thailand and the Philippines (Box 1).

### **Box 1: Examples of environment-poor people in the Philippines**

An estimated two thirds of the Philippine population depends directly on natural resources for a living: the agriculture and fisheries sectors contribute 20% to GDP and directly employ about 40% of the labor force. Among these people, the poor rely most heavily on the natural environment to sustain basic livelihood needs. While poverty is geographically widespread in the country, its causes vary greatly. Poor people whose livelihoods are closely linked to their natural surroundings can be broadly divided into four types: upland poor, lowland poor, coastal poor, and urban poor.

**Upland poor:** Uplands, operationally defined as areas with a slope of 18 degrees or more, constitute 54% of the land in the Philippines. The upland poor, who are often the poorest of the poor in society, primarily consist of cultural or tribal communities, slash-and-burn shifting cultivators or *kaingineros*, and rice and corn farmers who have been forced to resettle due to inequitable land distribution and lack of security of tenure in agricultural areas. They are typically subsistence farmers, often with no alternative source of income. These farmers usually cultivate informally tenured land, have extremely limited access to infrastructure, markets, and social resources, and face high food insecurity due to the seasonal availability of crops.

**Lowland poor:** The lowland poor consist of landless agricultural workers and small farm owners and cultivators who own between one and three hectares. The landless have neither ownership nor farming rights and typically earn a living from the sale of labor either to plantations or smaller farms. While agriculture is the major source of income for the lowland poor, off-farm income opportunities, particularly seasonal migration to urban centers by household heads, play a role in household income.

**Coastal poor:** Approximately 62% of the country's population reside in coastal areas. Of the over 1 million fishing labor force, over 60% are engaged in small-scale and subsistence fishing. The majority of municipal fishers are poor with over 1 million Filipinos deriving a direct income from small-scale fishing. These fishers do not use boats, or use boats weighing less than 3 tons, operate in inland waters and marine waters within 3 miles of the coast, and receive low yields per unit effort.

**Urban poor:** Rapid urbanization in the Philippines, with more than 2 million people being added to the urban population annually, is putting constraints on the ability of the country to provide adequate infrastructure, social services, and suitable urban environment. Consequently, increasing numbers of urban residents are becoming squatters and slum dwellers living in poorly serviced communities. This in turn increases the vulnerability of the poor to the health impacts of air and water pollution. In Manila, tuberculosis incidence per 1,000 residents is 159 times higher in urban poor settlements than in the rest of the city. The World Bank estimates that in 2007 indoor air pollution–related morbidity cost society \$33 million; outdoor air pollution–related morbidity \$21 million; and water pollution, and poor sanitation and hygiene, \$450 million. In each instance, productivity loss was the largest category, indicating that environment-related health problems significantly impact the earning capacity and livelihoods of the poor (World Bank 2009).

Source: ADB (2009) and World Bank (2009).

These environment poor are also particularly vulnerable to climate variability, which will likely be exacerbated by climate change. Many people are already vulnerable to climate variability, and climate change will only magnify this vulnerability. Typically, those whose livelihoods that are the most natural resource–dependent will be most exposed to climate risks, while those that are the poorest will have the least ability to adapt.

Climate change will severely undermine availability of and access to food. It is estimated that climate change will reduce global production of wheat, rice, and maize by 9–11%, potentially increasing hunger<sup>6</sup> by 10–60% (Parry et al. 2009a). The relationship between climate change and food security depends on a number of biological, geopolitical, and socioeconomic factors. Food production is directly affected by the changes in temperature and precipitation and indirectly by water availability. FAO estimates (2008)

<sup>6</sup> *Hunger* here is used in a generic sense that includes both under-nourishment and malnutrition, according to the World Food Programme (see <http://www.wfp.org/hunger/faqs>)

that Himalayan snow and ice, which are a vital lifeline for 1.3 billion people who live downstream (Chhibber and Schild 2009), are expected to decline by 20% by 2030. Rainfed agriculture, which covers 61% of cultivated land in Asia, will be hit by too little or too much rain. Food prices are expected to rise with increases in temperature. Changes in availability of and accessibility to food will have an immediate, dire impact on the vulnerable who have least financial and institutional resources to avert such an external shock. Green growth strategies need therefore to address the provision of effective social safety nets through better-targeted food security systems or conditional cash transfers as well as the transfer of new technologies for food production and abatement of climate risks.

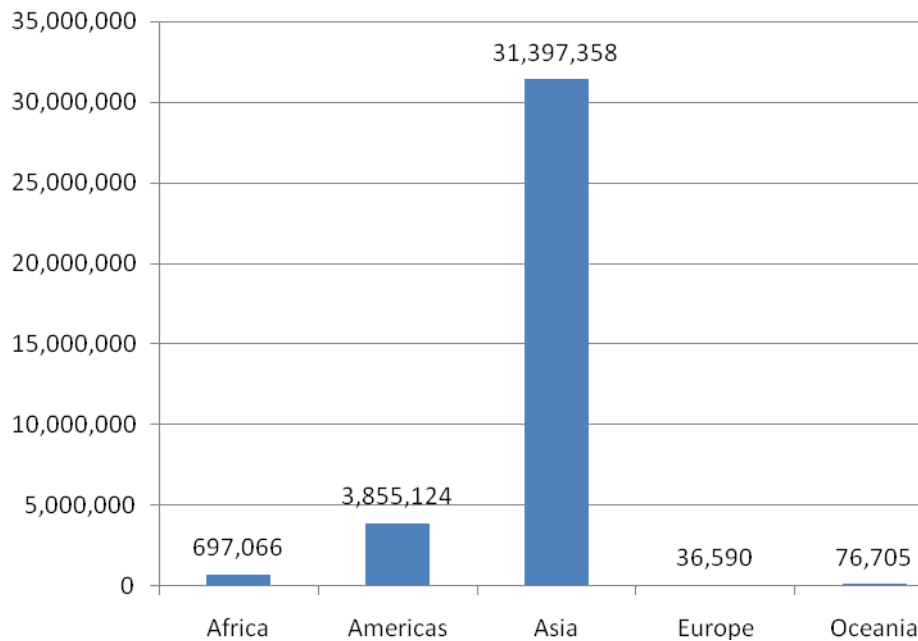
## Facilitation of rural and off-farm migration

Although many poor people live in rural villages, their incomes are not always from agriculture and natural resource-based sources. It has been estimated that off-farm incomes provide up to 30% of incomes for rural dwellers in many countries. In many cases, people live off money sent as remittances from relatives in urban areas or abroad. In some of the most environmentally vulnerable, impoverished locations—from the rural townships of South Africa to the drylands of Pakistan—it is the women and elderly who are left behind with the children when the men depart for better incomes. In other cases, the state may be providing significant income transfers to rural areas.

This trend to off-farm incomes is likely to increase. While natural resources may in some places and for some people currently be both the largest capital asset and the major source of income, will they always remain so? The present dependence of the poor on natural resources is rarely the most reliable indicator of what the future will look like. Out-migration may still offer the best route out of poverty, especially in environmentally vulnerable areas.

Estimates of climate migration are hard to predict, but climate variability has historically driven population movements. While climate and migration is an emotive topic, evidence suggests that migration away from rural areas will only increase with climate change (Brown 2007). The Norwegian Refugee Council (2009) estimated that 20 million people were displaced in 2008 due to climate-related disasters, and Asia was by far the most affected region in the world (Figure 5).

**Figure 5: Total displaced and evacuated in 2008 by sudden-onset disasters**



Note: Figures include non-climate-change related disasters. Climate-related disasters account for 56% of the total.

Source: Norwegian Refugee Council (2009).

Past evidence suggests that behind all those refugees and migrants are always people—usually the very poor and vulnerable—who do not have enough resources, networks, or capacity to move (Tacoli 2009). As noted earlier, the rural poor are already dependent on fragile, less-productive environments on which they subsist. This underscores the importance of not only investments in the ecosystem as insurance for climate change adaptation, but also establishing a framework that facilitates off-farm incomes for those left behind. Some measures include investment in human and physical capital to increase their opportunities and establishment of more reliable and efficient remittance system, government social safety nets, or migrant workers’ unions.

### Climate-resilient towns and cities

Half the world’s population now lives in cities (UN-HABITAT 2008). By 2050, in developing countries, urban dwellers will likely account for 67% of the population and Asia is at the forefront of urbanization. More than half of the world’s large cities (with a population of more than 1 million) are in Asia (United Nations 2008). This, coupled with an added inflow of migrants to cities due to climate change, will pose yet another set of challenges in, and therefore a compelling reason for, attaining green growth.

The first of these challenges centers on the fact that urban areas and Asian cities will need to have their high vulnerability to climate change reduced. Six of Asia’s 10 megacities—Bangkok, Jakarta, Manila, Mumbai, Shanghai, and Tokyo—are located on or near the coast. The PRC has 40% of its population, 60% of its wealth, and 70% of its largest cities in coastal areas (Brown 2007). In the Philippines, sea-level rise poses a significant threat as 70% of the country’s municipalities are along the coast (World Bank 2009). About 81% of the population is vulnerable to natural disasters and some 85% of the Philippine \$86 billion annual GDP is endangered, as it is located in risk areas. Nicholls et al. (2008) estimate that by

2070, globally, assets worth \$35,000 billion, or 9% of projected global GDP, will be at risk from the combined effect of climate change, subsidence, population growth, and urbanization.

Second, cities and urban populations may become exposed to climate increased disease vectors such as malaria and dengue. Due to climate change, urban populations that have not been exposed before will now face these health risks and this need to be planned for and prepared.

Third, cities have often benefited from support programs for food security and nutrition and this will need to continue if climate change pushes up food prices. The last few years has seen the impacts of rapid rises in food prices and accompanying political pressures. Traditionally “urban bias” by policy makers has led to food subsidies for urban populations (Lipton 1977). Many of these support programs had been dismantled over the last decade, but were reintroduced in the recent food price shocks. There is a need to review the effectiveness of such programs and how they can be made financially sustainable if climate change leads to increased food prices.

## Transitional support by the international community to shift to green growth

A key dilemma in the current financing debate is the need to avoid perverse incentives. There is currently a dichotomy between those who want adaptation costs to be separate as a liability or compensation by the rich world to the poor world versus the need to truly internalize the costs of adaptation into every decision and process. Clearly that latter approach will be cheaper, but fairness and the “north versus south” negotiating forums are pushing for the former stance. This tension needs to be urgently resolved. The danger is that a standalone approach to adaptation financing will create the kind of tensions that arose with standalone health funds for HIV/AIDS, etc., which undermined incentives to invest cost effectively in overall health systems.

A second danger is that a focus on standalone financing will lead to an attempt to separate development from climate adaptation spending. There is clear evidence that poor people and poor countries are more vulnerable to climate change because of their poverty. So any investment that reduces poverty will reduce climate impacts. The Asian Development Bank has recently demonstrated that expenditure on female education is not only good for poverty reduction but is also vital for climate adaptation.

While there is a need to see adaptation investments on a continuum from general development to specific climate-related investment, the costs of climate-resilient development will in the short run be higher than general development costs. There is little doubt that development will be more costly with a changed climate. While there are many difficulties and limitations in estimating the exact cost of adapting to climate change in various emissions and temperature increase scenarios, all the available indicative estimates suggest that adaptation costs in developing countries will be in the order of tens of billions of dollars.

Evidence is still being generated on the financing needs for adaptation. Recent research (Parry et al. 2009b) suggests that the costs of adaptation may be comparable to the costs of mitigation and possibly much higher. This is an added argument for mitigation, but it is also a wake-up call to think through what these adaptation costs will be and who will bear them. This research suggests that global adaptation costs could be two or three times as high as previous United Nations Framework Convention on Climate Change (UNFCCC) estimates of \$49 billion–171 billion a year, say in a range of \$100 billion–\$425 billion a year (Parry et al. 2009b). This compares with similar costs of mitigation of \$200 billion–210 billion a year by 2030 (by UNFCCC 2007) and \$400 billion–1,100 billion a year by 2050 (by IEA/OECD 2008). The UNFCCC and more recent estimates of the costs of adaptation focus only on the additional

cost of climate change so they do not include the cost of adapting to current climate variability, which is itself likely to be over \$100 million (Parry et al. 2009b).

While there is growing evidence of the high costs of adaptation, there are also few incentives for the private sector to bear these costs, unlike mitigation where the private sector is now making massive investments in the context of new regulatory and public action. These additional costs of financing are not only a moral demand of developing countries; they can also demand them as a legitimate payment to encourage developing countries to reduce their own emissions. Unlike traditional overseas development assistance (ODA), which is essentially a voluntary decision by industrial countries, for climate financing, developing countries can (and are) demanding this as a pay-off to ensure that they also reduce their emissions. So climate financing is no longer a voluntary donation to developing countries but a payment in receipt of reduced emissions. This is why developing countries are demanding that climate financing, unlike traditional ODA, is a guaranteed stream of payments.

Various schemes are being discussed to provide such guaranteed financing. These include voluntary contributions from governments, as well as different international levies on, for example, currency trading, as in the Tobin tax (see below). The UK and other governments are starting to make commitments on voluntary contributions for climate finance. While this is needed to get the debate started, the danger is that as all government funds are fungible, it is impossible to ensure that such funds are truly “additional” and do not implicitly reduce the existing aid budget. For this reason, levies paid by consumers and producers rather than provided by national governments would seem preferable, as they avoid the aid fungibility problem and they are not subject to the political, commercial, and other conditions that have bedeviled the aid industry.

One emerging source of levies is on bunker oil, which is used in shipping and airlines, particularly as both remain unregulated under the Kyoto Protocol. Shipping produces around 3% of total man-made carbon emissions and is equivalent to the total emission of Africa. Only six countries produce more greenhouse gases than international shipping. A carbon tax on emissions of US\$20/tonnes of CO<sub>2</sub> equivalent would generate annual revenue of about US\$17 billion a year based on 2007 data. A similar tax on airlines could raise US\$25 billion a year.

Another option gaining ground is a levy on the sale of currencies which was first proposed in 1971 by the Nobel Prize-winning American economist, James Tobin. This proposal was intended to reduce currency market fluctuations and various uses have been proposed for the revenues raised, with climate as the latest suggestion. Such an approach could help resolve the need for climate funding while improving financial management in the context of the economic crisis. The Tobin tax is consistent with the economic logic of taxing global “public bads” such as currency speculation to finance global public goods such as a low carbon economy and climate resilient development. A charge of 0.005% on global currency transactions could raise an estimated \$30 billion–50 billion, while a charge of 0.01% on transactions could raise an estimated \$100 billion a year. In the short run, given the need for swift implementation, the International Monetary Fund could facilitate the tax, while longer-term management arrangements are worked out.

So far the Tobin tax approach has been supported by a wide and growing list of politicians from across the political spectrum, including Angela Merkel (Chancellor of Germany), Nicolas Sarkozy (President of France), Luiz Inácio da Silva (President of Brazil), José Manuel Barroso (European Commission President), and Christina Fernández de Kirchner (President of Argentina). It has also received support from George Soros (financier and philanthropist) and Adrian Turner (Chairman of the UK Financial Services Authority). The Tobin tax approach was proposed by Angela Merkel in the run up to the G20 Pittsburgh meeting but was not agreed to by the EU. Nicholas Sarkozy proposed the approach in his speech to the UN General Assembly at the end of September. The UK Prime Minister voiced his support at the meeting of G20

finance ministers on 6 November. However, despite its role as one of the leading centers for trade, Asia-Pacific leaders have not fully contributed to this debate. If the PRC currency eventually becomes a reserve currency like the dollar, then PRC leaders need to develop and articulate a position on the Tobin tax.

The advent of new sources of guaranteed financing for climate resilient development, which will likely dwarf traditional flows of ODA, also provides a once in a generation opportunity to learn from the shortcomings of the aid business and put in place new models of aid delivery. In a new context where developing countries can demand guaranteed funding, these developing countries then can demand to have these funds delivered as they want without many of the supply driven modalities of traditional aid such as intermediaries institutions with unreasonably high transaction costs and unfair conditions such as tied aid.

These kinds of reforms are already emerging in the context of the globally agreed Adaptation Fund and to a lesser extent, the management of funds pledged by the G8 which are showing a much more equitable representation of developing countries in the governance of such funds. This is just a sign of the changes which will arise, leading eventually to a much more radical set of governance arrangements where developing countries ultimately control how funds are used—the reverse of the current aid business.

The most effective way to provide the finances is to allocate fair shares to each country as an annual lump sum payment and then allow the countries to decide how they want to program the funds. In some cases, they may require traditional aid bureaucracies such as development agencies to provide technical support, in others cases they may choose to program the funds through existing government, civil society, or private sector channels. Such “direct access” to climate financing will ensure that development agencies must become more demand driven and competitive otherwise they will no longer be viable. This will essentially be the end of the traditional aid business as we have known it over the last 65 years since the advent of the UN and Bretton Woods institutions.

Even with direct access to a pot of guaranteed global funds, there will still remain the challenge of determining a fair allocation of funds for each country. This will no doubt require considerable debate and deliberation. While it is not possible to predict the final formulas, it is possible to suppose that some set of formulas will be developed using criteria to determine the extent of expected adaptation costs which would include indicators such as population, income, and other measures of climate risk.

Once the funds are allocated to countries, the best option to incentivize effective use of the funds is to provide the external adaptation funds to be part of each country’s formal budget process. Essentially, external funds can be thought of as external “tax revenue,” only this time the tax is raised internationally rather than domestically. So as with any fiscal revenue, the funds should then be captured in the national budget process. The formal budget process is where accountability for government spending decisions takes place, and indeed, one of the major problems with past environment financing such as the Global Environment Facility and the Clean Development Mechanism is that they have been off-budget. So while budget processes are far from perfect, they are the best attempt each country has to be accountable to its citizens for public finances.

By contrast, any attempt to impose external conditions on adaptation financing has at least four drawbacks:

- It will replicate the shortcomings of ODA which has created accountability to the donor rather than the citizens and ignored the fungibility of external financing, which is why development agencies are now promoting budget financial support (into the national budget) and public financial management.

- It would replicate the shortcomings of the Global Environment Facility approach with high transaction costs in time and money in terms of monitoring and approvals, etc.
- It will replicate the shortcomings of National Adaptation Programs of Action in encouraging adaptation “projects” while the objective is instead to include the additional cost of adaptation across the public and private investment portfolio.
- It would replicate the shortcomings of vertical funds for HIV and other global health issue (which are now clearly shown to have distorted health funding priorities) by not promoting systemwide improvements to cope with adaptation.

So, based on emerging good practice in development financing, the least-bad option seems to be to provide the adaptation funds to the public budget, with “no strings attached.” It seems that the real challenge will be to overcome all the vested interests who want a role in managing these adaptation financial flows, such as other national governments and development agencies. It would seem that this is where the efforts should be—on demonstrating the clear economic, environmental, and governance rationale for providing funds directly to government budgets with no external conditions other than support for effective public financial management as provided by existing international support.

## Conclusion

Countries in Asia-Pacific face different threats from climate change. In the Himalayan nations of Bhutan and Nepal, one of the immediate and urgent threats from climate change is glacial-lake outburst floods. In many Pacific nations, it is sea-level rise that determines the very existence of the nation. In some emerging economies, it may be the combination of shifting patterns in production and urbanization and their associated impacts on socioeconomic development. Thus, each country will necessarily take different paths to building resilience to climate change and green growth. Using the LIFFT framework, which embraces some of the common elements that are essential to achieving green growth, this paper has presented some opportunities and challenges that confront countries in Asia-Pacific—and how they can play a leading role in the discussions on the green economy, climate change, and the future of aid.

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